



**Orari-Temuka-Opihi-Pareora
Water Zone Committee**

Zone Implementation Programme Addendum

DECEMBER 2018

FOREWORD

There's no doubt that huge change is coming to the agricultural sector to meet community and Government expectations to better manage environmental impacts on our waterways.

The recommendations we have put forward provide a path towards meeting these expectations, in a sustainable way, for our whānau, businesses and the environment. As a committee, we know these recommendations may go too far for some and not far enough for others – it has been a balancing act and we have considered feedback across the spectrum.

The ZIPA outlines more than 100 recommendations to councils and stakeholders. Priorities include the provision of safe drinking water, protecting mahinga kai and sites of cultural significance, protecting native plants and their habitat and maintaining a reliable source of water that contributes to the economy.

One of the ways we hope to reduce the impact of land use on our waterways is supporting farmers to move to Good Management Practices. This will be especially important to address nutrient, *E. coli* and sediment issues in the Temuka Freshwater Management Unit and nitrogen hotspots we have identified.

Farm Environment Plans need to be comprehensive, a prompt for continuous improvement and independently audited. Farmers need evidence that they are doing the right thing. On top of this, our cities and towns will be expected to manage water and land in a sustainable way that complements other efforts within the zone.

Catchment Groups will be important drivers to achieve change. It will be up to these local groups to be aware of the challenges in their water catchment area and drive actions that make a difference.

A huge thank you to the team who have allowed the Zone Committee to get this point: the late Mandy Waaka-Home, former chairs John Talbot and Dermott O'Sullivan, past zone committee members and also Kylee Galbraith, Ad Sintinie and James Pearse, who kindly remained on the committee until the conclusion of the ZIPA. Plus, the many people who have supported Catchment Groups, working parties, public consultation meetings and kindly provided feedback on our drafts. Your voice has been heard.

Our recommendations, which are both statutory and non-statutory, do require buy-in from our landowners, our local councils and our communities - whether they be urban or rural. We hope you will join us as we take this important step towards healthier waterways for our future generations.



Hamish McFarlane

CHAIR, ORARI-TEMUKA-OPIHI-PAREORA WATER ZONE COMMITTEE

Orari-Temuka-Opihi-Pareora Zone Committee

The Orari-Temuka-Opihi-Pareora Water Zone Committee is a joint committee of the Timaru, Mackenzie and Waimate District Councils and Environment Canterbury. The Committee is made up of local residents – the members who contributed to the ZIPA are:

John Talbot (Former Chairman)

Hamish McFarlane (Chairman)

Herstatt Ulrich (Deputy Chairman)

Phil Driver

Kylee Galbraith

Ivon Hurst

James Pearse

Ad Sintenie

Glen Smith

Mark Webb

The late Mandy Home – Te Rūnanga o Arowhenua representative

John Henry – Te Rūnanga o Arowhenua representative

Sue Eddington – Te Rūnanga o Waihao representative

Richard Lyon – Councillor, Timaru District Council

Anne Munro – Councillor, Mackenzie District Council

David Anderson – Councillor, Waimate District Council

With support from:

Technical support has been led by the planning and science sections of Environment Canterbury, with support from Timaru, Mackenzie and Waimate District Council staff.

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1.0 PURPOSE

This document is an ‘Addendum’ to the Zone Implementation Programme (ZIP) developed by the Orari-Temuka-Opihi-Pareora (OTOP) Zone Committee. The Zone Committee is a partnership between Papatipu Rūnanga (Te Rūnanga o Arowhenua and Te Rūnanga o Waihao) Canterbury Regional Council (Environment Canterbury) and Timaru, Mackenzie and Waimate District Councils. In addition, its membership includes community members from the local urban and rural communities.

This document contains statutory and non-statutory recommendations to contribute to the sustainable management of freshwater resources in the OTOZ Zone and contains recommendations to protect and enhance cultural values and biodiversity in the zone.

The Zone Committee is focused on collaboration and has sought to reach decisions by consensus. However, in developing these recommendations, the zone committee hasn’t always been able to agree, and where consensus could not be reached, it has been noted.

2.0 BACKGROUND

2.1 ZONE DESCRIPTION

The OTOP zone is bordered by the Rangitata River in the north and the Pareora River in the south, the Pacific Ocean in the east and inland towards the Main Divide in the west. It includes the Orari, Temuka, Opihi, Opuha, Te Ana Wai, and Pareora rivers and their tributaries, Lake Opuha and the Opuha Dam. The OTOP Healthy Catchment Project boundary covers most of the OTOP zone but excludes the hill fed tributaries which feed directly into the Rangitata River (Map 1).

The zone lies within the rohe of Te Rūnanga o Ngāi Tahu, and the takiwā of Te Rūnanga o Arowhenua and Te Rūnanga o Waihao. All waterbodies in the zone are of cultural, spiritual and historical significance to Ngāi Tahu; they are considered taonga, or treasure, left by the ancestors to sustain life. Water as a resource is viewed holistically according to the principle of ki uta ki tai (from the mountains to the sea) and as such must be managed in an integrated and collaborative way, acknowledging the connections between water quality and water quantity, precipitation, surface water, ground water, land use and the coast.

The recommendations in this addendum are for the area encompassed by Section 14 of the Canterbury Land and Water Regional Plan (LWRP). During the community phase of the development of recommendations the term “OTOP Healthy Catchment Project area” was used. The OTOP Healthy Catchments Project area was extended beyond the Section 14 area to include Lyalldale and Springbrook at the south of the Zone and extended to the Rangitata River in the north of the Zone.

2.2 ZONE IMPLEMENTATION PROGRAMME

Developed in 2012, the ZIP gave voice to the direction and intent of the Zone Committee to develop a local strategy for the management of water resources within the OTOP zone. This addendum builds on that initial work. With leadership from the Committee, much non-statutory work has already been undertaken in the zone. This includes the introduction of Catchment Groups, with support from Landcare Trust and the Sustainable Farming Fund, and the development of the Waitarakao/Washdyke Task Force, which arose due to the Committee’s desire to address the complex issues in this important waterbody.

The recommendations set out in this addendum are an integrated package, developed in collaboration with Papatipu Rūnanga, the community and other stakeholders, and with technical input from Environment Canterbury. The collaborative process has included workshops, community meetings and field trips, along with many presentations to the Zone Committee from stakeholders and other interested parties. The ZIP, and the technical information informing the recommendations in this addendum, are available at www.ecan.govt.nz.

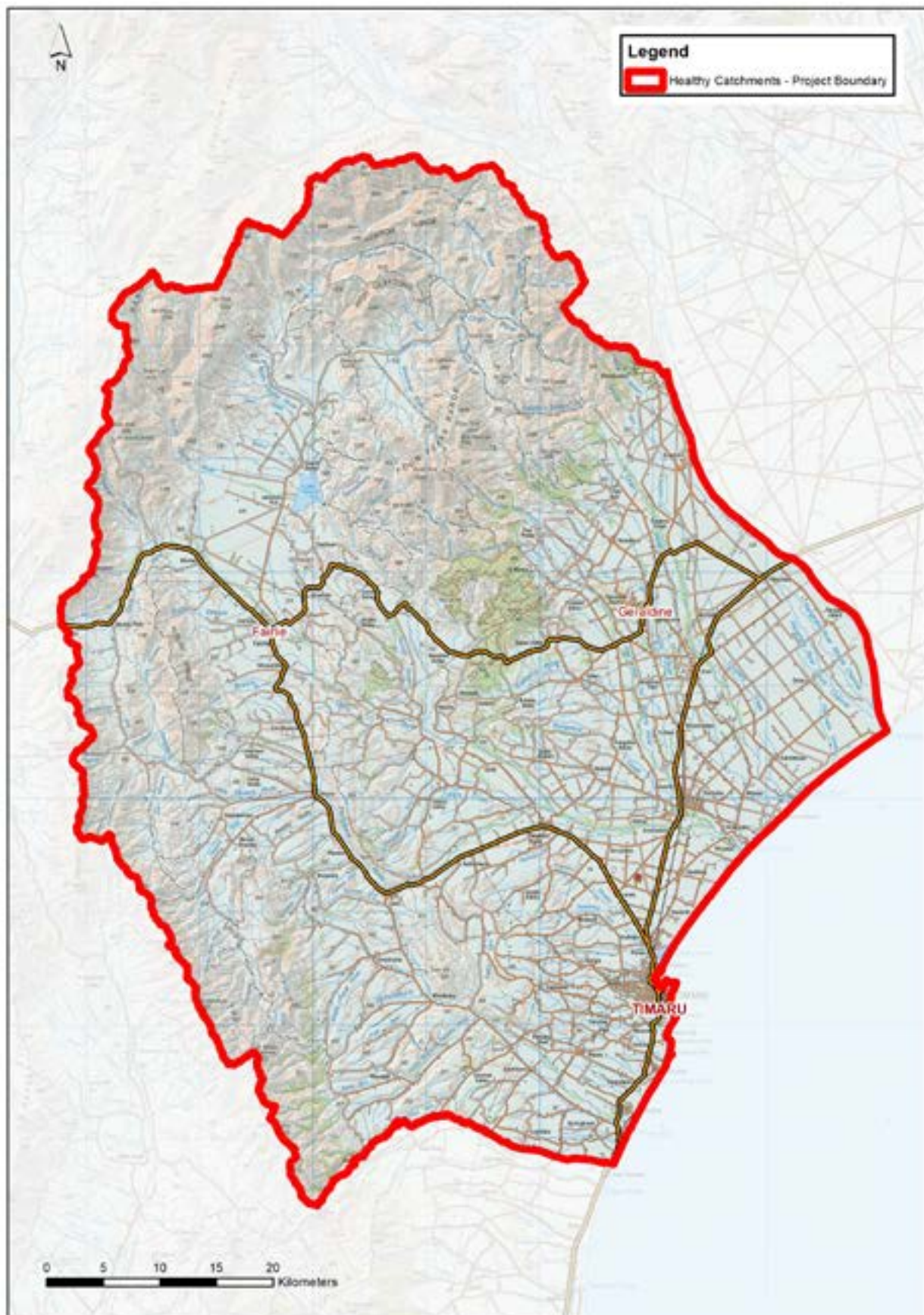
2.3 COLLABORATION

Catchment Groups

Following development of the ZIP, further community input and ownership of water management were recognised as key to success within the zone. The Committee felt that catchment groups could provide a vehicle for this, and worked with NZ Landcare Trust, who led their establishment and coordination with a grant from the Sustainable Farming Fund. The role of the catchment groups is to undertake and support sustainable land and water management in their area. Their broad objectives are to encourage environmental stewardship, support and sustain resilient catchments, and to work towards a positive future for those that work and play here. Membership of catchment groups covers a wide range of interests, including recreation, agriculture and the environment, with many members having interests in more than one of these areas.

There are now eight catchment groups in the OTOP zone, and they have played a key role in the Healthy Catchments Project, working with the Committee and supported by industry. Catchment groups presented to the Committee on the key issues and their recommendations for each of their catchments. These presentations are available at www.ecan.govt.nz. The Committee acknowledge and appreciate the contribution of the catchment groups and recognise their role in developing this ZIP addendum.

MAP 1: ORARI-TEMUKA-OPIHI-PAREORA HEALTHY CATCHMENTS PROJECT AREA



Farmer Reference Group

A Farmers' Reference Group was established in mid-2017 to support Zone Committee solution seeking on options to reduce contaminant losses on farm. The Group has a membership of lead farmers, zone committee members and industry representatives. It has provided robust investigation into the costs and benefits of mitigations to further reduce nitrogen losses, beyond those expected from the adoption of Good Management Practice. The Group has provided valuable information that will continue to be used in future decision-making. The Committee recognise this, and welcome further input from the Group along with their contribution to economic assessment within the zone.

2.4 DRIVERS FOR CHANGE

National Policy Statement for Freshwater Management 2017

The National Policy Statement for Freshwater Management 2017 (NPS-FM) sets the direction for freshwater quality and quantity management in New Zealand. Regional councils are obligated under the Resource Management Act 1991 (RMA) to give effect to the requirements of the NPS-FM when developing statutory plans and plan changes. The NPS-FM requires freshwater quality to be maintained (where it is of good quality) or improved over time (where it does not meet the requirements of the NPS-FM), and includes a national objectives framework for achieving this. The NPS-FM also requires engagement with iwi, hapū, and community in setting freshwater outcomes, and is enabling of different methods and timeframes being set. It is on this basis that the freshwater outcomes and timeframes in the recommendations have been made by the Committee.

Freshwater Management Units (FMUs)

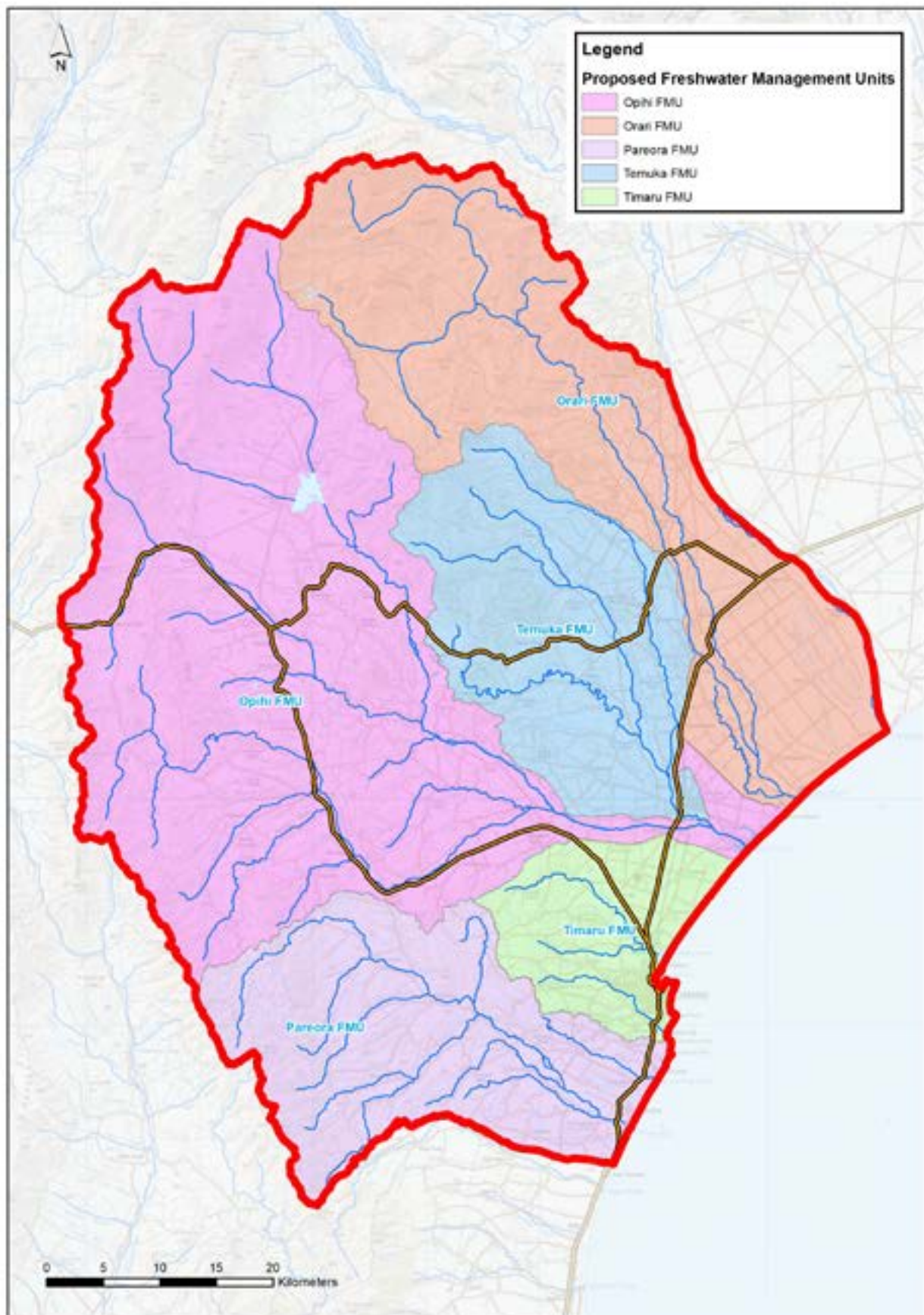
In managing freshwater quality and quantity, the NPS-FM requires that Freshwater Management Units (FMUs) be defined. FMUs may encompass either single or multiple freshwater bodies and are defined at an appropriate spatial scale for setting freshwater outcomes and limits for managing water quality and quantity (discussed below).

The Zone Committee considered three options for setting FMUs ranging from two broad FMUs through to dividing the zone up into 15 FMUs. The Zone Committee have recommended six FMUs (Figure 2) comprising:

1. The Orari River and its tributaries;
2. The Temuka River and its tributaries;
3. The Opihi River and its tributaries;
4. The Timaru FMU, including all urban waterways, and the Washdyke Lagoon.
5. The Pareora River and its tributaries and the small coastal streams and lagoons between Saltwater Creek and the Pareora River, and Lyalldale and Springbrook Creek;
6. A single Groundwater FMU encompassing all Groundwater Allocation Zones in the zone:
 - a. Rangitata Orton;
 - b. Orari Opihi;
 - c. Levels Plains;
 - d. Fairlie;
 - e. Timaru;
 - f. Upper Pareora;
 - g. Pareora

Within this addendum, recommendations are first made at a zone-wide level, followed by those recommendations that are specific to a Freshwater Management Unit.

MAP 2: ORARI-TEMUKA-OPIHI-PAREORA FRESHWATER MANAGEMENT UNITS



Water Quality Under the NPS-FM

The NPS-FM requires key values to be identified for each FMU, and for freshwater objectives to be developed for the key values. This is referred to as the National Objectives Framework (Figure 1). There are two national compulsory values; ecosystem health and human health for recreation, which must be included in the key values. For these the NPS-FM includes key attributes with numeric thresholds that define “Attribute State” conditions. For national compulsory values, freshwater objectives are required to be set at or above the “national bottom line”. Where the key attributes with numeric thresholds are below national bottom lines, water quality must be improved to at least the national bottom line, or better, over time. National bottom lines are not standards that should be aimed for.

The NPS-FM also sets an objective that requires water quality to be maintained or improved. Maintenance of water quality means that for attributes defined in the NPS-FM, water quality objectives are set at least within the same attribute state as existing freshwater quality, or for other values, will not be worse off when compared to existing freshwater quality.

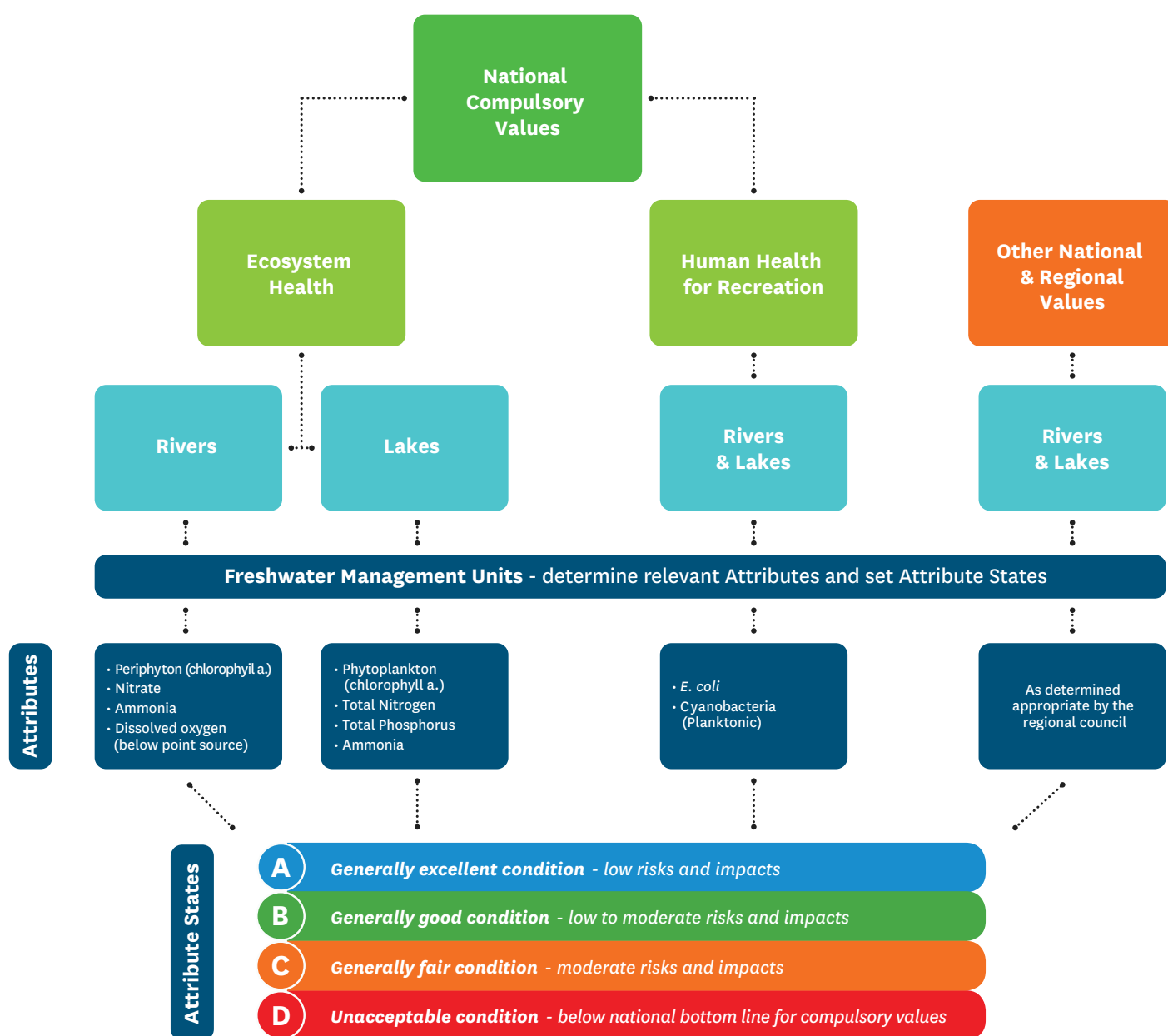


Figure 1: Outline of NPS-FM National Objectives Framework

Water Quantity under the NPS-FM

The NPS-FM requires that for each FMU, environmental flows are set (which much include a minimum flow), over-allocation of freshwater resources be avoided through the setting of allocation limits, and existing over-allocation be phased out over a defined timeframe.

Mātaítai

Mātaítai reserves can be declared under the Fisheries (Kaimoana Customary Fishing) Regulations 1998 or the Fisheries (South Island Customary Fishing) Regulations 1999 on application by tangata whenua. A mātaítai identifies an area that is a place of importance for customary food gathering and allows for the area to be managed by tangata tiaki/kaitiaki nominated by the tangata whenua.

Once a mātaítai reserve is established, commercial fishing is not allowed unless recommended by the tangata tiaki/kaitiaki. A tangata tiaki/kaitiaki can recommend bylaws to assist with the sustainable management of fisheries resources in the mātaítai. These bylaws must be approved by the Minister of Fisheries and must apply generally to all individuals.

There are currently two fresh water mātaítai reserves within the OTOP zone (Map 3). The Opihi Mātaítai Reserve extends from the Opihi Lagoon up the Opihi River to a point to the south of Pearse Road, and includes the adjoining creeks, streams and tributaries of the Opihi River. The Waitarakao Mātaítai Reserve includes the Waitarakao/Washdyke Lagoon and all streams and tributaries that flow into the lagoon, east of the railway line, and the Seadown Drain.

Canterbury Water Management Strategy

The Canterbury Water Management Strategy was developed in 2009. It provides a new way of working collaboratively to manage precious freshwater resources in the Canterbury region. The overarching vision of the strategy is “to gain the greatest cultural, economic, environmental, recreational and social benefits from our water resources within a sustainable framework both now and for future generations”. The strategy prioritises the environment, customary use, community supply and stockwater, and aims to realise its vision by achieving the following ten broad targets:

- Environmental limits
- Ecosystem health and biodiversity
- Natural character of braided rivers
- Kaitiakitanga
- Drinking water
- Recreational and amenity opportunities
- Water-use efficiency
- Irrigated land area
- Energy security and efficiency
- Indicators of regional and national economies

To deliver on these targets, the Zone Committee first completed a Zone Implementation Programme (ZIP) and has now developed a more specific programme for the zone. This Addendum to the ZIP provides recommendations and direction to Environment Canterbury and district councils as they develop their work programme, budgets and planning frameworks. It has been developed in collaboration with the community, and part of this has been the Zone Committee-led Healthy Catchments Project, designed to encourage community input into achieving better outcomes for managing freshwater in the OTOP zone.

To develop the most appropriate management strategies for a catchment, the people living there need to be involved in finding workable solutions. This document is therefore the result of community consultation, including public workshops, field trips and meetings, along with scientific investigation and technical support. It presents general solutions for the whole zone, and some which are catchment specific.

MAP 3: OPIHI AND WAITARAKAO MĀTAITAI RESERVES



Community Outcomes

The aim of the OTOP Healthy Catchments Project is to develop a package of freshwater management solutions which best deliver community outcomes (environmental, cultural, economic and social). The OTOP Zone Committee, with input from Papatipu Rūnanga and community, developed the following outcomes to reflect community and Papatipu Rūnanga aspirations:

- Protect and enhance the natural character and function of the zone's rivers, waterways and lake whilst providing a sufficient level of flood protection.
- Safe and reliable drinking water for community and domestic supplies both now and in the future.
- All surface waterbodies safe for recreation and gathering mahinga kai.
- Increase recreational opportunities in the zone by ensuring appropriate management of river flows.
- Rectify loss and improve opportunities for mahinga kai gathering in the zone.
- Protect and enhance sites of cultural significance.
- Protect and enhance indigenous biodiversity Ki uta Ki Tai, particularly high naturalness areas, coastal lagoons, and wetlands and springs in the upper parts of catchments.
- Maintain or increase the reliability of water available for industry and irrigation in the zone.
- Maintain or increase the area of land irrigated in the zone.
- Maintain and improve economic value in the zone and provide for community wellbeing.

These community outcomes are based on the Canterbury Water Management Strategy, Strategic Framework (2009).

The integrated package of local recommendations contained in this ZIP Addendum aim to work towards all the community outcomes together, rather than one outcome in isolation of others.

2.5 PATHWAYS FOR CHANGE

The major pathways for implementing the recommendations in this addendum are a plan change to Section 14 of the Canterbury Land and Water Regional Plan (LWRP) and through the Zone Implementation Programme, where priority areas can be identified and targeted non-statutory actions undertaken. District councils are also encouraged to consider the content of this document when they are preparing work programmes and budgets and developing plan changes or reviewing existing plans. While driven by community outcomes, the development of this document has also been guided by policy at a national, regional and local level.

3.0 CURRENT STATE OF THE ORARI-TEMUKA-OPIHI-PAREORA ZONE

History of the Zone

Against the backdrop of the Two Thumb Range, the wedge-shaped area between the Rangitata and Pareora Rivers stretches towards the east coast across rolling hills, flattening into plains as it nears the coast. This fertile area was originally home to podocarp forest, until flax, fern, tussock and cabbage trees became the predominant flora; wetlands were common, supporting diverse species. The area provided well for its inhabitants – wetland and other birds, flounder, shellfish, eels and lamprey were gathered and supplemented with plants, such as kāuru, a staple made by baking young cabbage tree (tī kōuka) roots in an oven (umu tī).

As European settlers arrived and began to farm the area, much of the indigenous flora and fauna disappeared, and there are now only small remnants of these. In the upper catchments, native tussock grasslands remain, providing clean runoff water that plays an important part in catchment water balance. Prior to this settlement, the zone had large areas of wetlands, however 95% of these were drained to allow for farming on the flat land near the coast.

Biodiversity

Even though there are now fewer wetland areas, those that remain have high values, providing important habitat for native fish, invertebrates, plants and birds. Wetlands also provide spawning habitats for fish, many of which have statutory recognition as toanga species, including flounder/pātiki, mullet and inanga (one of the species which makes up the whitebait catch). The health of wetlands and coastal lagoons is important for migratory fish and birds, which pass through these on their journey around the country and the world. The community have been clear that protecting and enhancing these vulnerable areas is important, and many of the recommendations relating to water quality and water quantity aim to meet this expectation.

Along with the wetlands, the hill-fed braided rivers in the zone provide important habitat for native species. Movement of gravels by floods and freshes is required to ensure these ecosystems maintain their dynamic, constantly-moving habitat. When freshes are reduced, due to over-abstraction or reduced input, rivers are affected by encroaching weed growth, which stabilises the islands and provides cover for predators which then feed on the native birds. The remaining un-modified parts of the zone provide an important refuge for bats, lizards, birds and other native species, and the Committee have supported a number of Immediate Steps restoration projects, such as fencing and planting, to protect them from further degradation and to ensure that biodiversity is woven through the working lands of the zone.

Land Use and Irrigation

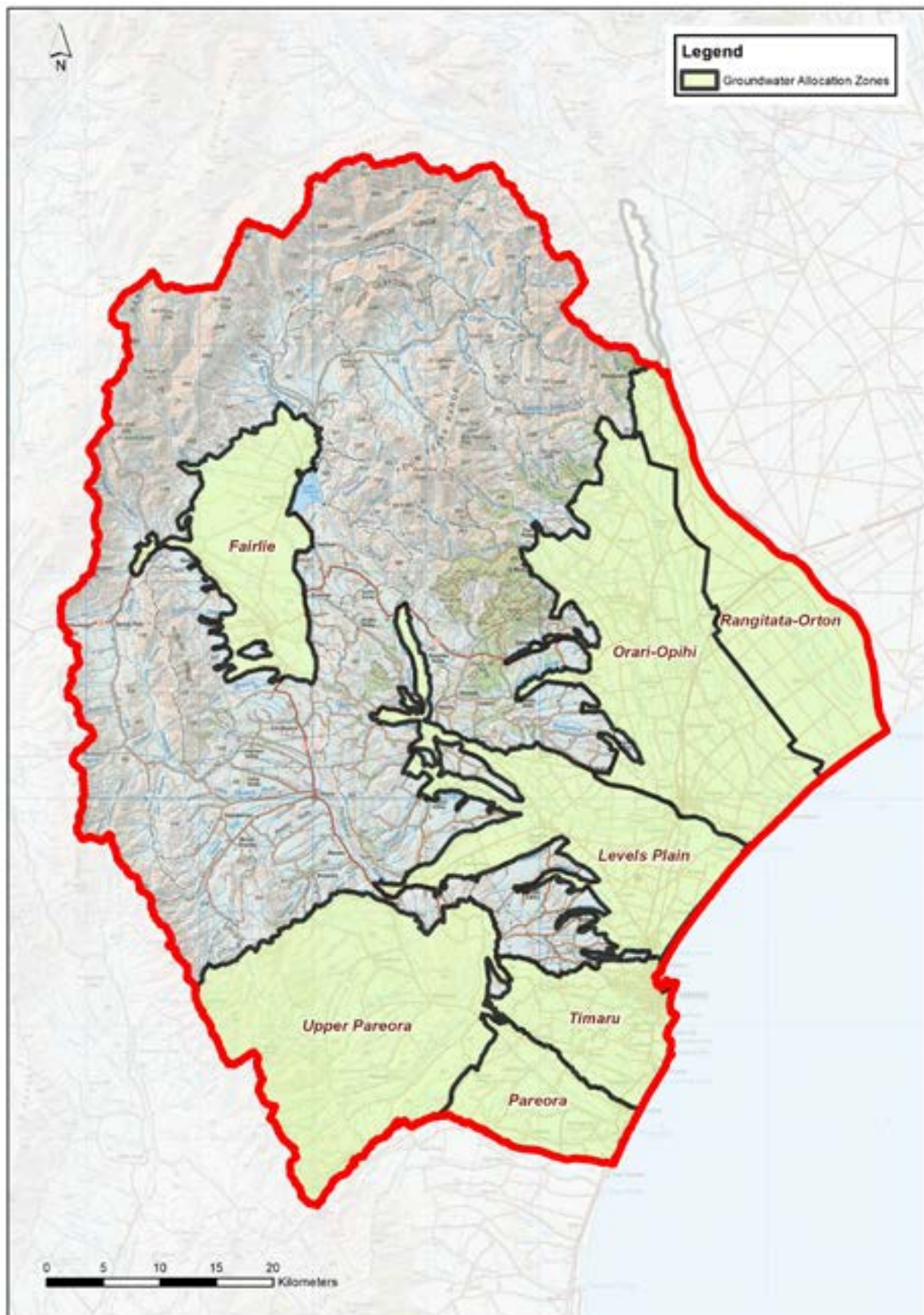
As agriculture spread throughout the area, sheep and cropping farms dominated a landscape made fertile with border-dyke or flood irrigation. Sheep and mixed sheep and beef farming still cover over half of the total area, dominating the hills and downlands. Significant numbers of deer farms are found throughout the zone, often in mixed farming systems with other stock types. In recent years, the area has experienced similar changes to other parts of Canterbury with the conversion of large areas of flat land to dairy farming. This has not only increased the economic viability of the area, but also increased irrigation in the zone, which recently reached approximately 54,000 hectares of irrigated land. Spray irrigation, with over half using pivot irrigators, is a common sight in the South Canterbury landscape.

Allocation and Water Use

Consented allocation of both surface water and groundwater within the zone has increased since the late 1980s to meet demand, with a rapid increase in the 2000s. In recent years consented allocations have plateaued as some allocations have become full and other remaining allocation may not have sufficient reliability. Of the seven groundwater allocation zones in the OTOP zone (Map 4) three are considered over-allocated, two are near full allocation and only the Fairlie and Timaru allocation zones have appreciable allocation remaining. Geological constraints in these areas may prevent full allocation from being uptaken.

Water usage data indicates that less than the consented allocation is used within each season. This data also shows that compared to surface water takes a greater proportion of the allocated volume of groundwater takes is used. This is likely to be the result of low flows in peak irrigation season resulting in surface water takes being restricted.

MAP 4: ORARI-TEMUKA-OPIHI-PAREORA GROUNDWATER ALLOCATION ZONES



Hydrology and Water Quality

The hydrology of the area is complex, with surface water and groundwater interacting which causes losses and gains within the waterbodies as the rivers flow towards the ocean. This interaction makes water management in the zone a challenging task, particularly when combined with increasing irrigation demands and a changing climate.

Groundwater levels generally follow climate variability, although there are some trends that can be seen in the monitoring data, including decreasing groundwater levels. This can be seen in areas adjacent to rivers with reduced flows, and in Levels Plains, where conversion from border-dyke to spray irrigation has reduced recharge. In the Rangitata-Orton area, increasing groundwater levels have been attributed to recharge from losses from the Rangitata South Irrigation Scheme.

The quality of groundwater is influenced by geology, depth, land use and recharge sources. Recharge from land surface in areas of intensive land use causes elevated nitrate concentrations, as can be seen in Fairlie Basin, Levels Plains and Rangitata-Orton. These areas have been identified as hotspots and have been noted by the Committee as priority areas for mitigation. Groundwater that is primarily sourced from river recharge generally has lower nitrate concentrations than groundwater sourced from land surface recharge.

Surface water quality varies throughout the area, high-quality water emerges from the upper hill catchments and it declines as it moves towards the coast. Some of the lowland streams near the coast show high levels of sediment, nutrients and faecal indicator bacteria, which affects their values for mahinga kai, recreation, and as a safe habitat for flora and fauna.

Flows in the zone are typical for hill-fed rivers in Canterbury, often water is lost as rivers cross the gravel plains towards the coast. Many of the rivers have dry reaches in the mid plains which can be exacerbated by abstraction. Along with these dry reaches, low flows are thought to increase the risk of algal blooms, some of which can be toxic. *Phormidium* is an example of this, and while still being researched, blooms appear to be most common in low, stable flows with moderate to high nutrient levels. The presence of algal blooms affects the community in many ways, preventing mahinga kai, and affecting swimming and other recreational activities.

The largest waterbody in the zone is Lake Opuha, providing irrigation water to approximately 16,000 ha of land and formed by the construction of the Opuha dam in 1998. The flows from the dam are regulated by Opuha Water Limited in accordance with the Opihi River Regional Plan (ORRP). The Opuha Environmental Flow Release Advisory Group (OEFrag) provides advice on how flows can be managed to protect the river environment below the dam while providing water for irrigators. The lake is very important as a water source for agriculture. This, coupled with its popularity as a recreational site for swimming, boating and fishing, has made it a vital component in this package of water management solutions. Opuha Water Limited continues to be involved in ongoing research into the best way to manage water in the catchment to provide both economic and environmental outcomes.

The Recommendations

The Committee have expressed a desire to both protect the environment and enable economic growth, and the following package of recommendations aim to do this. The Committee recognise that preventing further degradation is essential, and that change will take time. Reasonable timeframes have been recommended, and many recommendations involve staged changes over time to manage the impact while still making progress in the right direction. The recommendations are the result of collaboration with many interested parties including industry, catchment groups, and the community.

3.1 KEY QUESTIONS

The recommendations in this addendum address the following key questions for the OTOP Zone:

- How best can all remnant wetlands be retained as viable ecosystems and protected?
- How should land use intensification be managed to achieve environmental outcomes and a continuation of economic growth in the zone?
- How much of the water in a catchment should be available for abstraction and in over-allocated catchments, how can water allocation be reduced?
- How should groundwater be managed to ensure that groundwater levels are at least maintained at their current levels?
- What measures should be used to prevent further deterioration in water quality and, where water quality is already not meeting environmental outcomes, how should improvement be achieved?

- How should contributing sources of contaminants be managed so that further deterioration in water quality is prevented and improvement in water quality is achieved?
- How can industry contribute to an overall reduction in nutrient loads in the catchment, and over what time period should reductions in nutrient loss occur?
- How should the tension between the zone being 'water short' and the fact that many areas have poor reliability of supply (particularly in recent dry years) be resolved?
- What water allocation regime best resolves the tension between cultural values, ecological values and abstraction values?
- How should the on-going loss of biodiversity be halted, and the distribution and diversity of indigenous species improved?
- How do we better manage (and improve) the quantity and quality of water in our rivers to provide for recreational, cultural, ecological, and community uses?

4.0 ZONE-WIDE RECOMMENDATIONS

4.1 CATCHMENT GROUPS

The Committee acknowledge and appreciate the contribution of the catchment groups, and recognise their role informing the content of this addendum.

4.1.1 Recommendation: Support Catchment Groups

- Regional Council and industry support Catchment Groups in the OTOP Zone, where they are working to address catchment specific issues.

4.2 DRINKING WATER SUPPLIES

Community Drinking Water Supplies

The provision of clean, safe drinking water is a first order priority for all CWMS partners. Community drinking water supplies in the OTOP zone are sourced from the Pareora and Opihi rivers, and shallow groundwater. Most water abstracted for community drinking water in the zone is currently treated for water borne pathogens. Many rural properties have their own private water supply that may be sourced from rivers and streams, groundwater and rainwater collection systems. These supplies are generally not part of routine monitoring programmes and are likely to have variable quality. It is important that private water supply owners understand risks to their supplies and have access to useful information about monitoring and managing them.

The water quality outcomes for drinking water values are applicable to groundwater as the community have signalled that this is a valuable drinking water source and should be protected. The recommendations for groundwater nitrates are based on the Maximum Acceptable Value (MAV) for nitrate nitrogen of 11.3 mg/L in accordance with the Drinking Water Standards for New Zealand 2008. The recommendations state that average groundwater nitrates should not exceed half the MAV (5.65 mg/L), on the basis that groundwater nitrate concentrations are seasonally variable and by setting outcomes at half the MAV, it will broadly protect against exceedances of the MAV.

The recommendations also set a target to achieve the LWRP Schedule 8 groundwater limit for *Escherichia coli* (*E. coli*) concentrations. The LWRP requires that on a per well basis 95% of samples do not exceed a limit of <1 organism per 100 ml. Council's monitoring is undertaken at its nominated monitoring wells which are considered to be representative.

Groundwater Current State

Information about the current state of groundwater quality was presented to the Zone Committee during workshops, and is based on a network of monitoring wells (shallow wells <20m deep). These wells are generally representative of the shallow groundwater, although a desire for improvements to the representativeness of the monitoring network was

identified. Based on this analysis, the Levels Plains, Rangitata Orton and Fairlie Basin were identified as nitrate hotspots where the average nitrate nitrogen concentrations across a number of monitoring wells is above half MAV. In other areas, average nitrate concentrations across the wells are below half MAV, although samples from individual wells may occasionally show higher concentrations.

Based on the analysis of all groundwater data for the OTOP zone, half the wells that have been sampled have had a positive *E. coli* result (i.e. >1 organism per 100 ml). Of the samples that have had positive results and that have been sampled frequently, about 10% of the wells yielded over 5% of the samples with >1 *E. coli*/100 ml. This means that groundwater quality in the OTOP zone does not currently meet the LWRP Schedule 8 limit for *E. coli*. Based on the data available, it will require significant improvements in both practices on the land and appropriate protection around well heads to achieve the LWRP Schedule 8 limits for *E. coli*.

Private Supplies

To provide protection for private drinking water supplies the Committee recommends that in instances where monitoring identifies that there is an exceedance of allowable nitrate nitrogen in private bores, appropriate action should be initiated. This action should include, but not be limited to, identification of the source of the contamination, consideration of surrounding land use consent conditions (to identify if there has been non-compliance) and consideration of the consequences of any permitted land use activity.

Community Drinking Water Supply Zones

The identification and management of community drinking water protection zones (CDWPZ's) is one of the interventions to provide safe drinking water to the community. The LWRP contains a methodology for calculating provisional CDWPZs for community drinking water supply abstractions. These are the starting point for managing potential contaminant risks to sources of community drinking water. There are 32 identified CDWPZ's in the OTOP zone. Members of the community and the district councils in the zone have raised concerns regarding the risks associated with the CDWPZs. The recommendations below aim to address these concerns through further regulation and the setting of limits for contaminants.

Community Drinking Water Supply Abstractions

The Committee also acknowledge the first order priority of existing and future community drinking water supplies in the zone. Two of the current major abstractions for community drinking water in the zone are subject to minimum flow restrictions¹ in the Pareora and Opihi rivers. It is the view of the Committee that these abstractions should not be subject to these restrictions, but that they should be managed through a Water Supply Strategy that includes methods to reduce the demand for water in the supply area during times of low flow. This mechanism should also apply to any future abstractions of community drinking water in the zone and provides consistency across the Region.

4.2.1 Recommendation: Water Quality Outcomes for Groundwater

- I. Nitrate nitrogen concentrations in groundwater within each FMU, excluding the hot spot areas of Rangitata Orton, Levels Plain and the Fairlie Basin, shall not exceed 5.65 mg/l as an annual average, which is half the Maximum Acceptable Value of 11.3mg/l.
- II. Where an individual drinking water supply bore exceeds a nitrate nitrogen concentration value of 11.3mg/l in any sample, an investigation will be undertaken to identify the source of the contamination and remedial action taken as appropriate.
- III. Within five years of the OTOP sub-region plan change becoming operative, *E. coli* in groundwater shall not exceed the limit in the Land and Water Regional Plan.²
- IV. Where groundwater quality is currently better than these outcomes, there shall be no deterioration of that water quality.

4.2.2 Recommendation: Community Drinking Water Supply Protection Zones

- I. Regional council and district councils respond to the Stage 2 report of the Government Inquiry into Havelock North Drinking Water by making appropriate provision in their plans and by-laws and/or their work programmes to achieve any improvements required to the protection of community drinking water supplies.

¹ Minimum flow is a flow trigger level at which abstractions must cease; partial restrictions also apply above these levels.

² In 95% of samples, *E. coli* must meet a limit of <1 organism per 100 millilitres.

4.2.3 Recommendation: Monitoring, Awareness, and Education

- I. Regional council, South Canterbury District Health Board and district councils to continue to assess risks to community drinking water supply wells, and raise awareness of risks and management options with private drinking water supplies.
- II. Regional council provides education and support for ensuring compliance with CDWPZs.
- III. Regional council and district councils, in consultation with Community and Public Health, work collaboratively to improve communication and awareness about CDWPZs by:
 - a. Actively promoting well-head protection;
 - b. Ensuring maps of protection zones are easily accessible by the community;
 - c. Hosting community workshops to improve awareness of protection zones, risk and actions landowners can take;
 - d. Finalising farming and household waste guidelines to distribute to landowners;
 - e. Providing one-on-one contact with land owners in CDWP zones regarding their obligations.

4.2.4 Recommendation: Restrictions on Community Drinking Water Supply Abstractions

- I. Where community drinking water supplies are managed in accordance with a Water Supply Strategy, they are not subject to an environmental flow and allocation regime.

4.3 RECOGNITION AND PROTECTION OF CULTURALLY SIGNIFICANT SITES

The OTOP zone is in the takiwā of Te Rūnanga o Arowhenua and Te Rūnanga o Waihao. Cultural beliefs, values and practices that underpin the interactions of mana whenua with the catchments in their takiwā include mauri, kaitiakitanga, whakapapa, rangatiratanga, manaakitanga, mahinga kai and the philosophy of ki uta ki tai - a mountains to the sea approach to looking after water resources. Consistent with the philosophy of managing ki uta ki tai, there is an understanding that all parts of the catchments within the zone were traditionally valued and used, and that all values of importance to iwi and hapū need to be represented in the recommendation package as part of the Healthy Catchments Project.

Wāhi Taonga, Wāhi Tapu and Nohoanga

Sites of wāhi taonga are places that are treasured due to their high cultural values and the role they play in maintaining a balanced and robust ecosystem. Examples include spawning grounds for fish, nesting areas for birds, and fresh water springs (waipuna). Others may be associated with historic events such as battles and actions of ancestors.

Sites of wāhi tapu are places of significance that possess a quality of sacredness or restriction (tapu) after a certain event or circumstance. These sites should be treated according to local traditional customs that seek to ensure the tapu nature of a wāhi tapu site is respected. Sites of wāhi tapu also include urupā (burial sites), which are considered to have the most cultural significance, and require the greatest protection.

Nohoanga sites are known as traditional camp sites which are valued by Ngāi Tahu, particularly for mahinga kai. In the zone, there are two nohoanga sites adjacent to the Pareora River, and one site adjacent to the Te Ana Wai River. These nohoanga resulted from the Treaty Settlement, however there are more than 100 traditional nohoanga throughout the zone.

Other many important cultural sites still present and valued in the zone include Wāhi tupuna (significant cultural landscapes) Repo Raupō (wetlands), Wai Maori (important freshwater areas) and Mahinga Kai (places where resources including food are procured). Historical sites of importance indicate an area rich in resources and include Ara tawhito (trails) used to traverse the area, Pa Tawhito (pā sites), Tauranga Waka (canoe mooring sites) Umu ti (ovens for preparation of kauru) and Tuhituhi neherā (rock art).

Tuhituhi Neherā Rock Art Sites

South Canterbury has one of the highest densities of tuhituhi neherā rock art sites in New Zealand. Ngāi Tahu consider these to be a taonga and are actively involved in their conservation and management. Te Rūnanga o Arowhenua and Te Rūnanga o Waihao are the kaitiaki rūnanga for tuhituhi neherā in the OTOP zone, and the Ngai Tahu Maori Rock Art Trust is charged with working with Papatipu Rūnanga to manage these taonga. The rock art was most commonly applied to limestone, drawn on

the stone's surface using paint made from animal or bird fat mixed with vegetable gum and soot or kōkōwai (red ochre). The tuhituhi neherā sites occur throughout the zone in locations where there are limestone outcrops (Map 5).

Tuhituhi neherā sites are inherently fragile and are threatened, in many cases seriously, by adjacent land and water use activities. Rock art is particularly vulnerable to water use activities which can affect the rock art pigments, the integrity of the limestone surfaces, and threaten the nearby freshwater ecosystems which are an integral component of the wāhi tupuna (cultural landscape). Vulnerable tuhituhi neherā sites and related freshwater ecosystems are potentially sensitive to small changes in the local groundwater environment, changes in the local microclimate (increased air moisture, irrigation spray drift), changes in local drainage systems (diversions, new channels, ponding), increased saturated weight of overburden above an outcrop and changes in the water chemistry of natural seepages onto the rock surface and into freshwater ecosystems. These changes can cause the face of the limestone outcrops to deteriorate very rapidly and can lead to salt deposition on the limestone surfaces and to large areas of limestone calving off from the outcrops.

Protection for the cultural landscape is also relevant for sites of Wāhi Tapu, Wāhi Taonga, and Nohoanga, and water quality is a key driver for the maintenance of these sites. The Committee have acknowledged the cultural significance of these sites. In recommending that the policy and rule framework in the OTOP zone protects these sites, they are cognisant that these sites are diverse both in terms of their nature and spatial location. This means a case by case approach to managing the effects of land and water use activities on these sites is needed.

While the district and regional councils can provide some advice on whether there are likely to be cultural sites on a property, the Zone Committee recognise that the best source of information about the location of and effects on these sites is Papatipu Rūnanga.

Waipuna (Springs)

Waipuna have significant cultural value to Ngai Tahu whanui. Wai (water) is the essence of life and a medium between the physical and metaphysical worlds, so all wai is taonga. Waipuna are regarded by some whānau and hapu as a very pure form of wai and are wāhi tapu or wāhi taonga, depending on their whakapapa and use. Some waipuna are associated with special uses such as ceremonies or wai ora (blessings) or wai tophi (baptisms); some have important associations with atua (Gods) and tupuna (ancestors) and are integral to the whakapapa of Manawhenua with an area.

Waipuna are caused by the emergence of aquifer water at surface level, and represent the intersection of groundwater, surface water and land, with their own ecosystems created by the intersection of these three ecosystem types. They are often areas of rich biodiversity with distinctive flora and fauna, which may be endemic to the waipuna or the surrounding locality. Waipuna can provide cold-water inputs that act as refuge habitats at times of low flow, particularly in summer. Waipuna are vulnerable to pollution, damage or destruction from a variety of activities that can have direct or in-direct effects on them and protecting waipuna is therefore a vital tool for protecting biodiversity and mahinga kai in the OTOP Zone.

4.3.1 Recommendation: Sites of Wāhi Taonga, Wāhi Tapu, and Nohoanga

- I. The regional council work with Papatipu Rūnanga to develop provisions in statutory plans that recognise sites of wāhi tapu, wāhi taonga and nohoanga and their related freshwater ecosystems where these are an integral component of the cultural landscape and protect them from land and water use activities.
- II. The district councils work with Papatipu Rūnanga to develop provisions in statutory plans that recognise sites of wāhi tapu, wāhi taonga and nohoanga and protect them from potentially damaging effects of land use activities.

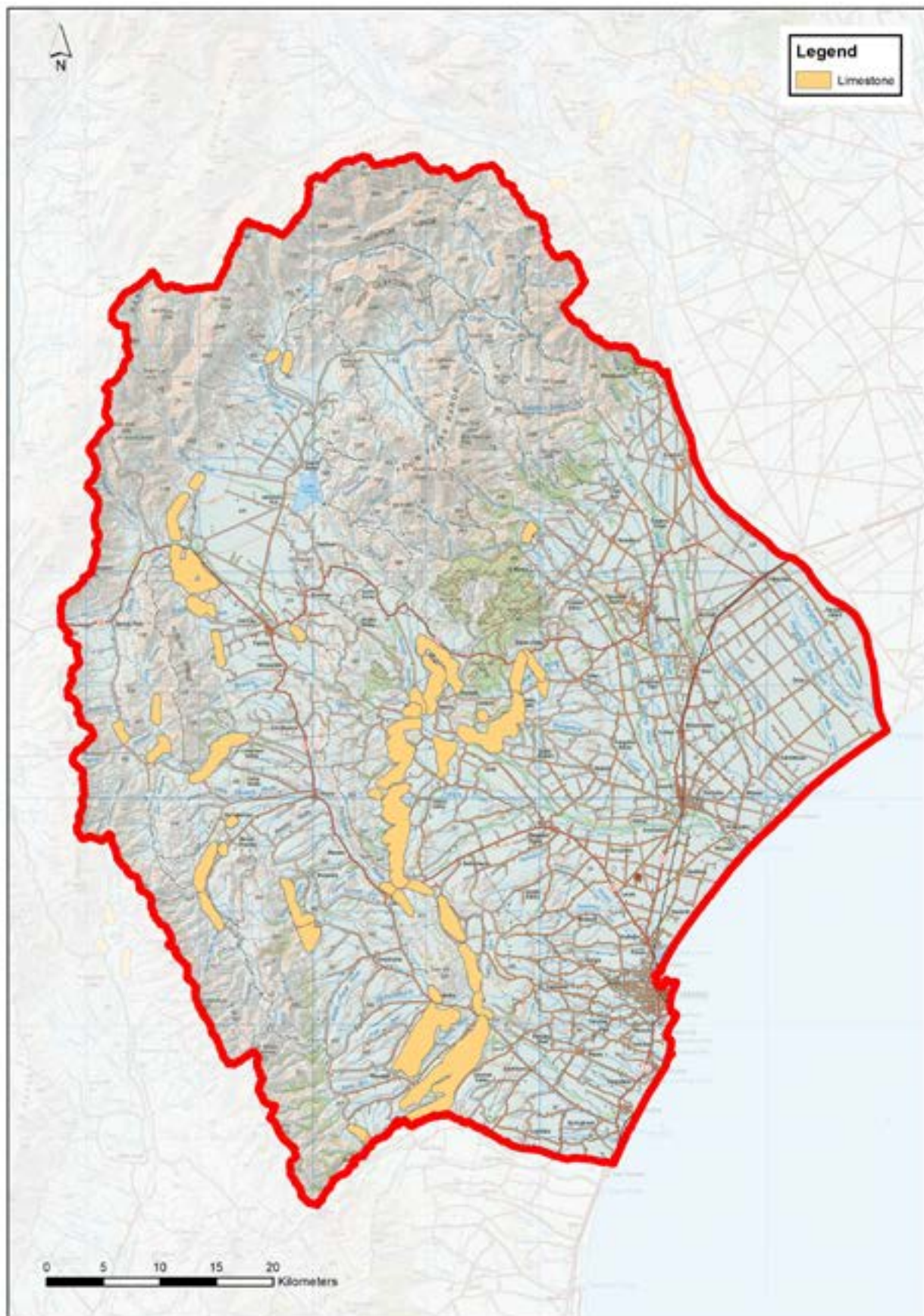
4.3.2 Recommendation: Tuhituhi Neherā Rock Art Sites

- I. The regional council and district councils work with Papatipu Rūnanga to develop provisions in statutory plans that identify and manage actual and potential effects on tuhituhi neherā sites from the taking, use, damming, diversion or discharge of water, the discharge of contaminants, and land use activities.
- II. The regional council and district councils work with Papatipu Rūnanga to develop non-statutory measures to protect and enhance tuhituhi neherā sites.

4.3.3 Recommendation: Protection and Enhancement of Waipuna (Springs)

- I. The regional council and district councils work with Papatipu Rūnanga to develop provisions in statutory plans that identify a waipuna zone and further culturally significant waipuna to manage actual and potential effects on waipuna identified and/or within the waipuna zone from the taking, use, damming, diversion or discharge of water, the discharge of contaminants and land use activities.

MAP 5: LIMESTONE IN THE ORARI-TEMUKA-OPIHI-PAREORA ZONE



- II. The regional councils and district councils work with Papatipu Rūnanga to develop non-statutory measures to protect and enhance waipuna identified as culturally significant and/or within the waipuna zone.

4.4 PROTECTION AND ENHANCEMENT OF MAHINGA KAI

The NPS-FM requires, as a minimum, water quality to be maintained or improved for ecosystem health and human health for recreation through the establishment of freshwater outcomes. The NPS-FM also enables additional optional freshwater outcomes to be set if desired by iwi and communities. On this basis, the committee have recommended a freshwater outcome for mahinga kai across the zone. Mahinga kai refers to all types of food and resources and to the places food and resources are gathered. It is of particular importance to Te Rūnanga o Ngai Tahu, Te Rūnanga o Arowhenua, and Te Rūnanga o Waihao.

The Committee have also recommended that mahinga kai values are protected through Farm Environment Plans and Management Plans for farming activities where they may have an impact on mahinga kai. Across Canterbury, mahinga kai values are protected in Farm Environment Plans as amended by Plan Change 5 to the Canterbury Land and Water Regional Plan. The Committee have acknowledged this but have recommended that these protections are extended to Management Plans for permitted farming activities, and are more comprehensive for Farm Environment Plans. Mahinga kai guidelines are currently being prepared by Environment Canterbury to be used by those preparing and auditing Management Plans and Farm Environment Plans for farming activities.

4.4.1 Recommendation: Mahinga Kai Freshwater Outcome

- I. The regional council work with Papatipu Rūnanga to develop provisions in the OTOP section of the LWRP that provide for improved quality and quantity of freshwater mahinga kai species for customary gathering, and water quality being suitable for their safe harvesting, and safety for consumption.

4.4.2 Recommendation: Mahinga Kai Protection in Farm Environment Plans

- I. Farm Environment Plans in the OTOP zone include an objective of protecting mahinga kai values of surface water bodies on the property, where this is achieved through meeting all other FEP objectives and targets and additionally by maintaining and/or enhancing indigenous and riparian vegetation on the property and appropriately managing pest species.

4.4.3 Recommendation: Mahinga Kai Protection in Management Plans

- I. The OTOP sub-region plan change include a requirement that Management Plans for farming activities include a description of how mahinga kai values will be protected.

4.5 PROTECTION AND ENHANCEMENT OF BIODIVERSITY

Biodiversity

Biodiversity describes the variety of all biological life, including all animals and vegetation, and the ecosystems they collectively form. Protecting and enhancing the diversity of species (no matter how small), and genetic and habitat diversity, provides resilient communities and enhances a wide range of ecosystem services, including those that support natural environments, agricultural and industrial activities, and human health and wellbeing.

Biodiversity in the zone is unique, and the habitats that support biodiversity values include high country, hill country, river gorges, inland and coastal plains. The waterways that traverse these landscapes feed into a network of wetlands and coastal lagoons (hāpua), where even small deteriorations to habitat and water quality can have a significant effect on biodiversity.

Species of particular significance in the zone include the Canterbury mudfish, which is critically endangered and lives only in Canterbury, and the long-tailed bat. Other special inhabitants of the area include galaxiids, eels, lamprey, lizards and braided river birds, all of which are dependent on having a safe place to live. Protecting the habitat of species such as these, even when that habitat is not indigenous vegetation, plays an important role in maintaining ecosystem health.

Protecting and Enhancing Biodiversity

The Resource Management Act 1991 (RMA) makes the protection of significant indigenous vegetation a matter of national importance. In meeting this obligation, the protection of indigenous biological diversity is a dual function of district and

regional councils. This is reflected in the content of the Canterbury Regional Policy Statement (CRPS), which includes criteria for determining whether indigenous vegetation is significant³ and defines the roles and responsibilities of district and regional councils for protecting significant indigenous biodiversity. District councils are responsible for managing terrestrial biodiversity, and significant indigenous biodiversity in areas classified as “Significant Natural Areas” or “Outstanding Natural Landscapes”. Regional councils are responsible for managing biodiversity in the coastal marine area, and in the beds of rivers, and in wetlands and hāpua. The protection of biodiversity and ecosystem health is also a first order priority under the Canterbury Water Management Strategy.

The Land and Water Regional Plan compliments protections in district plans relating to Significant Indigenous Biodiversity by signalling the need for compliance with these rules. Any area of Significant Indigenous Biodiversity mapped by a district council is also required to be identified in Management Plans and Farm Environment Plans.

Farm Environment Plans (FEPs) are required for all farming activities that require a resource consent to farm and are subject to an independent audit. FEPs are the key tool for mitigating adverse effects of a farming activity on the ground. FEPs contain a suite of Management Areas⁴ for on farm practices with objectives and targets to be met. The objectives are the outcomes sought for each of the Management Areas, and the targets are measurable statements that contribute to the achievement of objectives. FEPs are also required to identify the risks associated with the farming activity, and detail how these risks will be managed.

Farm Management Plans (FMPs) are required for permitted farming activities but are not subject to an independent audit. FMPs are also a key tool for mitigating the adverse effects of a farming activity. They contain a suite of “Practices” that must be met relating to on farm activities⁵, and the actions that have been taken to meet the practice must be detailed.

To further strengthen the protection of significant indigenous biodiversity, the Committee have recommended that Management Plans and Farm Environment Plans detail how compliance with any district plan rule is being achieved, and also identify areas on farm where indigenous biodiversity could be enhanced and protected.

The Committee recognise the contribution to biodiversity protection and enhancement voluntarily being made by some landowners and see an opportunity for that information to be shared, and for this contribution to be recognised and celebrated. In this way, gains already being made in the zone could provide a template for further protection and enhancement of biodiversity.

High Naturalness Waterbodies

Biodiversity can also be protected through the classification of “High Naturalness Waterbodies” in the OTOP sub-region section of the Land and Water Regional Plan. When waterbodies are classified as “High Naturalness”, their outstanding and significant characteristics⁶ are afforded protection from water take and use activities, damming, and land use activities⁷. These activities must not adversely affect their identified significant values and will require a resource consent to be granted before the activity can occur.

The Orari Gorge and its tributaries from a point upstream of the mouth of the gorge to the headwaters is currently listed in the LWRP as a High Naturalness Waterbody in the OTOP zone. The outstanding and significant characteristics identified for the Orari are the high degree of naturalness and the high amenity value, including very high scenic and recreational values, and very high-water clarity. The Committee has confirmed the Orari Gorge as a high naturalness waterbody and has further recommended the inclusion of Milford Lagoon and Orakipaoa Creek in the schedule of high naturalness waterbodies to protect their cultural and ecological values.

The Committee has also raised some additional areas for protection within the OTOP zone that do not necessarily meet the criteria for classification as High Naturalness Waterbodies. In particular, the Committee has sought to protect hāpua and wetlands, and the margins of braided rivers. The protection of the habitat and biodiversity values of wetland and coastal systems has been identified as a priority in the community outcomes. To provide this protection, the Committee has recommended that further named wetlands and hāpua within the OTOP zone are afforded the same protection as those hāpua, wetlands and natural state waterbodies that are classified as High Naturalness Waterbodies. Furthermore, through naming these waterbodies as special areas and habitats, the Zone Committee would like to see these as priorities for funding and restoration/enhancement initiatives.

³ Significance is determined by assessing areas and habitats taking account of representativeness, rarity or distinctive features, diversity and pattern, ecological context.

⁴ Nutrients, Irrigation, Cultivation and Soil Structure, Animal Effluent and Solid Animal Waste, Waterbodies, Point Sources, and Water use.

⁵ Fertiliser application, Irrigation systems, point sources, effluent application, stock exclusion, and riparian planting.

⁶ Characteristics can include cultural, ecological, landscape and amenity values.

⁷ Disturbance of their beds, installation of structures, gravel extraction, and introduction and clearance of non-native vegetation.

Waterbody Realignments

In the zone, waterbody realignments and channel straightening has been identified as an exacerbator of poor ecological health in waterways due to changes in hydrology and reduction in habitat variability. The Committee have considered this and recommend that LWRP policies and rules are strengthened to limit these activities to circumstances where they are necessary or would have a net benefit to the waterway. Vegetation clearance is also a common cause of loss of habitat for biodiversity, and mahinga kai values in the zone. The Committee have recommended that the vegetation clearance policies and rules in the zone take these factors into consideration.

Recommendations

In making recommendations to protect and enhance biodiversity, the Committee have acknowledged the roles and responsibilities of district and regional councils, and the protections already in place in the district plans, and the Canterbury Land and Water Regional Plan. Feedback received has indicated that one of the issues in the zone is a lack of understanding and awareness by landowners of planning provisions that protect indigenous biodiversity. The Committee agree there is an opportunity to improve this and wish to see biodiversity woven into the working landscape of the zone.

4.5.1 Recommendations: Information Sharing

- I. For the purposes of maintaining indigenous biological diversity, regional and district councils provide information to landowners about the rules controlling vegetation clearance and monitor the outcomes.
- II. Regional council, district councils and the Department of Conservation work together in identifying and prioritising initiatives for biodiversity enhancement and remediation.

4.5.2 Recommendation: District Council Plan Development and Plan Reviews

- I. When district councils are reviewing district plans, they:
 - a. Recognise the role indigenous vegetation plays in the health of water catchments, even where the catchment may not meet the criteria for significance, and include provisions controlling general clearance of indigenous vegetation;
 - b. Include provisions for controlling large scale earthworks in rural zones, particularly in the upper catchments;
 - c. Ensure that provisions relating to identified areas of significant indigenous biodiversity offer effective protection of those areas from clearance or other disturbances;
 - d. Include provisions for identified areas of significant indigenous biodiversity that control other land use activities, to manage any actual or potential effects on these areas;
 - e. Include provisions for maintaining and enhancing indigenous biological diversity

4.5.3 Recommendation: Farm Environment Plans and Management Plans

- I. Any areas of “Significant Indigenous Biodiversity” mapped by district councils shall be identified in Farm Environment Plans and Management Plans, and methods of complying with any relevant district plan rule relating to the Significant Indigenous Biodiversity must be detailed.

4.5.4 Recommendation: High Naturalness Waterbodies

- I. The Orari upper catchment and its tributaries (for its high degree of naturalness, high amenity values and very high water clarity), and Milford Lagoon (Opihi Lagoon) and Orakipaoa Creek (for their cultural and ecological significance) are classified as ‘High Naturalness Waterbodies’ for inclusion in the OTOP sub-region section of the Land and Water Regional Plan.
- II The policy and rule framework for High Naturalness Waterbodies recognises the value of, and investment in, existing irrigation infrastructure when considering resource consent applications that will replace an existing resource consent for the same activity on essentially the same terms and conditions.

4.5.5 Recommendation: Protection for Named Waterbodies

- I. The policies and rules of the OTOP sub region section of the LWRP provide for protection of the following wetlands and hāpua, particularly in respect of water and land use activities that may affect their natural character or natural function:
 - a. Spider Lagoon;
 - b. Orari Lagoon;

- c. Old Orari Lagoon and connected wetlands;
- d. Horseshoe Lagoon;
- e. Normanby Lagoon;
- f. Prattley Road Lagoon;
- g. Pig Hunting Creek;
- h. Otipua/Saltwater Creek;
- i. Waitarakao/Washdyke Lagoon;
- j. Seven Sisters wetland;
- k. Peel Forest wetland;

4.5.6 Recommendation: Riparian Management

- I. To prevent further encroachment into riparian margins, regional and district councils include provisions in their plans to prevent clearance of existing riparian vegetation (except pest vegetation) on the margins of rivers, wetlands and hāpua in the zone.
- II. Any plan provisions developed to implement (I) above shall not preclude the replacement of existing riparian vegetation, provided there is no net loss of riparian vegetation in the affected reach.

4.5.7 Recommendation: Channel Straightening and Waterbody Realignments

- I. Channel straightening and waterbody realignments are not appropriate unless they result in no net loss of any indigenous biodiversity or habitat in the affected reach

4.5.8 Recommendation: Vegetation

- I. Regional council and district councils recognise and protect habitat for indigenous species in policies and rules managing vegetation clearance.
- II. Regional council and district councils work with Papatipu Rūnanga to ensure that mahinga kai values are recognised and protected in policies and rules managing vegetation clearance.

4.5.9 Recommendation: Non-Statutory

- I. Regional council and industry support collective actions to reduce losses of contaminants and work on wetland and waterway enhancement, and biodiversity projects, prioritising this support in at-risk catchments.
- II. Regional council and industry groups develop good management practice guidelines for the tussock cover ecosystem and other biodiversity values.
- III. Farm Environment Plans, including those developed by industry groups, encourage the identification of further opportunities where new indigenous biodiversity could be established on farm.
- IV. Regional council and industry provide guidance and information on the protection of biodiversity values through a web-based tool.
- V. Land Information New Zealand and the Department of Conservation work with regional and district councils to ensure any tenure review process considers the biological diversity outcomes sought by the Committee.
- VI. Regional council coordinates work to promote habitat suitable for bird nesting and to manage waterbodies for the best cultural, ecological, coastal and flood outcomes.
- VII. Regional council implements the Canterbury Regional Pest Management Plan regarding wilding pines and other invasive forestry species to further protect biodiversity.
- VIII. Regional council to ensure all statutory documents that address gravel takes, flood management and control of instream vegetation align with the recommendations in this ZIPA, when these documents are reviewed, or by 2023 if they have not been reviewed prior to this date.
- IX. A biodiversity action group, or similar, with membership from Papatipu Rūnanga, the community and local bodies, is established to coordinate and promote biodiversity actions in the zone, and investigations are made into the

establishment of a fund to assist with projects in the zone which do not qualify for Immediate Steps Funding, but which will promote and enhance biodiversity within the zone.

- X. Projects that contribute to the protection and enhancement of the following areas are prioritised for funding and resources in the zone, including funding allocated under the Immediate Steps Programme:
 - a. coastal margins and lagoons to support indigenous biodiversity and over time provide a biodiversity corridor;
 - b. the protection of long tailed bats;
 - c. protection and enhancement of braided river habitat;
 - d. opportunities to protect high value species, sites or habitats in the zone, especially in the upper catchments.

4.6 FORESTRY AND WATER YIELD

Forestry

The management of forestry is a dual function of district and regional councils. District councils are responsible for managing forestry from a land use perspective to protect areas of significant indigenous biodiversity in areas considered Significant Natural Areas (SNAs) or Outstanding Natural Landscapes (ONLs). Regional councils manage forestry where it may reduce water yield (water quantity), and the clearance of forestry where it may affect surface waterbodies (water quality).

In May 2018, the National Environmental Standards for Plantation Forestry (NES-PF) came into effect. These standards replaced all district plan rules in the zone controlling forestry. In summary, the NES-PF does not restrict the location of plantation forestry, except in areas identified by district councils as SNAs or ONLs. However, district and regional councils can have more restrictive rules for forestry to protect these areas.

Water Yield

Catchments are considered Flow Sensitive where the river flows are dependent on rainfall, there is limited ability to store water, and evapotranspiration exceeds rainfall in summer months. Flow Sensitive Catchments have very low summer flows compared with annual mean flows and are vulnerable to reductions in flow. Forestry increases the evapotranspiration within a catchment which can exacerbate the severity of summer low flows.

The Canterbury Land and Water Regional Plan identifies eight “Flow Sensitive Catchments” within the zone (Map 6). The LWRP enables new forestry in Flow Sensitive Catchments where it will not result in a measurable reduction in flows in the catchment.

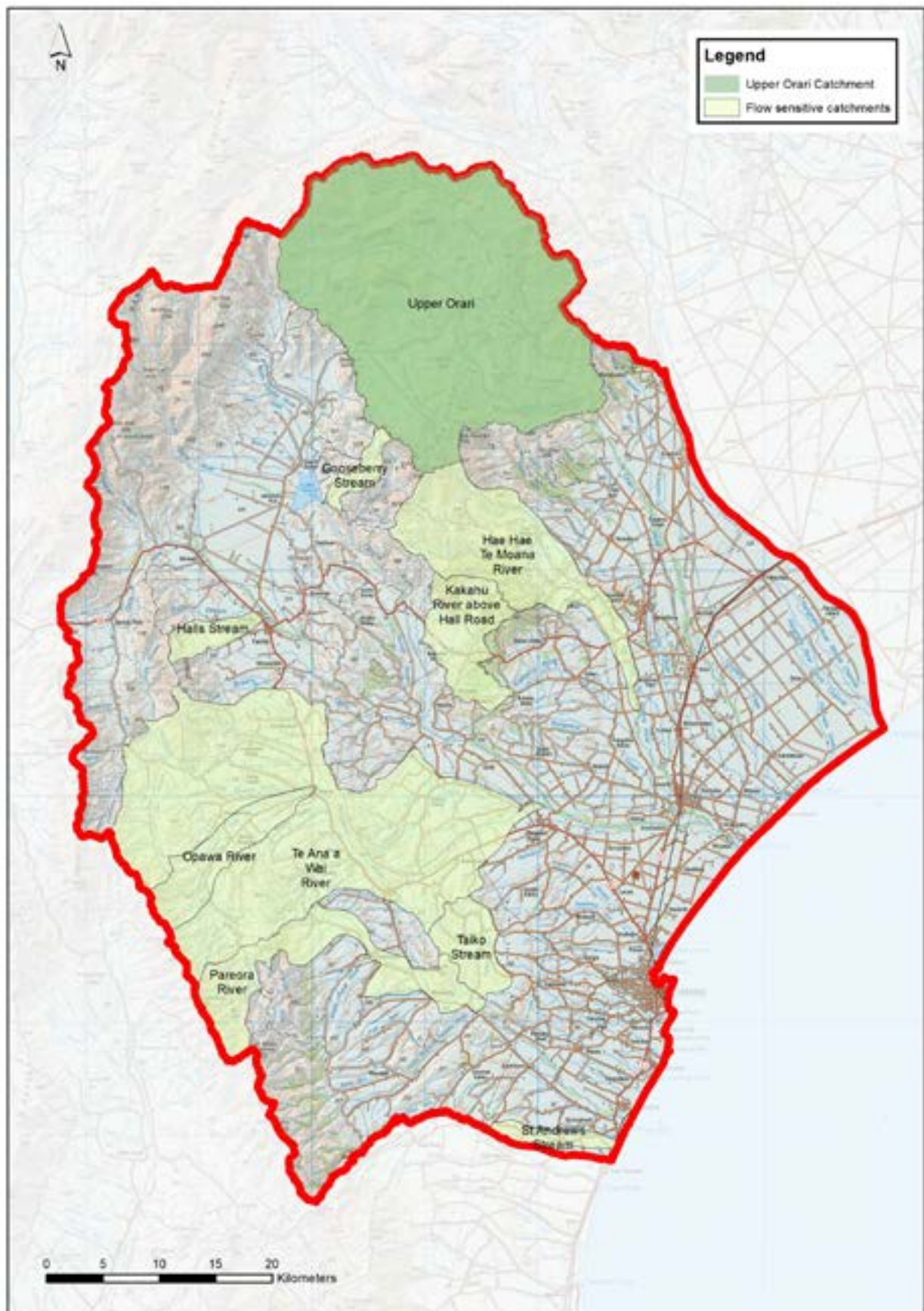
The Committee have identified that the Upper Orari River and tributaries may be at risk if forestry increases within the upper catchment. A study into the potential effects of forestry in the Upper Orari indicated that it would meet the criteria to be classified as a flow sensitive catchment. As this upper catchment has little abstraction, and flows leaving the gorge are important for sustaining the lower Orari catchment, there is benefit in limiting forestry in the upper catchment.

The following recommendations have been made acknowledging the roles and responsibilities of district and regional councils, and are a package for protecting both indigenous biodiversity, and water yield from forestry.

4.6.1 Recommendation: Flow Sensitive Catchments

- I. The Upper Orari Catchment be identified as a “Flow Sensitive Catchment” to protect water yield.
- II. Retain existing Flow Sensitive Catchments identified in the LWRP:
 - a. Gooseberry Stream;
 - b. Hae Hae Te Moana River;
 - c. Kakahu River;
 - d. Halls Creek;
 - e. Te Ana Wai River;
 - f. Taiko Stream;
 - g. Pareora River;
 - h. St Andrews Stream.

MAP 6: EXISTING AND PROPOSED FLOW SENSITIVE CATCHMENTS IN THE ORARI-TEMUKA-OPIHI-PAREORA ZONE



- III. To protect water yield, avoid new plantation forestry in all Flow Sensitive Catchments in the zone where it will result in a measurable reduction of flows in the catchment.

4.6.2 Recommendation: Forestry

- I. District councils include provisions in district plans which prevent forestry in areas of outstanding natural landscape, and significant natural areas to protect biodiversity.

4.7 PROTECTION OF UPPER CATCHMENTS

The upper catchments of the OTOP zone provide reliable, high-quality water that is valued for drinking water, recreation and irrigation uses. These areas also provide for in-stream values that encourage biodiversity to thrive. Protection of upper catchments is therefore essential, and the Committee have developed recommendations that aim to maintain or improve water quality and protect water yield by limiting diffuse discharges of nutrients and limit forestry in flow sensitive catchments.

Activities in the upper catchment are managed by the LWRP and the Timaru, Waimate and Mackenzie District Plans. Because of the cross-boundary issues, the areas require integrated management by all councils. With the Mackenzie and Timaru district plans currently undergoing review, there is an opportunity for alignment of plans to protect biodiversity from the effects of land use activities in these areas.

The recommendations provided in the Biodiversity, Forestry and Water Yield, and Water Quality and Ecosystem Health sections of this addendum will apply to the upper catchments of the OTOP zone. The recommendations below are intended to supplement these.

4.7.1 Recommendations: Further Protection of Upper Catchments

- I. To ensure achievement of the community outcomes regional and district councils work to align their district and regional plan provisions for upper catchments and consider strengthening these.
- II. The OTOP sub-region plan change to the LWRP include provisions that manage the potential effects of activities (including proposals to plant forestry or otherwise alter current land uses) on water quality and water yield outcomes.
- III. To protect biodiversity and water quality, regional and district councils recognise the importance of protecting and maintaining tussock cover by managing land use change in the upper catchments.
- IV. Erosion control is managed with species other than invasive and/or plantation forestry species.
- V. Regional council controls invasive species of forestry trees to protect biodiversity and water yield.

4.8 WATER QUALITY AND ECOSYSTEM HEALTH

Water Quality

Within the OTOP zone there is widespread concern regarding water quality and threats to drinking water, and ecological, mahinga kai, cultural and recreational values. There is also recognition of the significance of farming to the local economy, coupled with a desire to limit further diffuse discharges of nutrients that place increased pressure on the environment. The recommendations that follow point to a variety of mechanisms to address these concerns, and include recommendations for planning, research, non-statutory actions and support for community science and catchment groups. These recommendations apply across the entire zone. Additional recommendations are included in the Freshwater Management Unit specific sections of the addendum where required to address water quality.

The overarching principles of these zone-wide recommendations are to maintain water quality and stream health where it is meeting community outcomes, and to continuously improve water quality where it is not. With regard to maintaining water quality, the Zone Committee made a strong recommendation that water quality should not deteriorate within attribute state bands under the NPS-FM, but rather limits should be set at the water quality assessed at the most recent current state five-year period. For example, in the upper Orari and upper Waihi rivers, the recommendations specify that water quality should be maintained at its current state, and in spring-fed streams and wetlands of the lower catchments and coastal plains area which suffer poor health, such as Rhodes Stream, the recommendations are to improve water quality.

Ensuring that the cultural, environmental, social and economic needs of the zone are met is a challenging task, and the Zone Committee have tried to balance these factors when considering water quality issues by basing their decisions on

principles of equity and fairness. To protect and enhance the lower reaches of hill-fed rivers and spring-fed streams, it is critical that contaminant inputs are managed, and appropriate flow regimes are established.

Ecosystem Health

Periphyton is one of the key ecosystem health attributes in the NPS-FM for which freshwater objectives must be set. Furthermore, where conspicuous periphyton is likely to occur the NPS-FM requires regional councils to set instream concentrations of dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP) in rivers to help achieve their freshwater objectives for periphyton. In the OTOP zone, conspicuous periphyton is generally found in the mainstems of the Pareora, Opihi, Temuka and Orari rivers and their major tributaries.

Swimming Sites

Environment Canterbury's summertime contact recreational monitoring programme identifies numerous sites across the zone as popular swimming sites. Information about the state of the water at monitored sites is available at the following website: <https://www.lawa.org.nz/explore-data/canterbury-region/swimming>. These sites have been selected over several years based on community discussions, local knowledge and agreements with the relevant district councils and district health boards. Areas on rivers commonly used for swimming can be listed in Schedule 6 of the Canterbury Land and Water Regional Plan, which affords these sites protection, particularly from stock access. The Committee have acknowledged these sites and have recommended further sites for inclusion in Schedule 6 of the LWRP and that the Brassels Bridge site be removed.

Pathways for Maintaining and Improving Water Quality

The key pathways for reducing the impact of farming on water quality are the implementation of industry agreed Good Management Practices (GMP), Farm Environment Plans (FEPs), and stock exclusion from waterways. The Committee support these mechanisms as provided for in Plan Change 5 (PC5) and in the Canterbury Land and Water Regional Plan. PC5 requires a resource consent for high risk farming activities⁸ and preparation of an audited Farm Environment Plan. The consent pathway for these properties also requires the preparation of an OVERSEER[®] (or approved equivalent) modelled nutrient budget that is registered with the Farm Portal and that farming activities be subject to a Nitrogen Baseline GMP Loss Rate limit from July 2020. Lower risk farming activities⁹ are required to prepare a Management Plan (which is not audited) and are not be required to obtain resource consent.

The OTOP zone has large areas of erodible soils that occur on hill country and rolling down-lands, these are a high risk for runoff of sediment and contaminants. The High Runoff Risk Phosphorus Zone (HRRPZ) identifies areas that are likely to result in runoff, particularly when under pressure from stock, high rainfall events, and cultivation or areas of bare soil (Map 7). Research indicates that winter forage crops grazed by cattle and deer are a significant source of soil loss and overland flow of nutrients to surface waterbodies, particularly on sloping land. The Committee consider the risks from large areas of winter grazing (greater than 20 ha) in the HRRPZ should be managed through a resource consent and Farm Environment Plan that is audited. However, where this is the only reason for requiring an FEP and resource consent, the Committee does not see the necessity for these farms to prepare a nutrient budget. This recommendation seeks to ensure the effective management of critical source areas for overland flow of contaminants, while minimising the cost to the land owner.

Spring-fed streams in the OTOP Zone generally have poor health in terms of sedimentation and faecal contamination due to inadequate riparian protection, run-off from critical source areas, and stock access to waterways. Open drains and canals can also be a direct conduit for contaminants into these streams. Stock exclusion from waterways and effective management of riparian margins on farm are two of the most effective ways of minimising the overland flow of contaminants to surface water bodies from farming. The Committee have recommended that the stock exclusion rules in the OTOP Zone should be strengthened to include drains and canals discharging to surface waterbodies.

Farm Environment Plans and Management Plans are a key tool for ensuring stock are excluded from waterways with an appropriate setback distance. An "effective" setback distance for fencing a stream for stock exclusion will depend on the nature of the waterway, how vulnerable it is to contamination due to the surrounding land characteristics and practices, and whether the setback is for bank protection or nutrient filtering and assimilation. The Committee consider these

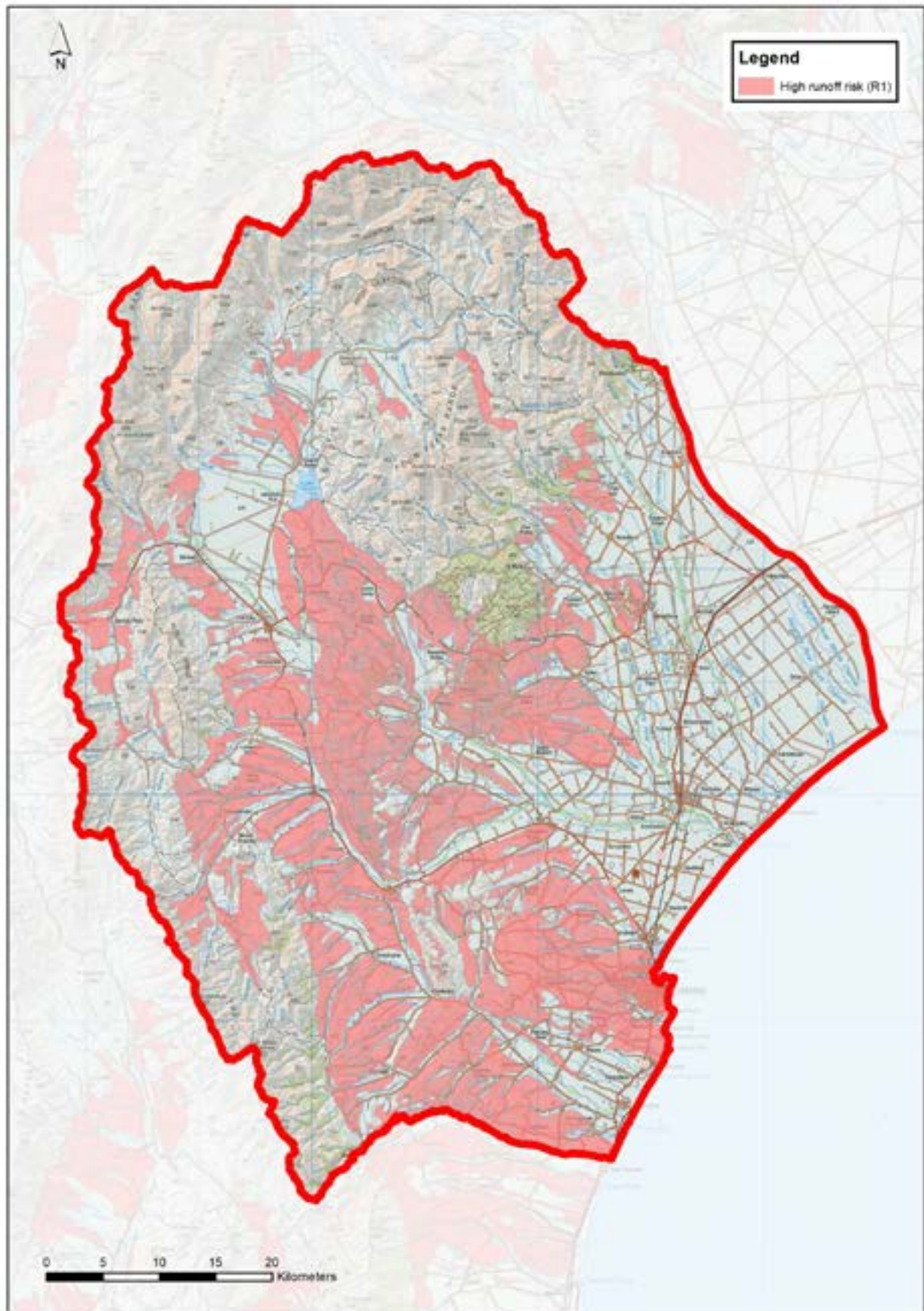
⁸ Farming activities on properties greater than 10 hectares, with more than 50 hectares of irrigation; or greater than:

a. 10 hectares of intensive winter grazing of cattle for properties less than 100 hectares in area;
b. 10% of the area of the property for properties between 100 hectares and 1000 hectares in areas;
c. 100 hectares for any property greater than 1000 hectares in area.

⁹ Farming activities on properties greater than 10 hectares, with less than 50 hectares of irrigation; or less than:

a. 10 hectares of intensive winter grazing of cattle for properties less than 100 hectares in area;
b. 10% of the area of the property for properties between 100 hectares and 1000 hectares in areas;
100 hectares for any property greater than 1000 hectares in area.

MAP 7: ORARI-TEMUKA-OPIHI-PAREORA HIGH RUNOFF RISK PHOSPHOROUS ZONE¹⁰



requirements will be best determined through the development, implementation and audit of FEPs and recommend some level of monitoring of Management Plans for permitted activities in high risk and priority areas.

Despite these pathways for maintaining or improving water quality, the current state¹¹ water quality data indicates that there is a requirement in the future for land owners in the Rangitata Orton, Levels Plains, and Fairlie Basin areas to reduce nitrogen losses further than Baseline GMP loss rates to achieve water quality outcomes over time. These areas are referred to as nitrate hot spots and are areas with high nitrate concentrations where targeted nitrogen reductions are required (Map 8).

A Farmers' Reference Group investigated the costs and benefits of mitigations to further reduce nitrogen losses and has reported to the Zone Committee on opportunities currently available and some alternatives still under investigation. The results of the modelling undertaken by the Group showed that achieving loss rates beyond baseline GMP will require farm system changes for many of the affected farmers and will also be likely to increase the complexity of farm management. The practices to reduce nitrogen losses from farm that can be implemented now, and reflected in overseer nutrient budgets, include reducing nitrogen fertiliser applications and reducing the nitrogen in supplements by using lower protein feed sources such as grain, maize and fodder beet. The use of standoff pads during high risk periods was also investigated by the Group and found to be an effective mitigation (although likely to be the most expensive option) to reduce nitrogen losses beyond baseline GMP.

Timaru, Waimate and Mackenzie District Councils all operate reticulated stormwater networks which discharge contaminants into surface water bodies across the zone. From 30 June 2018, district councils operating an existing network have been required to apply for a resource consent and comply with the water quality Receiving Water Standards contained in the Land and Water Regional Plan by 2025. A Stormwater Management Plan must accompany the application and detail how these limits will be met. The limits relate to metals and other toxicants, and are based on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) 2000. The limits provide different trigger values for different levels of protection (percentage of species expected to be protected).

It is predominantly urban waterways in the zone that receive stormwater discharges. The LWRP requires these discharges to meet at least 90% species protection by 2025. The Committee are supportive of this level of protection and timeframe for achievement but have recommended that any new discharge of stormwater into a reticulated network will be expected to meet the 95% level of species protection threshold.

While water quality in the zone is under pressure from the primary sector, there are additional factors affecting water quality, and it is essential that these are recognised, monitored and managed. This includes Emerging Organic Contaminants (EOC), and large-scale discharges of industrial wastewater that occur in the zone. EOCs are defined as 'any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and (or) human health effects'. Potential sources of EOCs include: stormwater, sewage, landfill, and chemical use by the agricultural industry.

There is also risk to in-stream values from the increased occurrence of potentially toxic *Phormidium* blooms across the zone, which over the past decade have had a profound impact on the community's recreational use of rivers in the OTOP zone. *Phormidium* blooms not only create issues for recreational water users, but also cause concern for mahinga kai and drinking water supplies.

Recommendations

In making the following recommendations, the Committee aim to address the community's concerns about water quality in the zone. The Committee acknowledge that there are already on-the-ground activities taking place, but that more needs to be done, over time, to protect ecological and cultural values in local waterbodies and achieve community outcomes.

4.8.1 Recommendation: Water Quality Outcomes (Groundwater and Spring-fed Streams) – Zone Wide

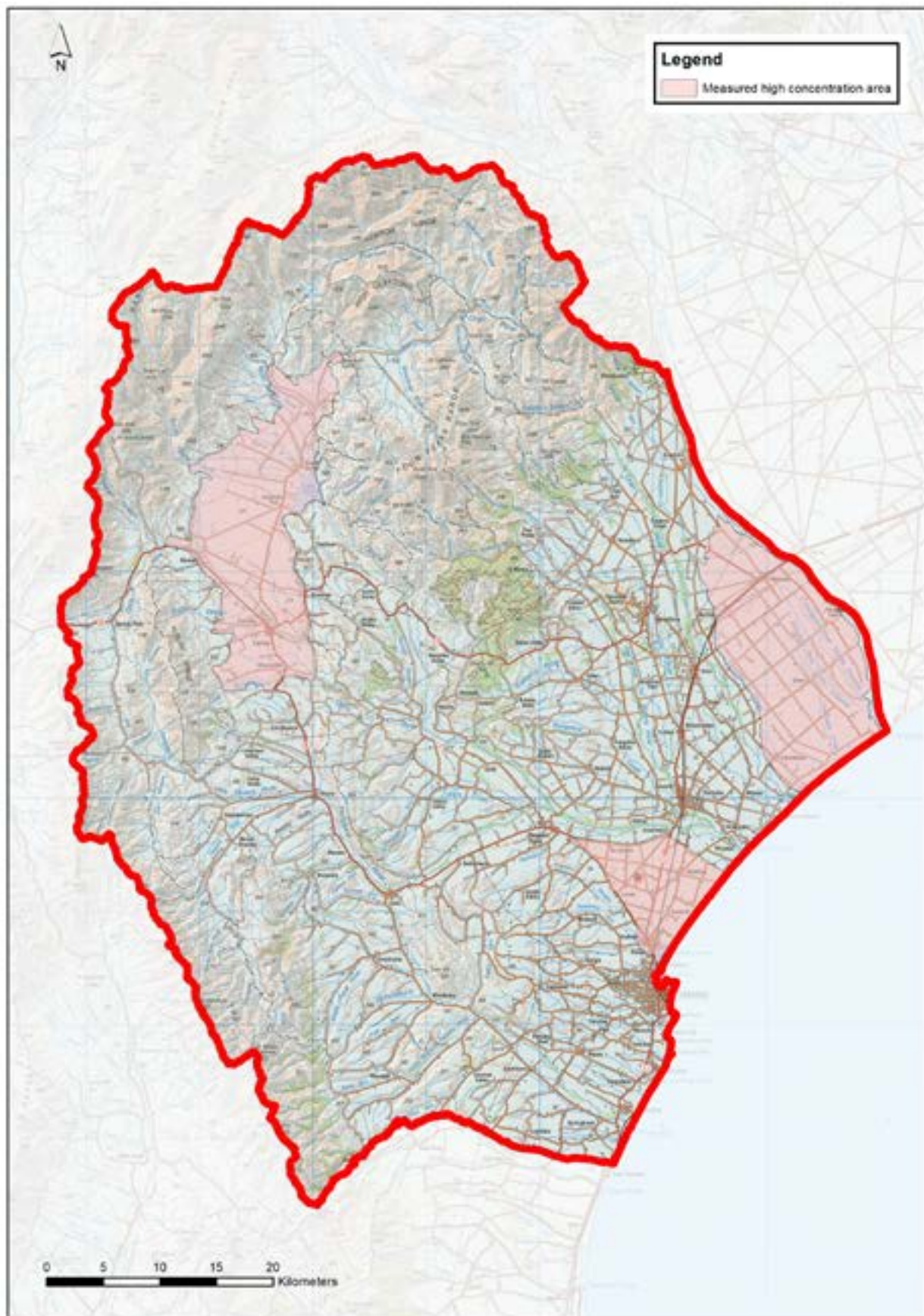
The recommendations below are the freshwater outcomes that apply across the zone for freshwater resources.

- I. No Deterioration of Water Quality:
 - a. Where existing freshwater quality is already better than any outcome or limit set out in this ZIPA, there shall be no deterioration of that water quality.

¹⁰ The High Runoff Risk Phosphorus Zone indicates areas where there is a high potential for fine particulate matter with attached phosphorus to be carried by runoff flow to surface waterbodies.

¹¹ Current state water quality is based on data from the preceding five-year period. Five years of regular monitoring data is generally considered appropriate for determining current state as it incorporates annual variability as well as time for recent changes to be detected, while also providing sufficient data points for determining mean, median, and variability of dataset.

MAP 8: NITRATE HOTSPOTS IN THE ORARI-TEMUKA-OPIHI-PAREORA ZONE



II. Groundwater:

- Annual average nitrate nitrogen concentrations in groundwater within each groundwater province (Map 9), excluding the hot spot areas of Rangitata Orton, Levels Plains, and the Fairlie Basin, shall be maintained at, or improved beyond, the current state limits set out in Table 1.
- In the hotspot areas of Rangitata Orton, Levels Plains, and the Fairlie Basin, annual average nitrate nitrogen concentrations in groundwater shall not exceed 5.65 mg/L¹² as a target to be achieved at or before the dates specified in Recommendations 5.1.2, 5.3.4, and 5.4.3 of this ZIPA.
- Within five years of the OTOP sub-region plan change becoming operative *E. coli* in groundwater shall not exceed the limit in the Land and Water Regional Plan¹³.

III. Surface Water:

- Annual median concentrations of nitrate nitrogen in individual spring-fed streams shall be maintained at or improved beyond the current state limits set out in Table 2.
- In the hotspot areas of Rangitata Orton and Levels Plains, annual median concentrations of nitrate nitrogen in individual spring-fed streams set out in Table 3 shall not exceed 6.9 mg/L¹⁴ as a target to be achieved at or before the date specified in Recommendation 5.1.2 and 5.4.3.

Groundwater Province	Recommend limits	
	Current State Average (mg/L nitrate nitrogen)	Recommended Default Limit* (mg/L nitrate nitrogen)
Geraldine	2.8	5.65
Opihi	4.7	
Orari	2.7	
Lower Pareora	2.6	
South Branch Pareora	Insufficient data available and ongoing monitoring is recommended.	Or where groundwater quality is already better than this limit, water quality shall not deteriorate below its existing state at plan notification.
Taiko Stream		
Te Ana Wai		
Timaru		
Upper Pareora		

Table 1: Recommended Nitrate Limits for Groundwater

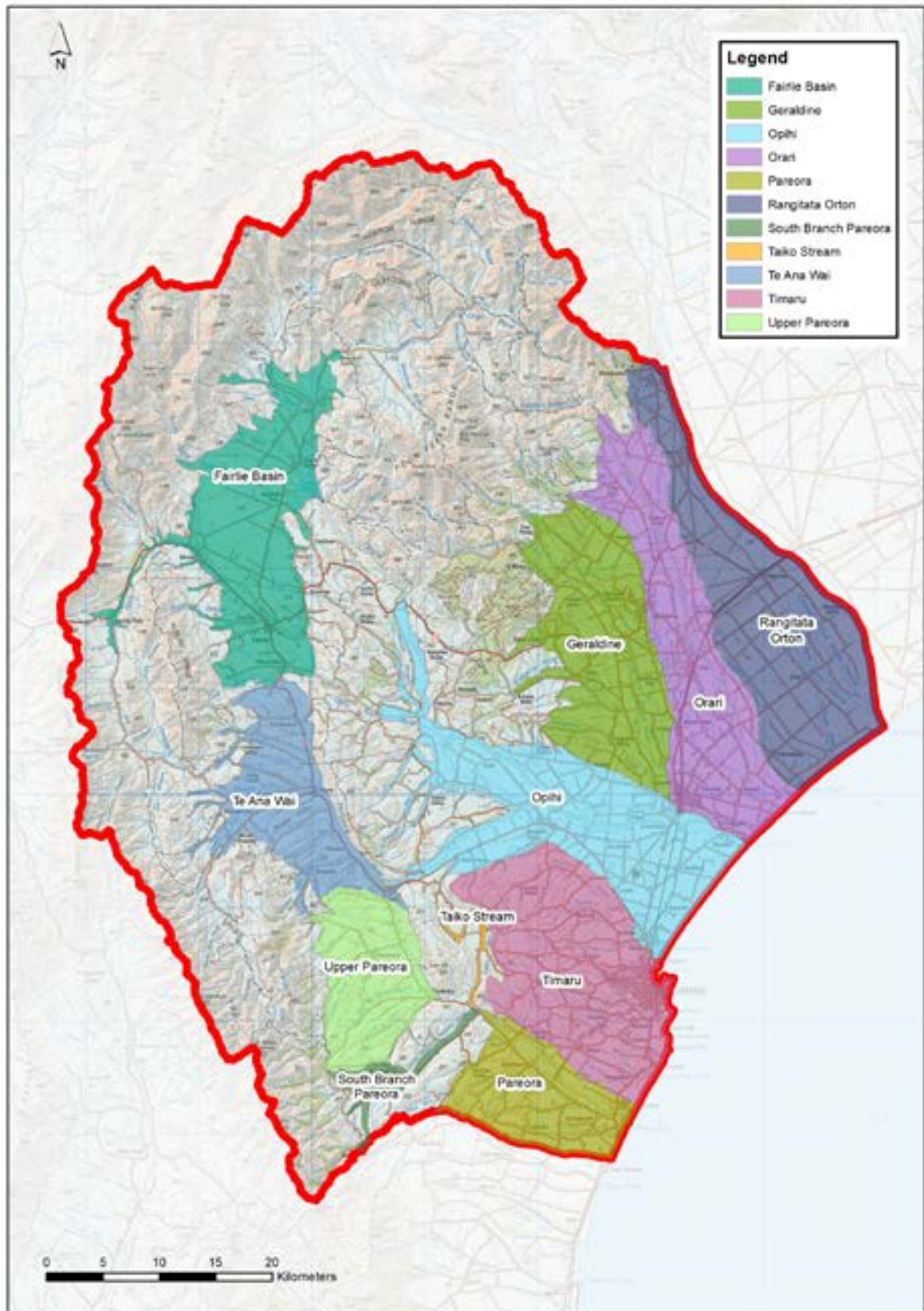
* Default limit applies where current state data is not available.

¹² 5.65 mg/L is half the Maximum Acceptable Value of 11.3 mg/L as set out in the Drinking Water Standard for New Zealand 2008

¹³ In 95% of samples, *E. coli* must meet a limit of <1 organism per 100 millilitres.

¹⁴ 6.9 mg/L is the National Bottom Line under the NPS-FM for nitrate toxicity for ecosystem health.

MAP 9: ORARI-TEMUKA-OPIHI-PAREORA GROUNDWATER PROVINCES



FMU	Site Name	Recommended limits	
		Current State 5 year median (nitrate nitrogen mg/l)	Default Limit* Annual median (nitrate nitrogen mg/l)
Orari	Petries Drain Canal Road	5.0	6.9 For any surface waterway, where water quality is better than this limit, water quality shall not deteriorate below its existing state at plan notification
	North Branch Ohapi Creek Guild Road	0.7	
	Ohapi Creek Guild Road	0.7	
	South Branch Ohapi Creek Guild Road	0.9	
	Ohapi Creek Above Orari Confluence	0.7	
	Coopers Creek SH72 Bridge	0.9	
	McKinnons Stream Wallaces Bridge	4.9	
Temuka	Smithfield Creek Te Awa Road	3.8	
	Taumatakahu Stream Murray Street	1.4	
	Raukapuka Creek Coach Road	1.8	
Opihi	Orakipaoa Creek Milford Lagoon	1.4	

Table 2: Recommended Nitrate Limits for Spring Fed Streams

4.8.1A Recommendation: Water Quality Outcomes (Rivers and Lakes) – Zone Wide

- I. All rivers and lakes in the OTOP Zone are to meet the freshwater outcomes contained in Tables 1a and 1b of the Canterbury Land and Water Regional Plan. Dissolved Inorganic Nitrogen (DIN) and Dissolved Reactive Phosphorous (DRP) limits will be developed to ensure the periphyton outcome, as required by the 2017 amendments to the NPS-FM, is met.

4.8.2 Recommendation: Pathways for Achieving Water Quality Outcomes

- I. Diffuse discharges of nutrients are capped at current limits, and are reduced over time where required to meet water quality limits in the nitrate hot spot areas of:
 - a. Rangitata Orton;
 - b. Fairlie Basin;
 - c. Levels Plain.
- II. High risk farming activities to be subject to a resource consent, operate at Good Management Practice and prepare Farm Environment Plans as required by Plan Change 5 to the Canterbury Land and Water Regional Plan, and as supplemented by the recommendations in this addendum.

* Default limit applies where current state data is not available.

- III. For farms incorporating winter grazing of either cattle or deer on a total area exceeding 20ha in the High Runoff Risk Phosphorus Zone, this activity shall be subject to a resource consent requiring a Farm Environment Plan to be prepared and implemented.
- IV. Regional Council reviews the High Runoff Risk Phosphorous Map for the Orari-Temuka-Opihi-Pareora Zone prior to the notification of the OTOP sub region plan change.
- V. Low risk farming activities to be subject to a Management Plan as required by Plan Change 5 to the Canterbury Land and Water Regional Plan, and as supplemented by the recommendations in this addendum.
- VI. For the purposes of stock exclusion as addressed in the LWRP, a river should include all drains and watercourses, but exclude irrigation canals, water supply races and canals for the supply of electricity generation, where these races and canals do not discharge to a river or surface water body.
- VII. For the purposes of stock exclusion as addressed in the LWRP, springheads will be protected where they discharge to a river or surface waterbody, or where they are within an area identified as a culturally significant site.
- VIII. Establish a nitrogen load limit for industrial discharges to achieve water quality outcomes, while recognising existing investment.
- IX. Industrial activities to adopt the Best Practicable Option (BPO) for the treatment and disposal of discharges.
- X. Where periphyton and macrophyte outcomes are not met, investigate and implement options to achieve these e.g. flow/shading/nutrients/sediment.
- XI. Operators of reticulated stormwater networks to apply for a discharge permit on or before 30 June 2018 and prepare a stormwater management plan.
- XII. Ground and surface water replenishment schemes such as Managed Aquifer Recharge and/or Targeted Stream Augmentation are enabled to improve freshwater quality across the zone.

4.8.3 Recommendation: Supporting Change

- I. Regional council and industry:
 - a. Support farmers' move to Good Management Practices (GMP).
 - b. Provide advice and support for successful and effective riparian planting.
 - c. Explore options for initiatives that enhance, improve or protect water quality (for example enhancing wetlands, riparian planting).
 - d. Prioritise work with farmers that addresses:
 - i. The Fairlie Basin, Levels Plain and Rangitata Orton nitrogen hot spots;
 - ii. Nutrient, *E. coli* and sediment issues in Temuka FMU.
 - e. Within six months of the sub region plan change for the OTOP zone being made operative regional council develop a robust water quality monitoring and reporting programme to inform plan effectiveness and review.
 - f. Regional council, in consultation with Papatipu Rūnanga and community groups, develop and support monitoring programmes that evaluate the effectiveness of both regulatory and non-regulatory interventions and initiatives, and enable communities to monitor their own environment.
 - g. Regional council makes provision in its Long-Term Plan for surveying, identifying and mitigation of Emerging Organic Contaminants, based on risk assessments.
 - h. Regional council make provision in its Long-Term Plan for some targeted monitoring of Management Plans, in high risk and priority areas.

4.8.4 Recommendation: *Phormidium*

- I. Environmental flow regimes, including those that are managed, will consider the potential impact on *Phormidium* blooms.
- II. Regional council completes further locally relevant research on *Phormidium* controls for future decision making.

4.8.5 Recommendation: Swimming Sites

- I. Regional council identifies the following sites as primary contact sites for inclusion in Schedule 6 of the Land and Water Regional Plan:
 - a. Orari River Gorge;
 - b. Waihi River Gorge;
 - c. Waihi River at Geraldine;
 - d. Hae Hae Te Moana River Gorge;
 - e. Lake Opuha at Recreation Reserve;
 - f. Lake Opuha at Ewatts Corner Boat ramp;
 - g. Opihi River:
 - i. Raincliff Scout Camp
 - ii. Allandale Bridge
 - iii. Saleyards Bridge;
 - iv. State Highway One;
 - v. Waipopo Huts;
 - h. Te Ana Wai River at Belmont Bridge.
 - i. Temuka River at State Highway One;
 - j. Pareora River:
 - i. Upper Pareora at Lindisfarne
 - ii. Evans Crossing;
 - iii. Pareora Huts;

4.9 WATER QUANTITY

Background

The Zone Committee recognise the growing pressure on local waterways and the risks of a drying climate. The Committee acknowledge that some surface water resources across the zone are considered over-allocated, and a number of waterways are under pressure from low flows.

Water quantity across the zone is currently managed by the Canterbury Land and Water Regional Plan in the Orari and Timaru FMUs, the Opihi River Regional Plan in the Opihi and Temuka FMUs, and the Pareora Environmental Flow and Water Allocation Regional Plan in the Pareora FMU. The Committee have acknowledged the management regimes under these plans and are not recommending any substantive changes to the Orari or Pareora environmental flow and allocation regimes.

Changes to Minimum Flows

The environmental flow and allocation regime for the Opihi and Temuka catchments has been operative since 2000, and the Committee acknowledge some changes are needed to this regime to address the over allocation of freshwater resources, minimum flows, and the methodology for estimating a stream depletion effect of shallow groundwater abstractions.

The Committees' first step in addressing this over allocation is to cap allocation limits and prevent further allocation from occurring. The Committee is also seeking to increase minimum flows at appropriate intervals, with the cultural flow preference for waterways being the long-term target. They recognise the need to strike a balance between the cultural, ecological, social and economic demands on the freshwater resources in the zone.

Out of Catchment Water

The Committee are supportive of out-of-catchment water being introduced into the zone, provided Papatipu Rūnanga are

actively engaged in any decision-making process. The Committee have therefore recommended that the sub-region plan change enables out-of-catchment water to be brought into the zone to restore any potential reduction in reliability that may occur as a result of increased minimum flows, or to provide for new irrigation.

Actual Use

Water metering data has shown that consent holders do not use all their consented allocation. Basing allocation on records of actual use for water abstractions, rather than an existing consented annual volume is a tool that provides a more accurate and equitable method of ensuring over-allocation is addressed when consents are renewed. Using the actual water use data reduces the risk of further abstraction on waterways without restricting consent holders beyond current reliability.

Stream Depletion

Groundwater abstraction can influence flows in nearby streams. The effect is referred to as stream depletion. The magnitude of this effect is dependent on the rate of pumping from the groundwater, the distance from the waterbody and the characteristics of the aquifer being pumped. If groundwater is closely linked to surface water, the effect can be mitigated at times of low flow by ceasing abstraction. This means low flows in streams can receive some protection by turning off stream depleting groundwater abstractions.

To quantify the stream depletion effect, the Land and Water Regional Plan sets a methodology which calculates the depletion effect if the take was pumped at its average rate for 150 days (and maximum rate for 7 days). This calculation quantifies the cumulative effect of a season's worth of abstraction and is applied throughout most of Canterbury.

The Opihi River Regional Plan has an older methodology for calculating stream depletion and uses a 30-day stream depletion calculation. Both methodologies indicate how connected a groundwater take is to the surface water body and are used to define whether a groundwater take needs a minimum flow and should be treated in the same way as surface water abstractions.

The 150-day stream depletion test is a more robust calculation of the stream depletion effect on nearby waterbodies and consequently provides a higher level of protection to these water bodies. It also means that more groundwater abstractions are counted as being stream depleting in the Opihi and the Temuka catchment than under the 30-day test in the ORRP. These newly identified stream depleting groundwater abstractions will have a reduction in reliability of supply as they will have minimum flows imposed on them at times of low flows. Previously these abstractions would have been unrestricted, even when nearby streams were experiencing low flows.

Groundwater Allocation Zones

Groundwater allocation within the zone is managed via seven groundwater allocation zones (GWAZ's), representing areas with similar hydrology and sources of recharge. The zone boundaries are generally based on areas defined as gravels. The seven GWAZ's combined do not cover the entire OTOP Zone, which creates difficulties for consenting and accounting for abstractions that lie outside of a GWAZ. Each GWAZ has an allocation limit set (in Million M3/year), against which consented allocations are counted. As the current groundwater allocation zones do not cover all areas within zones, it is possible for consent applications to be lodged for abstraction outside of these zones. If granted, these can still have an impact on the water balance of the catchment and aquifer. Extending the boundary of the groundwater allocation zones to the catchment boundaries will result in all areas within the OTOP zone being covered by an allocation zone, so that all consents will be counted towards an allocation limit, and over allocation can be avoided where an allocation limit is exceeded.

Recommendations

The recommendations provided below are general recommendations for water quantity that apply zone wide. Freshwater Management Unit specific recommendations for addressing over allocation and minimum flows are provided in the sections that follow.

4.9.1 Recommendations: General

- I. Where cultural flows are not being met across the OTOP zone, they remain the long-term aspiration.
- II. The installation of on-farm water storage to maximise efficient use of water and enhance reliability is enabled where appropriate.
- III. Groundwater allocation zone boundaries are extended so the entire OTOP zone has mapped Groundwater Allocation Zones.
- IV. The taking and use of irrigation scheme water is prioritised over individual surface and groundwater sources.

4.9.2 Recommendation: Stream Depletion Methodology

- I. The methodology in the Land and Water Regional Plan for estimating a stream depletion effect of shallow groundwater abstractions is to apply zone wide.
- II. The allocation block that newly identified stream depleting groundwater abstractions will be factored into is to be determined by the date their consent was granted in accordance with the priority for abstraction specified in the Opihi River Regional Plan.
- III. In the Opihi Freshwater Management Unit, water permits granted prior to 30 July 1994 are AN¹⁵ Permits. Water permits granted subsequent to this date are BN¹⁶ Permits.
- IV. In the Temuka Freshwater Management Unit, water permits granted prior to 1 January 1991 are A Permit consents. Water permits granted subsequent to this date are B Permit consents.

4.9.3 Recommendation: Allocation Limits and Transfers

- I. Establish allocation limits for abstractions of surface water in the Opihi and Temuka FMUs.
- II. Existing allocations for surface water are to be capped at current level of abstraction.
- III. Groundwater abstraction is to be capped at current volume of abstraction, and an additional allocation block provided to allow holders of surface water and/or stream depleting groundwater permits to abstract deep groundwater provided the surface water and/or stream depleting groundwater permit is surrendered and not reallocated.
- IV. Provide for site to site transfers of water but only in circumstances where the transfer is of water that has actually been used during the previous 5 years (based on actual usage records), does not affect the reliability of existing abstractors, and, in accordance with the extent the catchment is over-allocated, there is a surrender of water that matches the extent of over-allocation, up to a maximum of 75%.¹⁷
- V. Prohibit the transfer of any unexercised water permit, and/or of any unused water, based on actual usage records.

4.9.4 Recommendation: Preventing Over-Allocation

- I. Prohibit any new abstraction, other than for community drinking water supplies, where a limit has, or will be, exceeded.

4.9.5 Recommendation: Phasing out Existing Over-Allocation

- I. Water User Groups are incentivised to reduce allocation in the establishment of environmental flow and allocation regimes.
- II. On renewal of a water permit, annual volumes are to be based on actual use data, with data taken from the five-year period prior to notification of the OTOP sub-region plan change, taking account of climatic conditions and availability of alternative supplies.¹⁸
- III. Any application to amend any condition concerned with the rate, volume or application area of any existing resource consent to take and use water is to include a review of the actual usage compared with the consented volume and rate of abstraction and, where appropriate the consent is to be amended to reflect actual usage.¹⁹
- IV. For any water permit that lapses, is surrendered, or expires and is not renewed, the rate and/or volume is not reallocated.
- V. As part of an overall water quantity management regime, lapse dates on unexercised consents are prevented from being extended except where exceptional extenuating circumstances are demonstrated.

4.9.6 Recommendation: Introduced Out-of-Catchment Water

- I. The sub-region plan change for OTOP supports out-of-catchment water being brought into the zone.
- II. Papatipu Rūnanga are actively involved in any decision-making regarding out of catchment water being brought into the zone.
- III. The use of introduced water is to be prioritised over individual surface and groundwater sources.

Note: The Zone Committee did not reach consensus on this recommendation as the outcome does not address the concerns of Te Rūnanga o Arowhenua.

¹⁵ AN Permits are A permits where the consent holder does not hold shares in Opuha Water Limited.

¹⁶ BN Permits are B permits where the consent holder does not hold shares in Opuha Water Limited.

¹⁷ This recommendation does not apply to water permits affiliated to Opuha Water Limited.

¹⁸ This recommendation does not apply to water permits affiliated to Opuha Water Limited.

¹⁹ This recommendation does not apply to water permits affiliated to Opuha Water Limited.

4.9.7 Recommendation: Resource Consent Reviews and Priority

- I. Regional council to review water permits in the Orari, Temuka and Opihi FMUs to align with the Environmental Flow and Allocation Regime immediately following the OTOP sub-region plan change becoming operative.
- II. Regional council to include the stream depleting consents that affect the following catchments in the priority that is set for consent reviews in the OTOP Zone:
 - a. Awarua Catchment (Temuka FMU);
 - b. Waipopo and the area around the Opihi Lagoon (Opihi FMU);
 - c. Kotare Catchment (Opihi FMU);
 - d. Dobies Creek (Temuka FMU);
 - e. Raukapuka (Temuka FMU).

4.9.8 Recommendation: Global Water User Groups

- I. The formation of Global Water User Groups allowing members to increase their instantaneous rate of take above the rates specified on the members existing individual consents is enabled via a consenting pathway providing:
 - a. There is no net increase in the total instantaneous rate of take and volume abstracted from the subject water body as authorised by the individual existing consents;
 - b. The total instantaneous rate of take and volume is limited to actual use data in accordance with the members existing consents;
 - c. The abstraction(s) under the Global Water User Group consent complies with the applicable environmental flow and allocation regime, including partial restrictions.

5.0 FRESHWATER MANAGEMENT UNIT SPECIFIC RECOMMENDATIONS

The recommendations preceding this section apply across the whole OTOP zone, the following recommendations have been developed to address issues that are specific to a particular area, referred to as a Freshwater Management Unit (see FMU Map 2, Page 12). The sections herein begin with the Orari area in the north and work down the zone, finishing with the southern-most, the Pareora FMU.

5.1 ORARI FRESHWATER MANAGEMENT UNIT

The recommendations for the Orari Freshwater Management Unit are in addition to those that apply across the OTOP Zone.

Upper Catchment

The upper reaches of the Orari River, above the mouth of the Orari Gorge, are recognised in the LWRP as a high naturalness waterbody, and much of the area is identified as a regionally outstanding landscape by the Department of Conservation. The area also has high recreational and biodiversity values and good aquatic ecosystem health. The community has expressed concern about potentially adverse effects to this area from land use activities. The Zone Committee recognise and acknowledge the work of the local community to develop the Orari River Catchment Management Strategy, and fully supports its ongoing implementation as part of the Zone Implementation Programme (ZIP).

Orari Conjunctive Use Zone

The LWRP defines a conjunctive use zone in the Orari catchment, an area with a high level of interaction between surface water and groundwater. To acknowledge this close link, shallow groundwater takes (less than 30m deep) are counted as stream depleting, have minimum flow conditions and are counted as abstractions from the river. The committee consider there may be some groundwater abstractions near the boundary of this zone that may have extenuating circumstances

and may not be as closely linked to the river as the wider groundwater. In these special cases the Committee consider that consent holders should have the opportunity to assess their degree of hydraulic connectivity to surface water.

To maintain the purpose and benefit of the conjunctive use zone, shallow groundwater abstractions need to continue to be classified as directly stream depleting, but with some flexibility for the small number of consents which may not be as directly linked to the surface water. To meet this criteria consent holders would need to demonstrate that they have a moderate or low stream depletion effect via field testing.

5.1.1 Recommendation: General

- I. Regional and district councils' work programmes implement the Orari River Catchment Management Strategy 2008.
- II. Regional and district councils shall implement the Regional Pest Management Strategy to control invasive tree species

Water Quality

Rangitata Orton Hot Spot

The Zone Committee note the challenges in the Orari FMU, particularly the nitrate hot spot in the Rangitata Orton area, and the generally poor health of the lowland spring-fed streams. While the Committee understand the need for a pathway to improve surface and groundwater quality, it is also recognised that these improvements will take time.

While aiming to improve water quality across the entire zone the Committee also support targeted mitigations that address nitrate hot spots and poor stream health in the area. Recommendation 5.1.2 sets out a staged regime for further nitrate reductions beyond the reductions that will be achieved by the implementation of Baseline GMP Loss Rates. The Committee acknowledge that for most land owners the first step for improving water quality will be the requirement to operate at a Baseline GMP Loss rate which could incur significant cost.

To achieve the water quality targets, current measured concentrations indicate that total reductions in the order of 30-35% are required. The reduction in nitrate leaching from properties in the Rangitata Orton Hotspot area achieving their Baseline GMP Loss rate is expected to be approximately 15%. The staged regime set out below proposes a further step beyond GMP at 2030 of 10% and sets out a subsequent step that may be required at 2035 of 5-10% to achieve the water quality targets. These percentage reduction figures are based on the 2011 - 2016 current state modelling that has been undertaken. Improvements in water quality made by the reductions in nitrogen loss rates achieved by 2035 are expected to be visible in the environment and in water quality reporting by 2040.

The Committee recommend a monitoring programme be implemented to inform future State of the Environment Monitoring and enable a review of the targets and outcomes set by the Committee. A core component of the monitoring programme for the Rangitata Orton hotspot will be to determine if the planned future stepped percentage reductions beyond GMP, as established based on current science, would still need to apply to meet the water quality targets, or whether lesser or greater percentage reductions would be required in a subsequent plan change following new science.

The Committee considers that the policy framework of the OTOP sub region plan change could further support this direction by requiring that land use consents to farm are granted with durations not exceeding ten years so that only one further reduction beyond GMP step is imposed as a condition of consent. This would enable the renewal of farming land use consents to be relative to the five-yearly monitoring and ten yearly plan review cycles, and would ensure any future percentage reduction steps are relative to the future state.

The Committee also recognise the contribution of discharges from an industrial activity in the hotspot area. Clause (II) of Recommendation 5.1.2 has been included in the regime to ensure that the burden of reducing nitrogen losses is shared between individual land owners and industry.

5.1.2 Recommendation: Additional Pathways for Achieving Water Quality Outcomes in the Rangitata Orton Hot Spot Area

- I. The water quality targets for nitrate nitrogen in ground and surface water set out in Table 3 are to be achieved at or before 2040 by requiring high risk farming activities to reduce diffuse discharges of nitrogen beyond Baseline Good Management Practice Loss Rates of not less than a further:
 - a. 10% at 2030; and
 - b. 5 - 10% at 2035;
- II. In addition to clause (I), the water quality targets for ground and surface water set out in Table 3 are to be achieved

at or before 2040 by requiring discharges from industrial activities to be reduced beyond current nitrogen discharge rates by up to 30% by 2035.

- III. In addition to clauses (I) and (II), regional council should continue to support non-statutory measures for nitrogen reductions beyond Baseline GMP Loss Rates in order to achieve water quality outcomes before the target date specified in Table 3.
- IV. To track progress towards achieving the water quality targets set out in Table 3, the regional council shall monitor and report on water quality and report the progress towards achieving the targets within 5 years of the OTOP sub-region plan change becoming operative, and subsequently at 5 yearly intervals, to evaluate the efficiency and effectiveness of measures being taken to achieve water quality outcomes.
- V. Where this monitoring and review demonstrates that the water quality targets are likely or unlikely to be met prior to 2040, this information shall inform future plan changes for the OTOP zone to adjust the percentage reductions beyond Baseline GMP Loss Rates required to achieve the water quality targets.
- VI. The OTOP sub-region plan change directs that land use consents to farm are granted with durations not exceeding 10 years and only adopt one percentage reduction step beyond GMP. This is to ensure the renewal of farming land use consents is relative to the plan review cycle and ensure any future percentage reduction steps are relative to the future state.

Groundwater Province	Current State Average (mg/L nitrate nitrogen)	Target – Annual Average (mg/L nitrate nitrogen)	To be Achieved at or Before	Total Percentage Reduction Required to Achieve Water Quality Target
Rangitata-Orton	8.4	5.65	2040	33%
Spring Fed Streams	Current State 5-year Median (mg/L nitrate nitrogen)	Target – Annual median (mg/L nitrate nitrogen)	To be Achieved at or Before	Total Percentage Reduction Required to Achieve Water Quality Target
Old Orari Lagoon Outfall	9.1	6.9	2040	24%
Rhodes Stream Parke Road	9.8	6.9	2040	30%

Table 3: Water Quality Targets for the Rangitata Orton Hotspot Area

Water Quantity

An Environmental Flow and Allocation Regime for the Orari FMU was introduced as part of the development of the Canterbury Land and Water Regional Plan. This regime became operative in February 2017 and requires a consent review to align all existing abstractions of surface water and stream depleting groundwater with the regime. The regime is a time-stepped approach to increasing environmental flows and reducing allocation limits to better meet in-stream ecological, cultural and economic values through to 2040.

The Zone Committee recognise that there has been no significant change in values since the previous flow review, and that the benefit of the current regime change has not yet been observed. The Committee note that a review of resource consents as soon as the plan change is operative is an integral element of the package and is required to ensure effect is given to the regime. However, there are some changes required to the regime with regard to a minimum flow site on

Coopers Creek, and the correction of the measurement site for minimum flows on Ohapi Creek (which was previously at Browns Rd but has since moved to Houstons).

Coopers Creek is a spring fed stream that lies between the Rangitata and Orari rivers in the upper plains of the Orari catchment. Historically, abstractions have been managed with minimum flow restrictions on Coopers Creek at State Highway 72. However, in 2013, some of these minimum flow conditions on existing consents were changed to a minimum flow on the mainstem of the Orari River as a minimum flow site for Coopers Creek was not included in the environmental flow regime for the Orari catchment. Since then, Environment Canterbury has undertaken a study to determine if a minimum flow restriction on the mainstem of the Orari River is a suitable proxy for low flow conditions at Coopers Creek. The investigation concluded that the Orari River is not a suitable proxy for managing abstractions on Coopers Creek, particularly for stream depleting groundwater abstractions. The Committee have considered the findings of this study and recommended the inclusion of a minimum flow site on Coopers Creek accordingly.

5.1.3 Recommendations: Orari Environmental Flow and Allocation Regime

- I. The Environmental Flow and Allocation Regime for the Orari River specified in Section 14 of the Land and Water Regional Plan is retained, subject to the following additions:
 - a. Provision of an additional minimum flow monitoring site and allocation limit on Coopers Creek at State Highway 72;
 - b. Correction of the measurement site for minimum flows on Ohapi Creek to the Browns Road flow recorder to capture the intent of the previous flow review in the Orari Catchment.
- II. Any new water permit or change to any existing water permit to abstract surface water or stream depleting groundwater, shall be subject to the environmental flow regime for the Orari Freshwater Management Unit as though it is operative.
- III. Consent holders in the Orari Conjunctive Use Zone who are considered to be directly connected to surface water have the opportunity to undertake field stream depletion testing to determine their degree of connectivity to surface water.

5.2 TEMUKA FRESHWATER MANAGEMENT UNIT

The recommendations for the Temuka Freshwater Management Unit are in addition to those that apply across the OTOP zone.

The Temuka FMU covers an area of the zone that is of particular importance to Te Rūnanga o Arowhenua as a wāhi tūpuna, providing a variety of mahinga kai sites and areas of wāhi taonga. The philosophy of ki uta ki tai – the mountains to the sea – directs that all parts of the catchment are valued and protected, and that the health of all waterbodies is essential to realising the values within. The degradation of the waterbodies affects cultural, ecological and recreational values in this catchment in many ways, and the Committee acknowledge the importance of addressing water quality and water quantity in this area as a priority.

The Temuka River has three main hill-fed tributaries, the Kakahu, Hae Hae Te Moana and Waihi rivers, which originate in the Four Peaks Range. Lowland spring-fed tributaries flow into the lower reaches of the Waihi and Temuka rivers, notably the Raukapuka Creek, Dobies Creek and Taumatakahu Stream. These streams contribute significant flows over summertime when flows in the hill-fed tributaries are low. There is also a strong interaction between groundwater in the Orari and the Temuka catchments, with water leaving the Orari River and emerging in the Waihi Catchment. The catchment is considered over-allocated in respect of ecological and cultural values. The Temuka FMU also receives water from the Opihi Catchment through the Kakahu Irrigation Scheme. This water comes from the Opuha River and uses a combination of irrigation canals and natural waterways to convey water to shareholders for irrigation.

The long-term goal of the Committee is for environmental flow and allocation regimes to be established for each of the major sub-catchments in the Temuka FMU being the Waihi, Hae Hae Te Moana, Kakahu and Temuka Rivers. Establishing regimes in this manner acknowledges and protects the important values of these tributary rivers, as well as the Temuka River. Ecological information for flow regime establishment is currently limited to the mainstem of the Temuka River. Therefore, the Committee have recommended an environmental flow and allocation regime for the mainstem of the Temuka River to manage the catchment as a whole but have further recommended that environmental flow and allocation regimes are established as a sub catchment level in the future.

The Committee also acknowledge that Taumatakahu Stream is hydrologically different from the Temuka River and have recommended that this tributary be investigated to determine if a specific environmental flow and allocation regime can be established.

In addition to the zone wide water quality outcomes recommended in the ZIPA, the Committee have further recommended that the Temuka catchment is a priority area for the improvement of water quality, particularly with respect to non-statutory measures given its cultural significance.

Water Quality

5.2.1 Recommendations: Further Water Quality Outcomes for the Temuka Catchment

- I. That the Temuka River is a priority area for improving water quality in acknowledgement of its cultural significance.
- II. Non-statutory mitigations, particularly in respect of sediment, *E. coli*, and phosphorous to be prioritised for the Temuka Catchment.

Water Quantity

Environmental Flow and Allocation Regimes

The Zone Committee considered options for establishing environmental flow and allocation regimes based on ecological, and cultural flow preferences, as well as the preferences of the Temuka Catchment Working Party. As site specific ecological flow information is currently limited to the mainstem of the Temuka River, the focus of the Working Party was at this site only. The Working Party was endorsed by the Zone Committee and its attendees comprised of affected consent holders, Zone Committee members, Central South Island Fish and Game and Timaru District Council.

The Zone Committee acknowledges the substantial amount of time and effort undertaken by the Working Party in establishing the Working Party's preferred environmental flow and allocation regimes for the Temuka River. The preferred regime comprises an increase in minimum flows 3 years after the OTOP sub region plan change becomes operative and has a particular focus on reducing A and B Block consented allocation at 3, 5 and 8 yearly intervals. It includes methods to achieve this such as prohibiting site to site transfers of surface water and/or stream depleting groundwater permits, and ensuring all allocation alterations imposed on existing and renewed consents has been demonstrated to be efficient.

The preferred regime also includes a step that will apply at 2035 with further minimum flow increases, reductions in allocation and appropriately set pro-rata partial restrictions to satisfy the requirements of the National Policy Statement for Freshwater Management 2017.²⁰ The recommended regime also includes an allocation of water for cultural purposes to apply 8 years from the plan being made operative.

The Committee have accepted the preferences of the Working Party and have recommended that in the event alternative water becomes available prior to 2035, that the 2035 regime commences earlier.

The Zone Committee has recommended further investigation into a high flow harvest take regime to allow for an alternate water source to supplement lost reliability. The intention is for this to be a true high flow regime, with appropriate consideration given to the cultural importance of the Temuka River in the setting of a minimum flow and allocation limit.

5.2.2 Recommendation: Environmental Flow and Allocation Regimes in the Temuka Catchment

- I. An Environmental Flow and Allocation Regime is established for the Temuka River at Manse Bridge as set out in Tables 4 – 8.
- II. If alternate water becomes available in the Temuka Catchment to supplement any lost reliability from the proposed environmental flow and allocation regimes, uptake of this alternate water source should be prioritised, and the 2035 environmental flow and allocation regime commencement should be initiated as soon as possible thereafter.
- III. Site to site transfers of surface water, and/or stream depleting groundwater permits are prohibited in the Temuka Freshwater Management Unit.
- IV. The inclusion of a common consent expiry date in the Temuka Catchment of 1 January 2035 be considered for inclusion in the OTOP sub region plan change.
- V. The creation of a high flow harvest B Allocation Block for harvest takes comprising an allocation limit of 1500 L/s, and a minimum flow based on 90% of the naturalised mean flow of the Temuka River be investigated and considered during the drafting of the OTOP sub region plan change.

²⁰ The recommended regimes are considered to satisfy the requirements of the National Policy Statement for Freshwater Management 2017 when the regimes set out in Tables 7 and 8 apply in 2035 to ensure the applicable minimum flows are not breached due to abstraction.

- VI. An investigation to supplement Recommendation 4.9.3 (III) is undertaken during plan drafting to consider the possibility of increasing the well interference effects threshold from 20% to 30% as currently set out in the Land and Water Regional Plan.
- VII. On any application to change conditions, renew or review an existing surface water or stream depleting groundwater permit, an annual allocation be determined based on demonstrated use in accordance with Method 1 of Schedule 10 of the Land and Water Regional Plan.
- VIII. Environmental Flow and Allocation Regimes be established for the Waihi, Hae Hae Te Moana, Kakahu River to align with the next plan review with supporting ecological information and in collaboration with Papatipu Rūnanga, consent holders and other stakeholders.
- IX. An environmental flow and allocation regime be investigated and considered for the Taumatakahu Stream in consultation with Papatipu Rūnanga and consent holders for the forthcoming OTOP sub region plan change.

Note 1: The Zone Committee did not reach consensus on this recommendation as the outcome does not address the concerns of Te Rūnanga o Arowhenua.

Note 2: The Zone Committee agreed to adopt the following recommendation, but to note that some Zone Committee members stated this recommendation does not go far and/or fast enough in order to give effect to all first order priorities contained in the Canterbury Water Management Strategy.

River	Flow Recorder	Minimum flow for A ²² Permits (L/s) at which abstraction must cease					Partial Restrictions			Allocation Limit (Ls) – Current
		Current plan		3 Years from Operative Plan			Current	3 Years from Operative Plan		A Permits
Temuka	Manse Bridge	Oct – Mar	Apr – Sep	Nov – Mar	Apr – Sep	Oct	50% stepped reduction in rate of take ²³	50% stepped reduction in rate of take ²⁴	75% stepped reduction in rate of take ²⁵	2503
		700	1000	850	1500	1200				

Table 4: Temuka River A Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

River	Flow Recorder	Minimum flow for B Permits (L/s) at which abstraction must cease							Partial Restrictions	Allocation Limit (Ls) – Current
		Current		3 Years from Operative Plan					3 Years from Operative Plan	B Permits
Temuka	Manse Bridge	Oct – Mar	Apr – Sep	Nov – Mar	Apr	May – Aug	Sep	Oct	50% stepped reduction in rate of take ²⁶	784
		1600	1900	1750	2100	2400	2100	1900		

Table 5: Temuka River B Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

²² Excluding community drinking water supply abstractions

²³ A 50% reduction in rate of take applies when the flow at the flow recorder is at or below 1300 L/s

²⁴ A 50% reduction in rate of take applies when the flow at the flow recorder is at or below the applicable minimum flow + 625 L/s

²⁵ A 75% reduction in rate of take applies when the flow at the flow recorder is at or below the applicable minimum flow + 300 L/s

²⁶ A 50% reduction in rate of take applies when the flow at the flow recorder is at or less than the applicable minimum flow + 390 L/s

River	Time Period	Permit Type		Cultural Allocation
		A	B	
Temuka	3 Years from Operative Plan	2350	600	N/A
	5 Years from Operative Plan	2150	400	N/A
	8 Years from Operative Plan	1900 ²⁷	400	N/A
	8 Years from Operative Plan	N/A	N/A	100L/s

Table 6: Temuka River A and B Permit Staged Allocation Regime

River	Flow Recorder	Minimum flow for A ²⁸ Permits (L/s) at which abstraction must cease				Partial Restrictions	Allocation Limit (Ls) – 2035
		2035				2035	A Permits
Temuka	Manse Bridge	Nov – Feb	March	Apr – Sep	Oct	Pro-Rata ²⁹	1600
		1050	1200	1500	1200		

Table 7: Temuka River A Permit Environmental Flow and Allocation Regime – 2035

River	Flow Recorder	Minimum flow for B Permits (L/s) at which abstraction must cease				Partial Restrictions	Allocation Limit (Ls) – 2035
		2035				2035	B Permits
Temuka	Manse Bridge	Nov – Feb	March	Apr – Sep	Oct	Pro-Rata ³⁰	400
		2650	2800	3100	2800		

Table 8: Temuka River B Permit Environmental Flow and Allocation Regime - 2035

²⁷ Includes cultural allocation of 100 L/s

²⁸ Excluding community drinking water supply abstractions

²⁹ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the Temuka River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow and the sum total of the A Allocation Limit.

³⁰ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the Temuka River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow and the sum total of the B Allocation Limit.

5.3 OPIHI FRESHWATER MANAGEMENT UNIT

The recommendations for the Opihi Freshwater Management Unit are in addition to those that apply across the OTOP zone.

The waterbodies that make up the Opihi FMU have high cultural and recreational values, providing for mahinga kai, water sports and related activities. A mātaītai reserve covers much of the Opihi River and its lagoons and tributaries. Recent deteriorations in water quality have had a negative impact on cultural and ecological values, and on recreational activities within the area. The Fairlie basin area has high concentrations of nitrate nitrogen in groundwater and requires targeted reductions beyond GMP Loss Rates to achieve the recommended water quality limits.

Behind the Opuha Dam is the artificially created Lake Opuha. The lake's current primary purpose is storing water for environmental flows in the Opuha and Opihi Rivers and providing water for irrigation and community drinking water supplies. Lake Opuha also serves as a locally-valued recreational resource for boating, fishing and swimming. Water quality of the lake is moderately enriched with nutrients but does not exhibit issues such as significant algal blooms. It is important for the lake and the downstream environment that no further increase in nutrient enrichment occurs. Microbial quality of the lake is generally good and is considered suitable for swimming.

The Opuha Dam augments flows in the Opuha and Opihi rivers. It supplies reliable water for irrigation through the Opuha scheme and to the urban and industrial users of Timaru via the Timaru District Council's community water take. There are three irrigation schemes that draw water from the Opuha and Opihi rivers and there are also shareholder irrigators who operate directly off those two rivers as well as the Te Ana a Wai, the Upper Opihi and North and South Opuha rivers. However, the Committee also acknowledge that the tributaries do not directly benefit from releases from the Opuha Dam as they are not augmented.

The Zone Committee have been charged with improving freshwater management in an area with complex hydrology and an economy that relies in part on water for irrigation. Ensuring more efficient use of the available water resource and addressing over-allocation are two pathways to improvement. The environmental flow and allocation recommendations contained in this document have been developed in consideration of the ecological and cultural values of each tributary with input from Papatipu Rūnanga. The Committee have also considered the preferences of the Opihi Flow and Allocation Working Party.

The Committee acknowledge the contribution of the dam to the catchment, however concerns about water quantity remain, particularly the over-allocation of freshwater. As the catchment is operating under an environmental flow and allocation regime that has been in place since 2000, there is a need to address issues relating to low summer minimum flows, and absence of tributary specific allocation limits.

Water Quantity

The Committee seek flow regimes that provide for healthy and resilient ecological ecosystems, cultural values, community and stock water abstractions, and recreational and amenity values, while recognising the need to provide for irrigation abstraction and abstraction to storage. To address over-allocation of these freshwater resources, the Committee recommend changes to the existing environmental flow and allocation regime in the Opihi catchment to establish an environmental flow and allocation regime for each of the major sub-catchments. Setting allocation limits in this way acknowledges and protects values within the mainstem and the tributaries of the waterbodies of the Opihi FMU. The Committee are aware that this measure will have an impact on land use economics, so have suggested time frames that will enable consent holders to plan and prepare for any changes to minimum flows.

Recent experience managing flows in very dry conditions and the learnings developed by the Opuha Environmental Flow Release Advisory Group (OEFRAG) have been built upon by the Adaptive Management Working Group (AMWG). The Committee received a number of presentations from AMWG, and also Opuha Water Limited, who have sought a number of outcomes from the Healthy Catchments Project. These have been incorporated in the recommendations that follow.

5.3.1 Recommendation: Augmentation of the Opuha and Opihi Rivers

- I. The OTOP sub-region plan change includes an Adaptive Management Regime for the augmentation of the Opuha and Opihi rivers that provides for:
 - a. Environmental Flows;
 - b. Mahinga Kai Values;
 - c. Flow Variability;
 - d. Flushing Flows and Freshes;

- e. All flow gains achieved by minimum flow increases on the Upper Opihi and Te Ana Wai Rivers remaining in the mainstem of the Opihi River, and not being available for abstraction, and should be reflected in the minimum flows measured at Saleyards Bridge.
 - f. Community Drinking Water Supplies;
 - g. Irrigation Abstractions;
 - h. The Opuha Environmental Flow Release Advisory Group (OEFrag);
 - i. A flow regime that can be adapted to reflect the available water in the catchment and that recognises the priority of flows set out in clauses (a) – (h) above.
- II. The OTOP sub-region plan change includes a consenting pathway that provides for the amalgamation of resource consents affiliated to Opuha Water Limited.
- III. The OTOP sub-region plan change retains Saleyards Bridge as the measurement location for releases from the Opuha Dam.

Environmental Flow and Allocation Regimes

The Zone Committee considered options for establishing environmental flow and allocation regimes based on ecological, and cultural flow preferences, as well as the preferences of the Opihi Flow and Allocation Working Party.

A Flow and Allocation Working Party was endorsed by the Zone Committee and established by Opuha Water Limited for further targeted engagement with affected consent holders. The Working Party focussed on the main tributaries of the Opihi River, being the North Opuha, South Opuha, Upper Opihi and Te Ana Wai rivers. The Working Party membership was comprised of two irrigator representatives from each of the four main tributaries, Zone Committee members, Central South Island Fish and Game and Timaru District Council, with coordination and technical advisory support from Opuha Water Limited.

The Zone Committee acknowledges the substantial amount of time and effort undertaken by the Working Party in establishing preferred environmental flow and allocation regimes for each of the tributaries and providing these regimes to the Zone Committee as a comprehensive package of recommendations. The Committee has accepted the Flow and Allocation Working Party's environmental flow and allocation regimes for each of the tributaries as a first step in minimum flow increases to occur three years subsequent to the OTOP sub region plan change becoming operative. In response to feedback received from the wider community, the Committee have further recommended a second step of minimum flow increases to occur eight years subsequent to the OTOP sub region plan change becoming operative.

Some additional allocation has been proposed from the mid-range flows to be harvested as B block from each of the main tributaries. The intention for the additional allocation is to provide the opportunity for irrigators who may have some loss of reliability from changing minimum flows and partial restriction regimes for the tributary A blocks to offset this loss with additional water from the B block. The additional allocation is intended to be available to all abstractors.

The Committee's recommended A and B Block environmental flow and allocation regimes for the North and South Opuha, Upper Opihi and Te Ana Wai Rivers are set out in Tables 9 –20 of this section.

5.3.2 Recommendation: Environmental Flow and Allocation Regimes for the Opihi Catchment

- I. Environmental Flow and Allocation Regimes are established for the South Opuha, North Opuha, Upper Opihi and Te Ana Wai rivers as set out in Tables 9 – 19.

Note: The Zone Committee did not reach consensus on this recommendation as the outcome does not address the concerns of Te Rūnanga o Arowhenua.

SOUTH OPUHA RIVER - 3 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 9 sets out the recommended A Permit environmental flow and allocation regime for the South Opuha River that is proposed to apply 3 years subsequent to the OTOP sub region plan change becoming operative.

River	Flow Recorder	Minimum flow for AA, AN and BA Permits ³¹ (L/s)												Partial Restrictions	Allocation Limit	
		Current	3 Years from Operative Plan													
South Opuha	Monument Bridge	1 Sep – 30 Apr	1 May – 31 Aug	1 Sep – 30 Sep	1 Oct – 14 Oct	15 Oct – 30 Nov	Dec	Jan – Feb	1 Mar – 14 Mar	15 Mar – 31 Mar	1 Apr – 14 Apr	15 Apr – 30 Apr	May – Aug	Pro Rata ³³	97	634.4
		500	800	1000	900	800	550	520	550	600	800	1000	1200			
															CDWS ³²	BA

Table 9: South Opuha River A Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

³¹ Excluding community drinking water supply abstractions.

³² Existing Community Drinking Water Supply Consented Allocation.

³³ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the South Opuha River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the BA allocation.

SOUTH OPUHA RIVER - 8 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 10 sets out the recommended A Permit environmental flow and allocation regime for the South Opuha River that is proposed to apply 8 years subsequent to the OTOP sub region plan change becoming operative.

River	Flow Recorder	Minimum flow for AA, AN and BA Permits ³⁴ (L/s)										Partial Restrictions	Allocation Limit	
		Current		3 Years from Operative Plan									CDWS ³⁵	BA
South Opuha	Monument Bridge	1 Sep – 30 Sep	1 Oct – 14 Oct	15 Oct – 30 Nov	Dec	Jan – Feb	1 Mar – 14 Mar	15 Mar – 31 Mar	1 Apr – 14 Apr	15 Apr – 30 Apr	May – Aug	8 Years from Operative Plan Pro Rata ³⁶	97	634.4
		1000	900	800	600	600	600	600	800	1000	1200			

Table 10: South Opuha River A Permit Environmental Flow and Allocation Regime – 8 Years from Operative Plan

³⁴ Excluding community drinking water supply abstractions.

³⁵ Existing Community Drinking Water Supply Consented Allocation.

³⁶ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the South Opuha River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the BA allocation.

SOUTH OPUHA RIVER – B PERMIT

Table T1 sets out the recommended B Permit environmental flow and allocation regime for the South Opuha River that is proposed to apply following the OTOP sub region plan change becoming operative.

River	Flow Recorder	Minimum flow for BN Permits (L/s)		Partial Restrictions	Lake Opuha Level	Allocation Limit
		From Operative Plan				
South Opuha	Monument Bridge	All year		Pro Rata ³⁷	391.2 ³⁸	800
			3000			
				From Operative Plan	From operative plan	BN

Table T1: South Opuha River B Permit Environmental Flow and Allocation Regime

³⁷ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the South Opuha River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the BN allocation.

³⁸ Lake level above which BN takes may occur.

NORTH OPUHA RIVER – 3 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 12 sets out the recommended A Permit environmental flow and allocation regime for the North Opuha River that is proposed to apply 3 years subsequent to the OTOP sub region plan change becoming operative.

River		Flow Recorder	Minimum flow for AA, AN and BA Permits ³⁹ (L/s)				Partial Restrictions		Allocation Limit		
			Current	3 Years from Operative Plan		3 Years from Operative Plan		AA	AN	BA	CDWS ⁴⁰
						Part of a Water User Group	Not Part of a Water User Group				
North Opuha	Clayton Road Bridge	1 Oct – 14 Apr	15 Apr – 30 Sep	1 Oct – 14 Apr	15 Apr – 30 Sep	Pro Rata ⁴¹	50% stepped reduction in rate of take ⁴²	61	175	7	7.5
		850	1000	815	900						

Table 12: North Opuha River A Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

³⁹ Excluding community drinking water supply abstractions.

⁴⁰ Existing Community Drinking Water Supply Consented Allocation.

⁴¹ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the North Opuha River, pro rata restrictions will apply to members of a Water User Group (WUG) when the recorded flow at the flow recorder is less than the minimum flow, and the sum total of the AA, AN and BA allocation.

⁴² For consent holders not part of a Water User Group, a 50% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and the sum total of the AA, AN and BA allocation.

⁴³ For consent holders not part of a Water User Group, a 100% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and 50% of the sum total of the AA, AN and BA allocation.

NORTH OPUHA RIVER – B PERMIT

Table 13 sets out the recommended B Permit environmental flow and allocation regime for the North Opuha River that is proposed to apply following the OTOP sub region plan change becoming operative.

River	Flow Recorder	Minimum flow for BN Permits (L/s)		Partial Restrictions	Lake Opuha Level	Allocation Limit
		From Operative Plan				
North Opuha	Clayton Road	All year		Pro Rata ⁴⁴	391.2 ⁴⁵	500
			2300			

Table 13: North Opuha River B Permit Environmental Flow and Allocation Regime

⁴⁴ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the North Opuha River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the BN allocation.

⁴⁵ Lake level above which all BN takes may occur.

UPPER OPIHI RIVER – 3 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 14 sets out the recommended A Permit environmental flow and allocation regime for the Upper Opihi River that is proposed to apply 3 years subsequent to the OTOP sub region plan change becoming operative.

River	Flow Recorder	Minimum flow for AN and BA Permits ⁴⁶ (L/s)						Partial Restrictions			Allocation Limit	
		3 Years from Operative Plan						3 Years from Operative Plan		AA	BA	CDWS ⁴⁷
								Part of a Water User Group	Not Part of a Water User Group			
Upper Opihi	Rockwood	Current		Summer	Winter	Nov	Dec - Feb	Mar	Apr-Sep	Oct	Pro Rata ⁴⁸	50% stepped reduction in rate of take ⁴⁹
				790	1280	950	850	900	1500	1400		
												100% stepped reduction in rate of take ⁵⁰
										65	409	122

Table 14: Upper Opihi River A Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

⁴⁶ Excluding community drinking water supply abstractions.

⁴⁷ Existing Community Drinking Water Supply Consented Allocation.

⁴⁸ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. In the Upper Opihi river, for consent holders part of a Water User Group pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the AN and BA allocation.

⁴⁹ For consent holders not part of a Water User Group, a 50% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and the sum total of the AN and BA allocation.

⁵⁰ For consent holders not part of a Water User Group, a 100% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and 50% of the sum total of the AN and BA allocation.

UPPER OPIHI RIVER – 8 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 15 sets out the recommended A Permit environmental flow and allocation regime for the Upper Opihi River that is proposed to apply 8 years subsequent to the OTOP sub region plan change becoming operative.

River		Flow Recorder	Minimum flow for AN and BA Permits ⁵¹ (L/s)					Partial Restrictions		Allocation Limits		
			8 Years from Operative Plan					8 Years from Operative Plan		AA	BA	CDWS ⁵²
Upper Opihi	Rockwood	Nov	Dec - Feb	Mar	Apr-Sep	Oct	Part of a Water User Group	Not Part of a Water User Group	50% stepped reduction in rate of take ⁵⁴	65	409	122
		1000	1000	1000	1500	1400						
		Pro Rata ⁵³					100% stepped reduction in rate of take ⁵⁵					

Table 15: Upper Opihi River A Permit Environmental Flow and Allocation Regime – 8 Years from Operative Plan

⁵¹ Excluding community drinking water supply abstractions.

⁵² Existing Community Drinking Water Supply Consented Allocation.

⁵³ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the North Opuha River, pro rata restrictions will apply to members of a Water User Group (WUG) when the recorded flow at the flow recorder is less than the minimum flow, and the sum total of the AA, AN and BA allocation.

⁵⁴ For consent holders not part of a Water User Group, a 50% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and the sum total of the AA, AN and BA allocation.

⁵⁵ For consent holders not part of a Water User Group, a 100% reduction in rate of take applies when the flow at the flow recorder is less than the applicable minimum flow and 50% of the sum total of the AA, AN and BA allocation.

UPPER OPIHI – B PERMIT

Table 16 sets out the recommended B Block environmental flow and allocation regime for the Upper Opihi River that is proposed to apply following the OTOP sub region plan change being operative.

River	Flow Recorder	Minimum flow for BN Permits ⁵¹ (L/s)	River	Flow Recorder	Minimum flow for BN Permits (L/s)	Minimum flow for BN Permits (L/s)	Partial Restrictions	Allocation Limit
Upper Opihi	Rockwood	From Operative Plan	Opihi mainstem	SH1	Current	From Operative plan	From Operative Plan	BN
		All year			15,000	12,000	Pro Rata ⁵⁶	800
		4500						

Table 16: Upper Opihi River B Permit Environmental Flow and Allocation Regime

⁵⁶ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the Upper Opihi River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified for either river, and the sum total of the BN allocation.

TE ANA WAI RIVER – 3 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 17 sets out the recommended A Block environmental flow and allocation regime for the Te Ana Wai River that is proposed to apply 3 years subsequent to the OTOP sub region plan change becoming operative.

Environmental flows and partial restrictions 3 years from operative														Allocation Limit			
Location of recorder site, or site where flow is measured	Current	Minimum flow for all consented A block takes	Applicable time period	Minimum flow (flow at which all abstraction ceases) (L/s)	Residual flow (flow downstream of all abstraction) (L/s)	Part of Water User Group			Not Part of Water User Group			AA	BA	AN	CDWS		
						Partial restriction	Flow at recorder site (L/s)	Flow at recorder site (L/s)	Partial restriction	Flow at recorder site (L/s)							
Cave	40		1 Oct – 31 Oct; 1 Apr – 30 Apr	700	471	50%	800	50%	Minimum flow + 284 L/s	250.2	16.71	17.2	96				
			1 Nov - 14 Nov; 15 Mar - 31 Mar	550	322		650										
			15 Nov – 31 Nov	500	272		600	100%	Minimum flow + 142 L/s								
			1 Dec - 14 Mar	450	222		550										
	600	1 May – 31 July	1200	972	1300												
			1 Aug – 31 Aug	1100	872		1200										
			1 Sept – 30 Sept	900	671		1000										
	500																

Table 17: Te Ana Wai River A Permit Environmental Flow and Allocation Regime – 3 Years from Operative Plan

⁵⁷ In the Te Ana Wai River, for consent holders not part of a Water User Group (WUG), a 50% reduction in rate of take is required whenever the flow at the recorder is less than the applicable monthly minimum flow, and the sum total of the AA, BA and AN consents.

⁵⁸ In the Te Ana Wai River, for consent holders not part of a Water User Group (WUG), a 100% reduction in rate of take is required whenever the flow at the recorder is less than 50% of the applicable monthly minimum flow, and the sum total of the AA, BA and AN consents.

TE ANA WAI RIVER – 8 YEARS FROM OPERATIVE PLAN (A PERMIT)

Table 18 sets out the recommended A Block environmental flow and allocation regime for the Te Ana Wai River that is proposed to apply 8 years subsequent to the OTOP sub region plan change becoming operative.

River	Flow Recorder	Applicable time period	Minimum flow for AA, BA and AN Permits	Partial Restrictions		Allocation Limits		
				8 Years from Operative Plan	AA	BA	AN	CDWS
Te Ana Wai	Cave	1 Oct – 31 Oct; 1 Apr – 30 Apr	700	Pro Rata ⁵⁹	250.2	16.71	17.2	96
		1 Nov - 14 Nov; 15 Mar - 31 Mar	550					
		15 Nov – 31 Nov	500					
		1 Dec - 14 Mar	450					
		1 May – 31 July	1200					
		1 Aug – 31 Aug	1100					
		1 Sept – 30 Sept	900					

Table 18: Te Ana Wai River A Permit Environmental Flow and Allocation Regime – 8 Years from Operative Plan

⁵⁹ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the Te Ana Wai River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified, and the sum total of the AA, BA and AN allocation.

TE ANA WAI RIVER – B PERMIT

Table 19 sets out the recommended B Block environmental flow and allocation regime for the Te Ana Wai River that is proposed to apply following the OTOP sub region plan change becoming operative.

River		Flow Recorder		Minimum flow for BN Permits ⁵¹ (L/s)		Flow Recorder		Minimum flow for BN Permits (L/s)		Minimum flow for BN Permits (L/s)		Partial Restrictions		Allocation Limit			
				From Operative Plan						Current		From Operative plan		BN			
Te Ana Wai		Cave		All year		Opihi mainstem		SH1		15,000		12,000		Pro Rata ⁶⁰		800	
				2500													

Table 19: Te Ana Wai River B Permit Environmental Flow and Allocation Regime

⁶⁰ Pro rata means the proportional reduction of a take between the point at which the take is required to start reducing and the minimum flow. For the Te Ana Wai River, pro rata restrictions apply when the recorded flow at the flow recorder is less than the minimum flow specified for either river, and the sum total of the BN allocation.

Water Quality

The Zone Committee note the challenges in the Opihi FMU, particularly the nitrate hot spot in the Fairlie Basin area. While the Committee understand the need for a pathway for improving surface and groundwater quality, it is also recognized that these improvements will take time. The Ashwick Opuha Water Race network that services 4,500 hectares of land in the Fairlie Basin has been identified as a potential contributor to this hot spot area. The Committee have acknowledged this and consider alternatives should be considered as part of the renewal of the Mackenzie District Council water permit in 2020. The Committee also support targeted mitigations that address the nitrate hot spot in the Fairlie Basin.

Recommendation 5.3.4 sets out a staged regime for further nitrate reductions beyond the reductions that will be achieved by the implementation of Baseline GMP Loss Rates. The Committee acknowledge that for most land owners the first step to improve water quality will be the requirement to operate at a Baseline GMP Loss rate, which could incur significant cost.

To achieve the water quality target, the current measured concentrations indicate that reductions of up to 20% are required. The expected reduction in nitrate leaching beyond the root zone when properties in the Fairlie Basin area achieve their Baseline GMP Loss rate is approximately 10%. The staged regime set out below proposes a further step of 10% beyond GMP at 2030. This percentage reduction figure is based on the 2011 - 2016 current state modelling that has been undertaken. Improvements in water quality made by the reductions in nitrogen loss rates achieved by 2030 are expected to be visible in the environment and in water quality reporting by 2035.

The Committee recommend a monitoring programme be implemented to inform future State of the Environment Monitoring and enable a review of the targets and outcomes set by the Committee. A core component of the monitoring programme for the Fairlie Basin will be to determine if the future stepped percentage reduction beyond GMP, as established based on current science, will suffice in achieving the water quality target, or whether a further percentage reduction will be required in a future plan change as a result of new science.

The Committee considers that the policy framework of the OTOP sub region plan change could further support this direction by requiring that land use consents to farm are granted with durations not exceeding ten years so that the the renewal of farming land use consents is relative to the five-yearly monitoring and ten yearly plan review cycles, and would ensure any future percentage reduction step that may be required is relative to the future state.

5.3.3 Recommendations: Water Quality Outcomes for Lake Opuha

- I. Maintain trophic status level of Lake Opuha within current attribute states and with the maximum annual Trophic Level Index (TLI) to not exceed 4.
- II. Within five years annual median total nitrogen concentration of Lake Opuha does not deteriorate beyond Attribute State B.
- III. Annual median total phosphorous concentration of Lake Opuha does not deteriorate beyond Attribute State A.
- IV. Annual median chlorophyll a concentration of Lake Opuha does not deteriorate beyond Attribute State B midpoint (3.5 mg chl. a/m³) in accordance with the NPS-FM.

5.3.4 Recommendations: Additional Pathways for Meeting Water Quality Limits in the Fairlie Basin Nitrate Hot Spot Area

- I. The water quality target for nitrate nitrogen in groundwater set out in Table 20 is to be achieved at or before 2035 by requiring high risk farming activities to reduce diffuse discharges of nitrogen beyond Baseline Good Management Practice Loss Rates of not less than a further 10% at 2030.
- II. In addition to clause (I), regional council should continue to support non-statutory measures for nitrogen reductions beyond Baseline GMP Loss Rates in order to achieve the target before the date specified in Table 20.
- III. To track progress towards achieving the water quality target set out in Table 20, the regional council shall monitor and report on water quality and report the progress towards achieving the target within 5 years of the OTOP sub-region plan change becoming operative.
- IV. Where this monitoring and review demonstrates that the water quality target is likely or unlikely to be met prior to 2035, this information shall inform future plan changes for the OTOP zone to adjust the percentage reduction required to achieve the water quality target.
- V. The OTOP sub-region plan change directs that land use consents to farm are granted with durations not exceeding 10 years. This is to ensure the renewal of farming land use consents is relative to the plan review cycle and future science.

Groundwater Province	Current State Average (mg/L nitrate nitrogen)	Target – Annual Average (mg/L nitrate nitrogen)	To be achieved at or before	Total percentage reduction required to achieve water quality target
Fairlie Basin	6.9	5.65	2035	18%

Table 20: Water Quality Target for Groundwater Nitrates in the Fairlie Basin Hotspot Area

5.4 TIMARU FRESHWATER MANAGEMENT UNIT

The recommendations for the Timaru Freshwater Management Unit are in addition to those that apply across the OTOP zone.

Water Quality

The Timaru FMU covers an area that includes the township of Timaru. The waterbodies, particularly Waitarakao/Washdyke Lagoon, are of significance to Papatipu Rūnanga, and were traditionally used for mahinga kai. A mātaītai reserve covers the area of the Waitarakao/Washdyke Lagoon and the Seadown Drain. While the area has strong cultural values and a rich history, these values are affected by the deterioration in both water quality and quantity. The deterioration is the result of changes in land use, both rural and urban, and additional pressures, including stormwater discharges and other urban/industrial pollutants. Recent work by the Waitarakao/Washdyke Taskforce, which included membership from Papatipu Rūnanga, Zone Committee, Regional Council, Timaru District Council and Department of Conservation, has provided the basis for many of the recommendations that follow. The Committee acknowledge the work and commitment of those involved.

The water quality recommendations in this section for nitrates primarily aim to meet drinking water quality standards in Levels Plain groundwater. The Committee acknowledge that these measures alone will not achieve national bottom lines in Waitarakao/Washdyke Lagoon. The Committee also recognise that although high *E. coli* levels within Waitarakao Washdyke Lagoon are primarily related to large bird populations that inhabit the area, management of sources of faecal contaminants from agricultural and stormwater are still important.

The Committee have expressed a desire to move to the 99% level of species protection for all waterways in the area from toxicants from stormwater discharges, however, they also realise the need to make recommendations that, while aspirational, are realistic and achievable. The Committee support the approach in the Canterbury Land and Water Regional Plan for stormwater and toxicants for a 90% level of species protection to be achieved by 2025 for stormwater discharges. However, they also consider the 95% threshold for species protection in Schedule 5 of the LWRP should be achieved for any new discharges of stormwater into a reticulated network.

Levels Plain Nitrate Hotspot

The Zone Committee note the challenges in the Timaru FMU, particularly the nitrate hot spot in the Levels Plains area and the elevated nutrient concentrations in the Waitarakao/Washdyke Lagoon and its tributaries. Recent monitoring of the Waitarakao/Washdyke Lagoon catchment has shown that not only does the lagoon fail to meet the national bottom-line for total nitrogen and total phosphorus, some of the tributaries in the catchment also do not meet the national bottom line for nitrate toxicity. The elevated groundwater nitrate concentrations across the Levels Plains are significant contributors to elevated nitrogen concentrations in the lagoon and tributaries. Other industrial and stormwater discharges within the Washdyke industrial area are also likely contributors but there is currently insufficient information to determine the relative contribution from these sources.

While the Committee understand the need for a pathway to improve water quality, it is also recognised that these improvements will take time. While aiming to improve water quality across the entire zone, the Committee also support targeted mitigations that address the nitrate hot spot in Levels Plains and Waitarakao/Washdyke catchment. The Committee also recognise that additional interventions and mitigations will be needed to address water quality issues of Waitarakao/Washdyke Lagoon.

Recommendation 5.4.3 sets out a staged regime for further nitrate reductions beyond what will be achieved by the implementation of Baseline GMP Loss Rates. The Committee acknowledge that for most land owners the first step to improving water quality will be the requirement to operate at a Baseline GMP Loss rate, which could incur significant cost.

To achieve the water quality targets for groundwater and surface water (Table 22), current measured concentrations indicate that reductions in the order of 30% are required. The expected reduction in nitrate leaching from properties in the Levels Plains Hotspot area achieving their Baseline GMP Loss rate is approximately 15%. The staged regime set out below proposes a further step beyond GMP at 2030 of 10% and sets out a subsequent step that may be required at 2035 of 5-10% to achieve the water quality targets. These percentage reduction figures are based on the 2011 – 2016 current state modelling that has been undertaken. Improvements in water quality made by the reductions in nitrogen loss rates achieved by 2035 are expected to be visible in the environment and in water quality reporting by 2040.

The Committee recommend a monitoring programme be implemented to inform future State of the Environment Monitoring and enable a review of the targets and outcomes set by the Committee. A core component of the monitoring programme in the Levels Plain hotspot will be to determine if the planned future stepped percentage reductions beyond GMP, as established based on current science, would still need to apply to meet the water quality targets, or whether lesser or greater percentage reductions would be required in a subsequent plan change following new science.

The Committee considers that the policy framework of the OTOP sub region plan change could further support this direction by requiring that land use consents to farm are granted with durations not exceeding ten years so that only one further reduction beyond GMP step is imposed as a condition of consent. This would enable the renewal of farming land use consents to be relative to the five-yearly monitoring and ten yearly plan review cycles, and would ensure any future percentage reduction steps are relative to the future state.

The Committee also recognise the contribution of point source discharges from an industrial activity in the hotspot area. Clause (II) of Recommendation 5.4.1 has been included in the regime to ensure that the burden of reducing nitrogen losses is shared between individual land owners and industry.

5.4.1 Recommendations: Water Quality Outcomes for the Timaru FMU

- I. Stormwater and Toxicants:
 - a. All urban waterways in the Timaru FMU receiving discharges of stormwater from a reticulated network are to meet the Receiving Water Body Standards and 95% level of species protection in accordance with Schedule 5 of the Land and Water Regional Plan by 2035.
- II. Waitarakao / Washdyke Lagoon:
 - a. Chlorophyll a to continue meeting Attribute State A in accordance with the NPS-FM.
 - b. Total nitrogen and total phosphorous to meet NPS-FM 2017 National Bottom Line by 2050.
- III. Saltwater Creek, Washdyke Creek, and Seadown Drain
 - a. These waterbodies do not deteriorate below Attribute State C for nitrate nitrogen and *E. coli*.

5.4.2 Recommendations: Pathways to Achieving Water Quality Outcomes in the Timaru FMU

- I. Regional council classify Seadown Drain as a “spring fed plains” waterway to protect in-stream values and receiving environment, and ensure stock are excluded to manage inputs to the lagoon.
- II. Stormwater management plan to address further requirement to meet 95% species protection by 2035 for any new discharges of stormwater.

5.4.3 Recommendations: Additional Pathways for Meeting Water Quality Limits in the Levels Plains Hot Spot Area

- I. The water quality targets for ground and surface water set out in Tables 21 and 22 are to be achieved at or before the specified dates by requiring high risk farming activities to reduce diffuse discharges of nitrogen beyond Baseline Good Management Practice Loss Rates of not less than a further:
 - a. 10% at 2030; and
 - b. 5-10% at 2035;

- II. In addition to clause (I), the water quality targets for ground and surface water set out in Tables 21 and 22 are to be achieved at or before the specified dates by requiring discharges from industrial activities to be reduced beyond current nitrogen discharge rates by up to 30% by 2035.
- III. In addition to clauses (I) and (II), regional council should continue to support non-statutory measures for nitrogen reductions beyond Baseline GMP Loss Rates in order to achieve water quality outcomes before the target dates specified in Tables 21 and 22.
- IV. To track progress towards achieving the water quality targets set out in Tables 21 and 22, the regional council shall monitor and report on water quality and report the progress towards achieving the targets within 5 years of the OTOP sub-region plan change becoming operative, and subsequently at 5 yearly intervals, to evaluate the efficiency and effectiveness of measures being taken to achieve water quality outcomes.
- V. Where this monitoring and review demonstrates that the water quality targets are likely or unlikely to be met prior to the specified dates, this information shall inform future plan changes for the OTOP zone to adjust the percentage reductions beyond Baseline GMP Loss Rates required to achieve the water quality targets.
- VI. The OTOP sub-region plan change directs that land use consents to farm are granted with durations not exceeding 10 years and only adopt one percentage reduction step beyond GMP. This is to ensure the renewal of farming land use consents is relative to the plan review cycle and ensure any future percentage reduction steps are relative to the future state.

5.4.4 Recommendations: Non-Statutory

- I. Regional and district councils adopt and implement the Action Plan developed by the Waitarakao/Washdyke Taskforce, which includes the following:
 - a. Development of sustainable drain management extension;
 - b. Industrial and agricultural GMP extension;
 - c. Biodiversity enhancement actions;
 - d. Recreational access improvements, including cycle/walkway;
 - e. Investigate feasibility of constructed wetlands.

Groundwater Province	Current State Average (mg/L nitrate nitrogen)	Target – Annual Average (mg/L nitrate nitrogen)	To be achieved at or before	Total percentage reduction required to achieve water quality target
Levels Plain	6.3	5.65	2030	10%
Spring Fed Streams	Current State Median (mg/L nitrate nitrogen)	Target – Annual median (mg/L nitrate nitrogen)	To be achieved at or before	Total percentage reduction required to achieve water quality target
Ring Drain	10.5	6.9	2040	34%
Seadown Drain	7.2	6.9	2030	4%

Table 21: Water Quality Target for Groundwater and Surface Water Nitrates in the Levels Plain Hotspot Area

Waitarakao/ Washdyke Lagoon	Current State Annual Median (mg/L total nitrogen)	Target – Annual Median (mg/L total nitrogen)	To be achieved at or before	Magnitude of reduction required to achieve water quality target
Waitarakao/ Washdyke Lagoon at mid beach	6.7	0.75	2050	Approximately 9-fold

Table 22: Water Quality Target for Total Nitrogen Concentration in Washdyke / Waitarakao Lagoon

Water Quantity

There are several urban waterways⁶¹ in the Timaru FMU with small amounts of abstraction occurring. These waterways are considered inappropriate for abstraction due to their naturally low flow and variable nature.

The Seadown Drain is located in the Timaru FMU. The Seadown Drain was originally built to drain the Levels Plain area to provide for agriculture. While Seadown Drain is a modified waterbody, it has become important as both a source of water and as habitat for biodiversity. To enhance mahinga kai, enable fish passage, maintain ecosystem health and meet water quality limits the following recommendations aim to improve the freshwater quality of the Seadown Drain and manage inputs into the Waitarakao Washdyke lagoon.

There are a number of consents with minimum flows tied to Seadown Drain, which were granted in 2008 in consultation with Fish and Game. A presentation given to the Zone Committee and requested the minimum flow be replaced with a water level trigger. As Seadown Drain has a very low gradient and has issues with macrophyte growth, water level does not show a consistent relationship with flow. In summer months, when macrophyte growth is high, velocity in Seadown Drain is very low and water level is high. During these times using a water level trigger rather than a measured minimum flow can result in abstraction occurring when flow is very low. As Seadown Drain contributes an important part of the freshwater input to Waitarakao/Washdyke Lagoon, increasing abstraction at times of low flow poses a risk to Lagoon health.

5.4.5 Recommendations: Water Quantity

I. Urban Waterways

- Allocation limits are set for all urban waterways in the Timaru FMU, that render these surface water bodies fully allocated.
- Further allocation from these urban waterways is prohibited.

II. Seadown Drain

- An allocation limit is established for Seadown Drain that renders it fully allocated.
- Further allocation from Seadown Drain is prohibited.
- Regional council continue with current minimum flow regime unless investigations into water quantity indicate a different regime is more appropriate for protecting the values of Waitarakao/Washdyke Lagoon.

Otipua/Saltwater Creek

The Otipua/Saltwater Creek catchment is mostly agricultural and developed land, and includes the Otipua Wetland. Due to the degraded nature of the catchment the area no longer provides for mahinga kai values, but does have amenity values for many local residents, particularly those using the walkways and cycle tracks and the water surface itself. Amenity values are affected by sluggish flows, low water levels and the presence of sediment in the waterway.

A Saltwater Creek Working Party was formed to investigate the water quality and quantity issues in the catchment and the following recommendations were received and are supported by the Committee:

⁶¹ The following streams are classified as Hill-fed urban in the Timaru FMU: Saltwater Creek, North Branch Otipua Creek, unnamed creek locally called Ashbury Stream, Te Aitarakihi Creek.

5.4.6 Recommendations: Non Statutory

- I. Local authorities investigate establishment of a River Rating District for the Otupua/Saltwater Creek catchment.
- II. Regional and district council support the establishment of an Otupua/Saltwater Creek Catchment Group.
- III. Regional and district council investigate stream health and flow rates to provide baseline data to inform future decision-making.
- IV. Regional council support Timaru Rowing Club to investigate cost and benefit of silt excavation from lower reaches.
- V. Regional council conduct a feasibility study and costing of weir modification to increase water level and improve fish passage.
- VI. Regional council monitor water level below weir for comparison with above-weir data.
- VII. Regional council investigate catchment inflows and abstractions.
- VIII. Regional council assess coastal erosion processes to inform decision-making.

Te Aitarakihi Creek

Te Aitarakihi Creek was traditionally of importance for mahinga kai but has become degraded over recent years. Its lower reach and mouth are within an area used for recreation by fishers, walkers and cyclists crossing the path of the coastal track. Improvements to water quality and quantity in this area would improve cultural and recreational opportunities.

5.4.7 Recommendations: Water Quantity and Quality

- I. Regional council and industry investigate opportunities to protect and enhance cultural, amenity and biodiversity values.

5.5 PAREORA FRESHWATER MANAGEMENT UNIT

The recommendations for the Pareora Freshwater Management Unit are in addition to those that apply across the OTOP zone.

The Pareora FMU is the southern-most in the OTOP zone, and the community have been engaged in recent years addressing issues of flow and allocation. Water quality is generally in good condition, and the implementation of Farm Environment Plans and Good Management Practice on farm are expected to achieve the water quality outcomes recommended in this addendum.

An Environmental Flow and Allocation Regime for the Pareora FMU became operative in July 2012 in the form of the Pareora Catchment Environmental Flow and Water Allocation Regional Plan. All water permits in the Pareora FMU have been reviewed so that abstractions of surface water and stream depleting groundwater align with the regime in this plan. The Zone Committee recognise that there have been no significant changes in values since the previous flow review, and that the benefit of the current flow and allocation regime is yet to be observed. Therefore, the Committee have recommended no substantive changes to the regime with the exception that a regime be developed for the remaining surface water bodies in the Pareora FMU.

When the regime for the Pareora River and its tributaries was developed, it was acknowledged that the shift to the full ecological flow preference (660 L/s) would have a significant impact on reliability of supply for existing abstractors. The minimum flow for the Pareora River was instead set at 400 L/s, an increase of 100 L/s from the previous minimum flow restriction. The Committee acknowledge the increase in minimum flow and maintains its position that the cultural flow preference is the long-term aspiration for minimum flows in the zone. In the Pareora River, the cultural flow preference aligns with the ecological flow preference of 660 L/s.

5.5.1 Recommendations: Environmental Flow Regime and Allocation Regime

- I. The environmental flow and allocation regime for the Pareora Catchment specified in the Pareora Catchment Environmental Flow and Water Allocation Regional Plan, is retained subject to the following additions:
 - a. Environmental flow and allocation regimes are established for Pig Hunting Creek, Lyalldale Creek, and Springbrook Creek.

6.0 ORARI-TEMUKA-OPIHI-PAREORA HEALTHY CATCHMENTS PROJECT TIMELINE AND NEXT STEPS

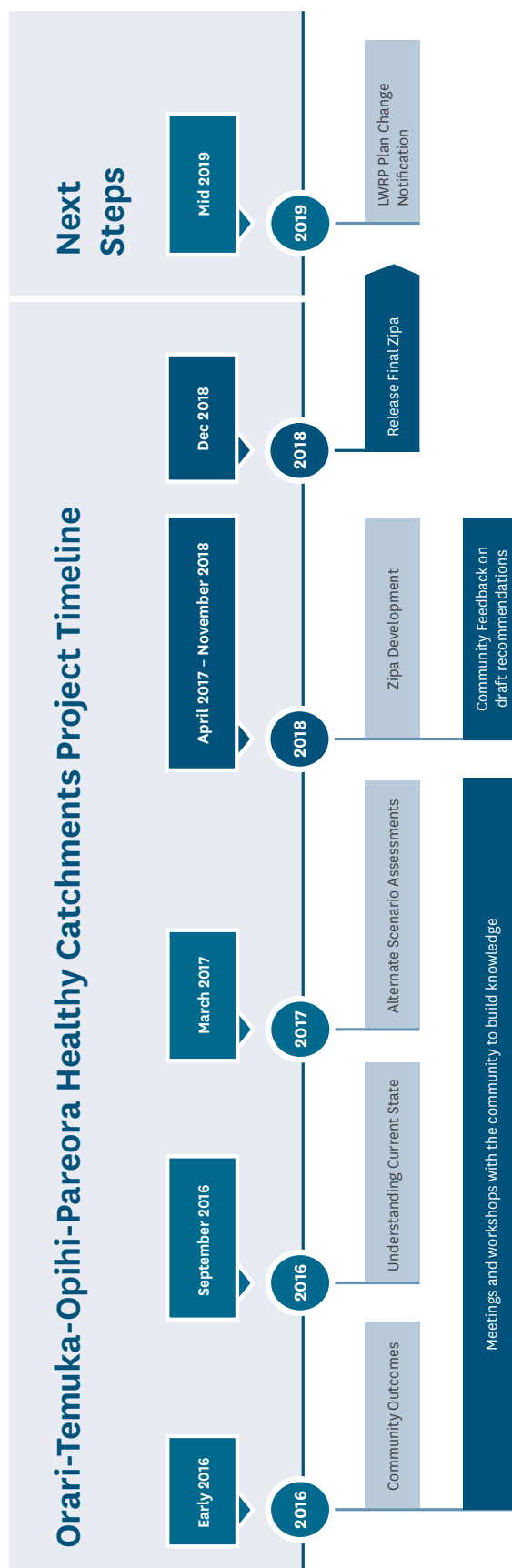


Figure 2: Timeline - Orari-Temuka-Opihi-Pareora Healthy Catchments Project Timeline and Next Steps



*The Orari Temuka Opihi Pareora Water Zone Committee
is a community led committee supported by councils.*

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