Regional Public Health
HAUORA Ā IWI KI TE ŪPOKO O TE IKA A MĀUI
Better health for the greater Wellington region

11 July 2018

The Chairperson
Ruamahanga Whaitua Committee

By email ruamahangawhaitua@gw.govt.nz

Dear Sir

Re: Comments on the draft Ruamāhanga Whaitua Implementation Programme

Thank you for the opportunity to comment on the implementation programme. Attached is the interactive pdf incorporating our comments. We wish to comment here on your recommendation 76 and your comments on page 79 regarding minimum flow management in the Waingawa River and reductions of municipal water takes. Such comments may well also apply to other municipal water supply takes such as those from bores adjacent to the Waiohine River.

Whilst Regional Public Health supports the move towards greater efficiencies in the use of Municipal Drinking water supplies, we recognise that there will be some practical issues and challenges with the proposal that *"Masterton Municipal supply would be required to reduce the amount of water taken to that required for the health needs of people".*

The definition of the health needs of people contained in the Proposed Natural Resources Plan is narrow in that it states that the health needs of people is equivalent to the "*amount and quality of water needed to adequately provide for peoples' hygiene, sanitary and domestic requirements...".* Regional Public Health believes there needs to be a broader interpretation of the health needs of people to support the intent of the recommendation. Confining health needs to only domestic requirements, will have a significant impact on many support structures of a society. Such structures include, but are not limited to, such activities as commercial food preparation, personal care services, schools and retailing, which enable the functioning of a society and contribute to the health status of a community.

Care needs to be taken when writing such a rule that unintended consequences are not created because the wording is too narrow. Regional Public Health believes that the requirement for Community and Group Drinking water suppliers to address efficiency of use and low flows is adequately covered by schedule Q and policy 115 of the Proposed Natural Resources Plan. The response to water efficiency requires consideration of wider urban and spatial planning, and sustainable development policy, with links to District Plans amongst other processes. Regional Public Health believes that a policy approach such as the package on page 36 including integrated planning is most likely to achieve the intent of recommendation 76 to enable an increase in minimum flows. Regional Public Health would welcome the opportunity to discuss this further with the committee.

Kind regards

Dr Jill McKenzie
Medical Officer of Health

Peter Gush
Service Manager

Ruamāhanga Whaitua Committee

DRAFT

Ruamāhanga Whaitua Implementation Programme

Ruamāhanga Whaitua Committee

June 2018

Available for public comment 13 June – 11 July 2018

Ruamāhanga Whaitua Committee

Contents

Ruamāhanga Whaitua Implementation Programme summary

The people of the Wairarapa Valley share a sense of love and respect for the Ruamāhanga whaitua; its landforms, tributaries, creeks and wetlands.

The Ruamāhanga Whaitua Committee (RWC) is made up of elected members, mana whenua (Rangitāne and Ngāti Kahungunu) and community members drawn from throughout the Wairarapa Valley. This group of people was brought together to provide recommendations to Greater Wellington Regional Council (GWRC) on the way forward for land and water management in their place.

In particular, the RWC was asked by GWRC to make recommendations on how to implement the National Policy Statement for Freshwater Management (NPS-FM) in the Ruamāhanga Whaitua.

This Whaitua Implementation Programme (WIP) is the result of the Committee's work and conversations and is a community response to a community need for change.

In preparing this WIP, the mission of the RWC has been to develop approaches to improving water quality that meet both the aspirations of community and our statutory obligations, while also being managed with increased fairness, efficiency and accountability.

The challenge

Improving water quality is not easy.

The overarching and complex issues that have caused and will continue to cause issues for the health of the Whaitua are addressed in the WIP. We all need to be thinking of the catchment as a whole system to address these issues and explore the opportunities to reverse the damage done. Climate change, land use activities which affect water, river and lake management and water allocation all present challenges when looked at in the context of improving water quality.

Solving these issues is not an easy or quick process and will require changes and effort across the whole catchment and community. Everyone will need to do their part, and sometimes that will mean new costs, new work programmes and behaviour changes.

Our approach

The RWC has spent the last four years discussing and communicating with different groups from within this community including iwi and hapū, business owners, farmers, scientists and ecologists to dig deep into what they want and need for this catchment in order to look after water and how these changes could be implemented.

The Ruamāhanga whaitua process is the collaborative discussion around the future of our streams, rivers, and lakes. The water that connects us. The land and our communities. Their historical nature and value to mana whenua.

Peter Gawith, Chair of the Ruamāhanga Whaitua Committee

Values-based decision making

The Committee worked with communities to identify core Ruamāhanga values. The Committee has utilised these values as their primary guide for all decision making. National legislation directs all communities to improve water quality. Continuing our current practices across urban and rural land management will not deliver us the changes sought by this national direction nor by our communities. New limits and management approaches in this WIP must do so.

The Committee's work has been driven by the way people value water in the Ruamāhanga whaitua. From discussions in country halls, marae and town centres across the valley, the Committee has distilled the essence of how the community values water and identified a vision for the future of the whaitua to be a place where water glistens, where:

- We are all connected to the water so we are all equally responsible for creating a more natural state
- Holistic land and water management creates resilience
- Recreational and cultural opportunities are enhanced
- There is a sustainable economic future
- Water quality is improving
- Ecological enhancement is sustainable
- Ko wai, mo wai, no wai: waterways connect communities, there is a sense of identity for people and water
- There is safety and security of (drinking) water supply

Reflecting mana whenua relationships

The identity and wellbeing of Wairarapa iwi, Rangitāne and Ngāti Kahungunu, are directly associated with Te Awa Tapu o Ruamāhanga (the sacred Ruamāhanga River) and its many tributaries. From the headwaters to the sea, local iwi and hapū identify with the river system as a source of mana and mauri. These traditional relationships of Māori with water are recognised in the Resource Management Act (RMA) and in the NPS-FM as matters of national significance. Recent Treaty Settlements have also recognised mana whenua role as kaitiaki in the future governance and management of Wairarapa Moana and Ruamāhanga.

Integration of mana whenua perspective in this catchment planning is critical to the work of the RWC who have been working with local kaitiaki and marae communities to ensure that Māori values are recognised and provided for in the WIP.

The Committee's recommendations aim to ensure that active mana whenua leadership and participation is integral to the implementation of improved water quality and quantity at all scales and in all places throughout the Ruamāhanga catchment. The recommendations do this by requiring that hapū/marae have a structural role in FMU implementation management processes and that their values are integral to reporting on progress at community catchment scale. The recommendations also require that hapū/marae capacity and capability to both lead and participate as mana whenua kaitiaki is supported and resourced through development of a mana whenua led kaitiaki support mechanism.

Our tasks

The RWC is part of a broader national push in land and freshwater management, but that also reaches individual communities such as hapū and marae. Under the national direction of the National Policy Statement for Freshwater Management (NPS-FM), regional councils are required to set the goals with their community to maintain and improve freshwater quality. These goals are based on the community values.

Part of the RWC's task was to identify the boundaries of 'freshwater management units' for all water bodies and their catchments and then, within these units, to identify the goals for providing for how water is valued (also known as freshwater objectives) and the ways in which to reach these goals (described in integrated policy packages). Identifying freshwater management units enables communities to take ownership and responsibility for looking after the waterbodies in each sub-catchment. Each freshwater management unit has its own mana and identity. The Committee has identified 21 river freshwater management units and two lake freshwater management units for looking after water quality in the Ruamāhanga whaitua. These are shown in the map on page 18.

The following sections summarise what the Committee believes the draft objectives for each freshwater management unit and the community are, and outlines the ideas underpinning who we might reach this glistening future and identifies the key parts of the policy packages (rules, investments and further work) to get us there.

What we want to achieve

The Committee has identified a broad range of freshwater objectives for streams, rivers and lakes in order to provide for the way fresh water is valued in the Ruamāhanga Whaitua (see section 4).

These objectives can be broadly summarised as follows:

- Water quality for recreation needs to improve across the whaitua so that waterways are swimmable, including to improve the state of *E. coli* in all river freshwater management units so that at least a National Objectives Framework (NOF) state of C is achieved by 2040

- Periphyton and macroinvertebrate health is improved across many streams and rivers, including to ensure that all waterbodies meet the national bottom line for periphyton by 2040

- By 2050, sediment loads reaching waterways is substantially reduced in order to contribute to improving macroinvertebrate and native fish health in streams and rivers and to improving ecosystem function and mahinga kai values in lakes

- The health of native fish communities is improved in all water bodies, including to ensure that mahinga kai and cultural values are provided for

- The natural character of streams, rivers and lakes is restored, including to ensure there are healthy macroinvertebrate, native fish and plant communities in these water bodies

- The health and resilience of Lake Wairarapa and Lake Onoke are improved, including to ensure all national bottom lines are meet and both lakes improve their trophic level index state

Some of these objectives are expressed in words (see sections 4.2.1 to 4.2.3) while others are expressed in numeric form, including using the NOF of the NPS-FM to set objectives for the compulsory attributes of ecosystem health and human health for recreation (see section 4.3 and 4.4 and Tables 11-15 in the appendix for a full summary of these).

Our key themes

Across the course of the Committee's extensive work, a number of themes have emerged that provide a strong underpinning to the whole of the WIP direction and which provide insight into the intent of the Committee's direction for land and water management in the whaitua over the next ten years and beyond. These themes are:

- Ensuring integrated land and water management
- Effective implementation of the whole of the WIP
- Promoting innovation
- Seeking good management practice across sectors and activities
- Improving efficient use of water in an increasingly water-constrained environment
- Being equitable across the community
- Improving how we monitor, account for resource use and review progress

How we're going to get there – three policy packages

1. Discharges and land use

The discharges and land use policy package is made up of the following key parts:

- Load limits and targets for nitrogen, phosphorus and sediment, and concentration limits and targets for *E. coli*, for each freshwater management unit. These will be set as rules in the PNRP. For the catchment they require a nitrate reduction of 7.5%, a phosphorus reduction of 28% and a sediment reduction of 28%.
- Reduction targets for sediment loss from land uses to be achieved by 2050 by:
  - Reducing streambank erosion in all freshwater management units
  - Significantly reducing hill slope erosion in the 'top five' freshwater management units producing the most sediment from non-native land uses (the Taueru, Huangarua, Eastern hill streams, Whangaehu and Kopuaranga)
- Undertake sub-catchment, landscape-scale strategic planning with communities in each relevant freshwater management unit to identify how to best achieve these sediment reduction targets
- Manage diffuse source discharges (e.g. farming activities) through a non-allocation regime. Manage these discharges in accordance with good management practice, farm planning, regulation of land use change and through the promotion and support of 'catchment communities' as key mechanisms to meeting water quality limits and the achievement of freshwater objectives in each freshwater management unit.
- GWRC review the need for a nutrient allocation approach ten years after the plan change resulting from this WIP
- Promote farm environment planning as a primary tool of management of activities at the farm-scale
- Emphasise and promote riparian management as a key part of improving impacts from discharges on water quality
- Manage point source discharges (e.g. wastewater treatment plants) with discharge standards consistent with these limits and the achievement of freshwater objectives
- Ensure wastewater discharges are disposed to land (in the main) by 2040
- Manage urban stormwater discharges in accordance with the consenting process in the PNRP

2. *River and lakes management*

The rivers and lakes management policy package is made up of the following key parts:

- Take an integrated approach to slowing water down across the whaitua, including through promoting groundwater recharge
- Restore the health of Lake Wairarapa and Lake Onoke, with an emphasis on the trial and application of management methods in the lake
- Investigate options for restoring the connection of the Ruamāhanga River to Lake Wairarapa, holding Lake Wairarapa at higher levels and different opening regimes for Lake Onoke
- Promote the restoration and creation of wetlands
- Seek opportunities to enhance the natural character of rivers, including by aligning flood management processes, planning and investment with the Ruamāhanga Whaitua freshwater objectives

3. *Flows and water allocation*

The flows and water allocation policy package is made up of the following key parts:

- Enable attenuation and storage at a range of scales
- Base the water quantity limits (minimum flows and allocation amounts) on those in the Proposed Natural Resources Plan (PNRP), with the following changes:
    - Raise the minimum flows in the Upper/Middle Ruamāhanga river area (above the Waiohine River) over 20 years, and in the Waipoua River over ten years, to provide for the same level of habitat protection for fish as all other rivers in the Whaitua, and
    - Cap allocation amounts from all waterbodies at the current use
- After ten years, require takers of Category A groundwater (groundwater directly connected to a surface water body) to fully cease take of water at minimum flow
- Undertake further investigations to ensure those groundwater takes classified as Category A groundwater have a direct connection with a nearby river stream or lake.
- Ensure protection of small streams at low flow through clearer setting of minimum flows in the PNRP and by undertaking investigations into streams under pressure from potential over-abstraction (including the Parkvale Stream, Booths Creek, Makoura Stream, Kuripuni Stream, Huangarua River, Tauanui River and Turanganui River)
- Reduce the amount able to be taken as a permitted activity (outside of takes for the health needs of people and for stock watering) from 20m^3/day to 5m^3/day
- Update all resource consents with relevant conditions to ensure they are in line with policy settings

- Review conditions for resource consents to take water and apply water shortage directions in order to ensure adverse effects are appropriately addressed

This document is a community response to a community need for change. The people of the Wairarapa valley share a sense of love and respect for Ruamāhanga; its landforms, tributaries, creeks and wetlands. Ruamāhanga the ancestor, Ruamāhanga the childhood playmate, Ruamāhanga that feeds the land and the people, Ruamāhanga that overwhelms with floods, Ruamāhanga the sewer. Ruamāhanga; a source of community pride and community sorrow.

Process and opportunity to be involved going forward

Comments from the Ruamāhanga Whaitua Committee Chair, Peter Gawith

We've held an extended conversation with the community over the last four years. The Whaitua Committee is now getting to the sharp end of the process and the extensive engagement with the community since February has focused peoples' minds.

We're happy to stretch the period of engagement but we need to keep the process moving forward, which is why we want community feedback to our draft WIP in June so we have time to consider the feedback and present the WIP to GWRC in August.

But that's not the end of the discussion, in many ways it's just the beginning. There will be plenty of opportunity for more public input.

Once the Whaitua Committee's recommendations are adopted by Greater Wellington, and become a plan change there will be formal consultation. This plan change, or variation to the Natural Resources Plan, will be publicly notified and the public will be able to make submissions on it.

There's much more discussion to be had on the issues raised by the Whaitua Committee. The current extension of engagement is just one stepping stone in a long conversation with the Wairarapa community about our land and water.

1. Te Mana o Ruamāhanga – The significance of Ruamāhanga

Tuatahi ko te wai, tuarua whanau mai te tamaiti, ka puta ko te whenua

Ko wai oranga, ko tangata oranga, ko whenua oranga

When a child is born the water comes first, then the child, followed by the afterbirth

The living water, the living people, the living land

The challenge of improving our waterbodies in the Ruamāhanga catchment must not be underestimated. We must change or we will not be able to support our lives and those of our future generations. This change will take the determined effort and commitment of our whole catchment community from Pukaha to Palliser; town and country, industry, community groups, whanau and individuals to provide for the fresh water values required by government and Wairarapa people. Improvement relies on us taking more care and investing more in practices that will limit the effects of our activities on our waterbodies. It requires us to have new ideas, great innovation, investment and the courage to change the way that we do things.

We must commit to new learning and understanding that will inspire our communities to change their practice and look for the opportunities to do it better. Improved water quality will take time and sustained effort over many generations to restore values and build resilience. The Ruamāhanga Whaitua Committee (the Committee) emphasises collaboration. We see that the drivers for change lie with the people of Wairarapa.

This document is a community response to a need for change. The people of the Wairarapa valley share a sense of love and respect for Ruamāhanga; its landforms, tributaries, creeks and wetlands. Ruamāhanga the ancestor, Ruamāhanga the childhood playmate, Ruamāhanga that feeds the land and the people, Ruamāhanga that overwhelms with floods, Ruamāhanga the sewer. Ruamāhanga; a source of community pride and community sorrow.

1.1 Where water glistens – Ruamāhanga values and issues

Over the past four years the Committee has heard expressions of pride and frustration from Wairarapa communities concerned about the current and future state of their rivers, local water quality and quantity, the impact of new regulation on their livelihoods and the effects of climate change on their communities.

Community values (see Appendix 10.1) expressed to the Committee from discussions in country halls, marae and town centres have been brought together into a single vision led document entitled “Where water glistens”. It tells the story of a Ruamāhanga future where:

- We are all connected to the water so we are all equally responsible for creating a more natural state
- Holistic land and water management creates resilience
- Recreational and cultural opportunities are enhanced
- There is a sustainable economic future
- Water quality is improving
- Ecological enhancement is sustainable
- Ko wai, mo wai, no wai: waterways connect communities, there is a sense of identity for people and water
- There is safety and security of (drinking) water supply.

Through extensive community engagement over four years the Committee heard that the Ruamāhanga catchment is degraded and does not meet the cultural, social, environmental and economic expectations and needs of Wairarapa communities. In particular:

- The natural state of rivers and lakes has been modified to the extent that low flows occur in our rivers that harm the ecology and natural habitat, and affects our ability to use rivers for recreation and cultural purposes
- Mana whenua values and interests are not well recognised in the current water management system
- Reliability of water supply for town supply, agriculture and industry is decreasing
- The current water allocation mechanism is not the most efficient or equitable method
- Water fails to meet national objectives in some places. This includes national objectives and community expectations for swimmability
- Water quality fails to meet the national bottom lines in Wairarapa Moana and Lake Onoke
- Effects of climate change are expected to become more pronounced, which will exacerbate flood events, droughts, irrigation reliability and habitat loss.

1.2 Who is Ruamāhanga?

The mana of Ruamāhanga is carved across the lower North Island. Ruamāhanga has massive scale, great diversity and a generative force that enables and empowers all life within the Wairarapa valley.

Ruamāhanga is the largest flowing body of water in the Wellington region. It extends from Pukematawai, a peak in the north western Tararua range through to Wairarapa Moana in the south eastern Wairarapa. This is a journey of more than 130 kilometres taking in many thousands of hectares of land and a myriad of water bodies, large and small. Along the way the flow of Ruamāhanga is at times strengthened as it receives water from many tributaries and at others

diminished as water is given to the land, forming springs and streams that ultimately return to the main stem.

Te Awa Tapu o Ruamāhanga – The sanctity of Ruamāhanga

Ruamāhanga exists in a cultural and spiritual context described by Wairarapa iwi Rangitāne o Wairarapa and Ngāti Kahungunu ki Wairarapa.

> *The breath of life (te hā o te ora) was placed within the Ruamāhanga River at the beginning of time. The hā is present in Papatuanuku, the earth mother's blood or the water that flows in through her main vein the Ruamāhanga. If water can breathe, all other life breathes and therefore ira tangata/humans are sustained.*
>
> *Ngā Taonga nui a Kiwa – Schedule B, PNRP (Appendix xxx)*

In this statement Wairarapa iwi Rangitāne o Wairarapa and Ngāti Kahungunu ki Wairarapa identify the sanctity of Ruamāhanga and how the health of the water is fundamental to human health and wellbeing.

Te Mana o Ruamāhanga – The authority and renown of Ruamāhanga

Wairarapa rangatira Whatahoro Jury likened the waters of Ruamāhanga to mother's milk nurturing the people of Wairarapa.

> *Ko Waiohine ko Ruamāhanga ēnei e wairua tipu mai i Tararua maunga e oranga e te iwi.*
>
> *These are Waiohine and Ruamāhanga.*
>
> *They are like mothers milk flowing out of the Tararua mountains for the prosperity of the people*
>
> *Na Whatahoro Jury 1841 -1923*

Te Mauri o Ruamāhanga – The life force of Ruamāhanga

The mauri and mana of Ruamāhanga is a composite formed by the individual mauri of many places, species and water sources. From the West come Waipoua, Waiohine, Waiawangawanga (Waingawa) and Mangatarere. These find their source in the steep catchments of the Tararua range. They bring force and energy along with mountain rock and gravel as they join the main stem of Ruamāhanga along the Wairarapa valley floor. Whangaehu, Kopuaranga and Taueru in the North and Eastern hills bring soft sediments and a lazier flow. Further south Tauherenikau, Huangarua, Tauanui and Turanganui all make their own distinct contribution as they enter Wairarapa Moana and Onoke.

Ngā puna waiora (sources of life giving water) are the many springs, small streams and wetlands that feed the larger water courses. Away from the force and volume of the larger entities, these places are rich in their ability to house and feed the many and diverse life forms that inhabit Ruamāhanga. These smaller places are greatly esteemed by mana whenua for their mahinga kai values and ability to support Māori customary use, particularly around marae and papa kainga. They are some of the places best known by rural landowners and towns people; the places they swam and fished as children, rely on for their water supply, the places by which they note changes to land and water over time.

The mauri or life force of the river is also made up of the many natural elements that give it form. These include the mineral and organic compounds of the land it traverses and the many people, plants, birds, insects, fish and animals that inhabit Ruamāhanga.

1.3 Wairarapa Moana – Ka ora te repo, whakaora te taonga wai

Restore the wetland and you will breathe life into a treasured inheritance

Vision of Wairarapa Moana governance group

The mana of Wairarapa Moana is the mana of Wairarapa, the second largest freshwater body in the North Island and an internationally significant wetland. Wairarapa takes its name from Wairarapa Moana, “the glistening waters” named by Haunui a Nanaia some 800 years ago. Wairarapa Moana persona, culture and history are fundamental to iwi identity and the story of Wairarapa settlement and development from that time.

Treaty settlement has recognised the significance of mana whenua relationship with Wairarapa Moana and iwi will have ownership of the lake bed returned to them along with a leading governance role in managing both the Wairarapa Moana and Ruamāhanga catchment.

It is of course the mauri or life giving element of the water itself that represents the ultimate state of the catchment and its management. Wairarapa Moana and Onoke are the last stopping places for Ruamāhanga on the long journey from Tararua to Kawakawa (Palliser Bay). It is in these wetlands and shallow tidal estuaries that the accumulated effects of that journey are finally able to be told.

The mauri of Wairarapa Moana has been repurposed, reduced and restrained through disconnection, discharge and drainage. Wairarapa Moana is polluted to the extent that the mauri or life force of the lake is at the point of extinction. Formerly the place where the waters of Ruamāhanga joined a massive tidal estuary rich in every kind of indigenous fish, plant and bird life, Wairarapa Moana has been disconnected from the river and become an unrefreshed backwater, loaded with sediment and introduced pest fish, slowly stagnating to a eutrophic state.

The much smaller Onoke now takes on the full load of the Ruamāhanga. Onoke is the sump of the Wairarapa; the small coastal estuary accepting everything that the Ruamāhanga catchment community; land, people and livestock, collectively release into the river. Cleaned by daily tidal change, Wairarapa’s run off is pushed up and down the coast implicating marine and intertidal values.

Despite this degradation the mana of Wairarapa Moana is in the ascendant. Underpinned by recent Treaty settlements that recognise the fundamental importance of Wairarapa Moana to Wairarapa iwi, the region and the nation, there is increased determination to better understand, protect and restore the values of the area. This is happening through new regulatory emphasis on stock exclusion around the lakes and reducing contamination throughout the catchment. The proposal to restore Ruamāhanga to Wairarapa Moana is an example of the innovation required to improve the water quality of both lakes.

1.4 A privilege, not a right

Water quality objectives must address the most challenging ecosystem impacts affecting Wairarapa's rivers and lakes. There is the need to reduce contaminant loads, including *E. coli*, sediment, and nutrients as well as restore habitats. Some of these shifts will be very challenging and require investment into a long term programme to change practice and introduce new interventions.

For example, the presence of human and animal effluent and associated pathogens in waterbodies throughout the Ruamāhanga poses a risk to human health and does not support community and mana whenua aspirations. The reduction of *E. coli* for any waterbody will demand a number of interventions including innovative changes to land use practice, upgrade of urban storm and wastewater systems, stock exclusion from waterbodies and investment in whole landscape riparian management.

To make these changes we must recognise that using land and water is a privilege, not a right. By valuing water, we can change the way in which our catchment performs. We must take ownership so that it becomes second nature for each and every person to think about, conserve, protect, and cherish water. From turning the tap off when brushing our teeth, to encouraging better land use practices we need water to be front and centre of how we live.

We need to understand that the land, water, vegetation, and people are all linked and form a complex whole. To improve our catchment we need to understand and consider the whole catchment and how all our individual actions, past, present, and future, effect the operation of the catchment.

We need to work collectively and as community catchments. It was clear during the whaitua process that very few people were thinking in catchment terms. The overarching feeling was that many people were looking after their own interests and arguing a corner. The best outcomes for the catchment will almost certainly involve innovative and collaborative investigation of actions. The tools that are used to manage the environmental effects of land and water use are often developed by combining a pool of knowledge and encouraging innovation. Community catchments; people working together is the future for collaborative implementation.

Much has been done to date. However making the improvements recommended in this document will require sustained efforts over generations and involve development of innovative land uses, new science and technology and new resources.

1.5 A complex legacy – town and country

Ruamāhanga has become the servant of many masters. The rivers bring water to meet the increasing needs of communities, farms and industry. It also has to take water away in the form of waste and stormwater, flood flows and run off. In addition, community expect to retain their ability to fish, swim and have cultural interaction with Ruamāhanga throughout the catchment. Ruamāhanga has been reshaped and repurposed to meet these demands creating new, sometimes unintended but ever accumulating issues and complexity.

The state of our water is determined by the land that surrounds it. If land is poorly managed, human and animal effluent, sediment and nutrients will contaminate water creating health risks, compromising ecological health and limiting use. It is difficult to improve water quality once the contaminant is in the river or to increase flow once the water has been taken out.

Historic deforestation and subsequent land use throughout the catchment continues to have the most severe impact on water quality, environmental health, cultural values and natural character of Ruamāhanga.

Where forest cover has been lost the speed of water in steep hill country drives damaging flood flows. As a result the river has been managed as a flood channel to protect people and property. The straightening, grooming and braiding of the Ruamāhanga reduces natural character, mahinga kai and ecosystem habitat and destroys cultural values. Lack of shade throughout the catchment increases water temperature and promotes algal growths that impacts human health and limits contact recreation and cultural uses. The increased speed of water also limits the ability of landowners to manage stock effluent on land and the opportunity to reduce contamination of water over extensive areas.

Climate change is a challenging issue. A warming and drying climate with less water requires immediate action and innovation to maintain and secure current levels of water use reliability, let alone what may be required for the future. Reviewing how we use water, closer monitoring of water takes and establishment of new limits for water use in both town and country is required to provide for the sustainable future of the communities who rely on Ruamāhanga for their health and wellbeing.

In addition, climate change is driving an increase in frequency of higher intensity and severe weather events. These have the potential to significantly impact our communities and environment through flood flows and damage to vulnerable soils.

Issues are not confined to rural areas. Ageing pipes and higher stormwater flows off ever-growing areas of hard surfaces put additional pressure on wastewater and stormwater systems through increased volumes and cross contamination. These issues result in both managed and unmanaged discharges of contaminants to surface water and risks contamination of groundwater. There is increasing uncertainty and concern on the potential for both rural and urban contaminant sources to seriously affect public health through contamination of aquifers.

1.6 Doing nothing is not an option

These issues affect the whole Ruamāhanga catchment community. Addressing them will require a whole catchment and whole community effort over generations.

Taken together, the often competing expectations, roles and demands have gradually changed the physical shape, capacity and nature of Ruamāhanga. Increased pressure across the whole system from river management, water takes and discharges that cause contamination has degraded both the natural character of Ruamāhanga and the quantity and quality of water.

Much has and is being done to address these issues. Three generations of hill country landowners have worked in partnership with the regional council to reduce sediment through intensive tree planting. Year by year, local councils continue to upgrade sewerage and stormwater networks and reduce contamination of Ruamāhanga. Every winter, Wairarapa people of all ages plant tens of thousands of plants and trees. In addition to work done and funded by individual land owners this is supported by a range of non-government, council and central government agencies.

Public and private partnerships are formed to protect biodiversity and to restore our environment, to create additional protection through covenants and collaborative work programmes.

Farmers are continuously endeavouring to improve practice to reduce the effects of their activities through innovation and refinement of land use supported by their industries and research bodies. Mana whenua share their understanding and knowledge of land, water, people and place and look for a stronger role as kaitiaki in managing the restoration of their tūrangawaewae (traditional homeland). For innovation to flourish we need to understand and embrace risk and acceptance of risk. Currently we do not facilitate innovation because we do not accept the risk of failure in trying something new.

In some places we have made real progress, improving water quality, reducing the effects of activities, and making a difference. However, whilst we must acknowledge and value our endeavours and our achievements, we must also accept that our past efforts have not been enough to secure our future; the health of our waterways.

Doing nothing is not an option: our environment and economy is in danger of declining and we must find alternative ways of managing our catchment to ensure that future generations inherit a vibrant catchment, environment, and lifestyle.

Our communities all agree that change is required. They agree that we need a new approach to river management that reduces contamination, increases flow and restores the natural character of the river. They want more certainty for ecological health, certainty of water use reliability, certainty that can support the wellbeing and development of the social, cultural, economic and environmental health of Wairarapa community.

This document sets out that new approach towards “catchment thinking” and increased resilience, and identifies the direction and degree of change, the new mechanisms, objectives, limits, targets, methods and timeframes required to achieve that change.

2. Introduction

The Ruamāhanga Whaitua Implementation Programme (WIP) is a non-statutory report that provides locally developed advice and direction to Greater Wellington Regional Council (GWRC) on how best to manage land and water in the Ruamāhanga whaitua (catchment).

The authors of this WIP are local people; women and men, mana whenua, farmers, townspeople and councillors who have come together to learn about the Ruamāhanga and develop approaches to water management, and a new economy that meet both the aspirations of community and our statutory obligations. How this is achieved is critical and this document describes a way that the Ruamāhanga whaitua can be managed with increased fairness, efficiency and accountability.

2.1 Who are the Ruamāhanga Whaitua Committee and what do they do?

The Committee is an advisory body established by the Greater Wellington Regional Council.

The Committee is made up of elected and community appointed members drawn from throughout Wairarapa and includes mana whenua representatives from Wairarapa's two iwi. As a group they are responsible for developing a WIP that will outline regulatory and non-regulatory proposals for integrated land and water management within the Ruamāhanga whaitua boundary including measures to implement the National Policy statement for Freshwater Management (NPS-FM).

Ruamāhanga Whaitua Committee members

Aidan Bichan
Andy Duncan
Cr Chris Laidlaw (Wellington Regional Council)
Cr Colin Olds (South Wairarapa District Council)
David Holmes (Masterton District Council)
Esther Dijkstra (Deputy Chair)
Cr Michael Ashby (Carterton District Council)
Mike Birch
Peter Gawith (Chair)
Philip Palmer
Rawiri Smith (Ngāti Kahungunu ki Wairarapa)
Russell Kawana (Rangitāne o Wairarapa)
Rebecca Fox
Vanessa Tipoki

The establishment of the Ruamāhanga Whaitua Committee was seen by GWRC as an opportunity to do things differently through a devolved, community led planning process. GWRC are particularly concerned to ensure that regulation for improving water is as far as possible driven by local leadership, knowledge and priorities in order to achieve the most pragmatic balance between giving effect to the NPS-FM whilst maintaining the economic viability and the community support needed to deliver improved water quality and sufficient water quantity.

The recommendations in this WIP will be implemented by GWRC working alongside mana whenua, communities and partner organisations. Some recommendations will become part of a plan change to the Ruamāhanga Whaitua chapter of the Proposed Natural Resources Plan (PNRP), driving the way sub-catchment scale targets are achieved and resource consents issued. Other recommendations will be implemented through changes to strategic and operational planning undertaken by GWRC, affecting the way resources are allotted into the future. Other recommendations set out the challenges and opportunities to the people of the whaitua and other organisations to play their role in helping achieve this WIP's vision of glistening waters.

This document provides recommendations in the following chapters:

Whaitua implementation and Māori

Rangitāne and Kahungunu hapū and marae are mana whenua kaitiaki of Ruamāhanga. They maintain the traditional relationships with Ruamāhanga over time including future aspirations for the restoration of the mauri or life force of the whole system.

The Committee's recommendations support the leadership and participation of hapū/marae of the Ruamāhanga as being central to the achievement of fresh water objectives at all scales, particularly FMUS. Their recommendations specify that GWRC must actively support the capacity and capability of hapū/marae to have a leading role in Whaitua implementation through development of mechanisms and supporting resources.

Freshwater management units and objectives for water bodies

The Ruamāhanga whaitua has been divided into 21 river freshwater management units (FMU) and two lake freshwater management units. A FMU is an area that identifies and spatially delineates waterbodies and the surrounding land that drains to those waterbodies. Each of the FMUs is described in this chapter together with the objectives for each FMU.

Overarching themes

A number of key themes cut across the policy packages and provide an overall context and direction for the WIP. These themes cover:

- An integrated land and water management system
- Effective implementation of the whole of the WIP
- Promotion of innovation
- Seeking good management practice across sectors and activities
- Efficient use of water in an increasingly constrained water environment
- Equity
- Monitoring

River and lake management

The physical habitat of rivers, streams, lakes and their margins is vitally important to determining the way ecosystems function and how the relationship between people and waterbodies flourish. The 'River and lake management' chapter outlines the changes to high level policy, investment and implementation methods needed to deliver on the objectives and the integrated water management story of the Ruamāhanga WIP.

Managing contaminants - discharges and land management

The way we use our land and what we do on the land impacts on the quality of water in our rivers and streams. The 'Discharge and land management' chapter outlines the recommendations for limits and methods to achieve the water quality objectives.

Flows and water allocation

We value our fresh water in many different ways, whether it is the water's life supporting capacity, recreational values or the economic value water brings to the region. How we manage and use fresh water to provide for the range of values is a challenge. The 'Flow and allocation' chapter outlines the recommendations on the policies, rules and methods that will deliver the objectives associated with the take and use of water.

2.2 The decision making process

2.2.1 Partnerships

The Ruamāhanga Whaitua Committee has operated in partnership with mana whenua and our recommendations were guided by the five following principles:

1. Ki uta ki tai – interconnectedness
2. Wairua – identity
3. Kaitiaki – guardianship
4. To matou whakapono – judgement based on knowledge; and
5. Mahitahi – partnership

Figure 1: Five guiding principles developed by Te Upoko Taiao

The identity and wellbeing of Wairarapa's two iwi, Rangitāne and Ngāti Kahungunu is directly associated with Te Awa Tapu o Ruamāhanga (the sacred Ruamāhanga River) and its many tributaries. From the headwaters to the sea, local iwi and hapū (families associated with a particular area and marae) identify with the river system as a source of mana (pride and strength) and mauri (vitality and sustenance). Iwi have a traditional relationship with the catchment which is being limited by changes in water quality and quantity. In addition to the direct effects of changing water quality on community health, economic and social wellbeing that they share with the whole catchment, local Māori point to a decline in mahinga kai (traditional food sources) and their ability to interact with water for cultural and spiritual purposes.

These traditional relationships of Māori with water are recognised in the Resource Management Act (RMA) and NPS-FM as matters of national importance. More recently Wairarapa's Treaty Settlement has given local recognition of the iwi relationship with the catchment through establishment of an ongoing role for iwi in the governance of Wairarapa Moana and the Ruamāhanga River. Integration of mana whenua perspective in catchment planning is critical to the work of the Committee who have been working with local kaitiaki and marae communities to ensure that Māori values and interests are reflected in the Ruamāhanga WIP.

2.2.2 Legislation, principles, values and voices

The whaitua concept was born out of the need to make land and water management decisions that reflect the issues, physical setting and community of a place. One set of decisions for the whole region doesn't allow for this. Land and water management has traditionally been catchment based. The whaitua concept is a return to catchment based decision making. The Committee was formed partly in response to the government's new freshwater management regime for New Zealand, which is set out in the NPS-FM. This includes minimum standards for freshwater that regional councils must seek to achieve, so that the overall water quality in the whaitua is maintained or improved.

The Committee must give effect to both the NPS-FM and the NZ Coastal Policy Statement (NZCPS). The Committee is also guided by the PNRP. These require that:

- Life supporting capacity of freshwater ecosystems and health of people and communities in fresh water is safeguarded.
- Iwi and hāpu are involved in freshwater decision making and the values and interests of tangata whenua are reflected in freshwater planning.
- Provision is made for ecosystem health and mahinga kai, and for contact recreation and Māori customary use in rivers and streams, wetlands, estuaries and the open coast.
- Objectives are set that will maintain or improve freshwater quality. The NPS-FM contains a National Objectives Framework (NOF). This contains a set of optional values (things that the community want water in their region to be used for, such as swimming, irrigation and economic or commercial development), as well as two mandatory 'national values' (ecosystem health and human health for recreation). The NPS-FM sets a number of bottom lines for key attributes for the mandatory values, and directs how councils are to go about setting objectives for the state of our waterbodies and related limits on takes and discharges. There are biophysical attributes e.g. *E. coli*, periphyton, nitrate toxicity for all rivers and lakes. Other national values that must be considered include natural form and character, mahinga kai, fishing, irrigation and food

production, animal drinking water, wāhi tapu, water supply, commercial and industrial use, hydro-electric power generation, transport and tauranga waka.

- Over-allocation is avoided, and fresh water quality is improved where over-allocation has occurred.
- Communities are enabled to provide for their economic well-being through the use of water, within limits.

Ruamāhanga whaitua decision making is informed by many voices. There is national legislation that directs regional plans. There are the voices of the many diverse local communities, whanau, businesses, hāpu and individuals who have provided their views. There are groups with clearly vested interests; there are scientists from all disciplines, those with cultural knowledge, local knowledge, political views, and sector views. There are also those who do not have a voice or struggle to be heard but who must be considered. These include the Treaty, social equity, Te mana o te wai, the future of the catchment as a whole, the youth and unborn future generations, the mauri of individual waterbodies, climate change and of course the views of the Committee themselves.

The Committee's recommendations are drawn from all of these. Recommendations have been informed by considerations that include but go well beyond a balance between environment and economy. The NPS-FM directs all communities and councils to maintain or improve water quality. The status quo has not and will not achieve this; new limits and management approaches must do so.

2.2.3 Collaborative approach

A fundamental basis of this process has been the adoption of the collaborative approach to decision making. The collaborative model has given an unprecedented opportunity for the people of the catchment to imagine goals and put into reality methods to achieve those goals, whether they are improved water quality or quantity, or the economic or cultural prosperity that comes from balanced, sustainable and efficient functioning of the catchment. The community has been instrumental in contributing to how land and water resources will be managed.

2.3 What could this mean for me?

Implementation and compliance will require new costs, new work programmes and changes in practice that will inevitably affect some parts of the community more than others. It is anticipated that new limits and management requirements proposed in this document will drive changes in land use, require additional funding from ratepayers and demand an "all in", whole landscape, whole community approach to achieving freshwater objectives.

3. Whaitua implementation and Māori

3.1 Context

While many aspects of the wider community's values are highlighted in the WIP, there is an important emphasis on Māori values, many of which are shared by the wider community.

Throughout the process of drafting the second generation of a regional plan (the PNRP), GWRC has sought to include Māori explicitly in this process. Ara Tahi has been the Committee that has brought iwi leadership within the Greater Wellington Region to the table with the region's political leadership to set direction for the plan.

Much of the specific and technical overview in the drafting of the Proposed Natural Resources Plan has come from Te Upoko Taiao. It is here that the principles of the Treaty of Waitangi were given space to consider how tangata whenua and tangata tiriti would be partners in protecting the whenua and wai and how each partner would participate from governance through management to operation. One way the Treaty principles are made explicit is through the five principles (see section 2.2.1) that set the foundation for how we relate to the rights and responsibilities of local government in the Greater Wellington Region.

3.2 Ruamāhanga Whaitua Committee and Te Mana o Te Wai

These five guiding principles are the base for the Ruamāhanga Whaitua Committee too. As this Committee has met to draft this report, and ultimately for the recommendations to go through a plan change process, they have been required to consider legislation that applies to the drafting of regional plans. Some of these requirements apply directly to including Māori perspectives.

The Committee has taken into their WIP these requirements. These include the guidance from the NPS-FM, the Resource Management Act itself and the provisions in the PNRP. The NPS-FM guides the Whaitua to consider and recognise Te Mana o Te Wai.

This specifically happens at the freshwater management unit scale. Each community will decide what Te Mana o te Wai means to them at a FMU scale, based on their unique relationship with fresh water in their area or rōhe.[1] The Statement of National Significance in the NPS-FM describes the concept of Te Mana o te Wai as the integrated and holistic well-being of the water. It is up to communities and councils to consider and recognise Te Mana o te Wai in their regions.

Te Mana o te Wai is a concept for fresh water that encompasses several different aspects of the integrated and holistic health and wellbeing of a water body. When Te Mana o te Wai is given effect, the water body will sustain the full range of environmental, social, cultural and economic values held by iwi and the community. The concept is expressed in te reo Māori, but applies to freshwater management for and on behalf of the whole community.

The mana of water also applies to natural form and character. Natural form and character is where people value particular natural qualities of the FMU. Matters contributing to the natural form and character of a FMU are its biological, visual and physical characteristics that are valued by the community, including:

[1] https://www.mfe.govt.nz/sites/default/files/media/Te%20Mana%20o%20te%20Wai.pdf

- its biophysical, ecological, geological, geomorphological and morphological
- aspects
- the natural movement of water and sediment including hydrological and fluvial
- processes
- the location of the water body relative to its natural course
- the relative dominance of indigenous flora and fauna
- the presence of culturally significant species
- the colour of the water, and
- the clarity of the water.

There may be FMUs with exceptional, natural, and iconic aesthetic features.

The NSP-FM also refers to Māori rights specifically in Section D when it states the following about tangata whenua roles and interests:

Objective D1

To provide for the involvement of iwi and hapū, and to ensure that tangata whenua values and interests are identified and reflected in the management of fresh water including associated ecosystems, and decision-making regarding freshwater planning, including on how all other objectives of this national policy statement are given effect to.

Policy D1

Local authorities shall take reasonable steps to:

a) involve iwi and hapū in the management of fresh water and freshwater ecosystems in the region;

b) work with iwi and hapū to identify tangata whenua values and interests in fresh water and freshwater ecosystems in the region; and

c) reflect tangata whenua values and interests in the management of, and decision-making regarding, fresh water and freshwater ecosystems in the region.

The NPS-FM requires Councils to establish FMUs for all water bodies. FMUs are water management areas that identify and spatially delineate waterbodies and surrounding land that drains to those waterbodies. The NPS-FM states that an FMU is '*A water body, multiple water bodies or any part of a water body determined by the regional council as the appropriate spatial scale for setting freshwater objectives and limits and for freshwater accounting and management.'*

The Committee has identified FMUs or sub-catchments as the appropriate scale for achieving Te Mana o Te Wai. This approach is supported by mana whenua who recognise the individual mana and mauri of all the water bodies that make up the Ruamāhanga river system. They also agree that identification and connection of people with their environment is the fundamental basis for improving water quality. Linking an FMU directly to the people who have the closet connection with the waterbody enables catchment communities to take ownership and responsibility for required improvements.

For mana whenua, the FMU relationships with waterbodies occur at a hapū/marae scale. The mana and mauri of hapū/marae is directly linked to the mana and mauri of their ancestral puna (springs), manga (streams), awa (rivers), roto (lakes) and repo (wetlands). The importance of their waterways is fundamental to their identity and survival as mana whenua. The water body is a source of physical and spiritual strength and nourishment and a connection to a shared cultural landscape inhabited by hapū and family members over many generations.

Mahinga kai and Māori customary use values, along with the Ruamāhanga whaitua values, are reflected in the freshwater objectives (FWOs) set for each of the FMUs. To be able to measure progress toward achieving FWOs GWRC needs to ensure that provision of mana whenua values in fresh water are meeting legislative requirements.

The recommendations in this WIP must be consistent with requirements of the RMA sections 6(e), 7 and 8, the NPS-FM and the PNRP. The importance of the mana whenua relationships with their waterbodies is expressed in Schedule B Ngā Taonga Nui a Kiwa (of the PNRP) and recent Waitangi Tribunal Settlements.

Recommendation 1

GWRC will:

- Support mana whenua as active partners in the management of the Ruamāhanga whaitua
- Work in partnership with mana whenua to develop a management structure that includes a permanent role for hapū/marae at the FMU level
- Work in partnership with mana whenua to establish and resource a kaitiaki support structure that ensures that Ruamāhanga whaitua hapū and marae are enabled to fully participate in FMU and catchment community planning including;
  - Identification of indicators
  - Monitoring programme
  - Kaitiaki training
  - Development of matāuranga Wairarapa
- Ensure that sufficient funding and dedicated resourcing to enable mana whenua participation is available as soon as the implementation of FMU/FWO framework begins
- Establish operative role for mana whenua, hapū/marae in the management of water quality and quantity and river management activities within the Ruamāhanga whaitua.
- Support hapū and marae to develop their own indicators for each FMU including one for the Ruamāhanga as a whole. This process to start as soon as implementation of FMU/FWO frameworks begins.
- Include hapū/marae indicators in reporting on progress towards meeting FWOs
- Establish and support the process for mana whenua analysis and interpretation of hapū/marae indicators
- Ensure that hapū/marae are informed through multiple channels of any new resource consent

applications or renewals of existing consents within their FMU and that their input into the consent process is supported.

- Encourage and work with mana whenua on the development and inclusion of mātauranga Māori innovative regulatory and non-regulatory approaches to achieving improved water quality.
- Include PNRP Schedule B Ngā Taonga Nui A Kiwa which specifies the relationship of Wairarapa mana whenua with Te Awa Tapu o Ruamāhanga within the Ruamāhanga chapter.
- Include PNRP Schedule C sites of significance to Wairarapa mana whenua within the Ruamāhanga whaitua in a specific schedule within the Ruamāhanga Whaitua chapter.

The Committee notes that the opportunity to refresh and redefine the roles and relationships of mana whenua with Council can be achieved through the recent introduction of Mana Whakahono ā Rohe (Iwi Participation Arrangements) in legislation.

The Committee further notes that the establishment of the Wairarapa Moana Statutory Board to give effect to settlement is a further opportunity to ensure whaitua freshwater management is shaped by mana whenua.

4. Freshwater objectives for the Ruamāhanga Whaitua

4.1 Ruamāhanga Whaitua freshwater management units

The National Policy Statement for Freshwater Management (NPS-FM) 2014 (amended 2017) directs all regional councils to identify freshwater management units (FMUs) in their regional plans. FMUs are water management areas that identify and spatially delineate waterbodies and the surrounding land that drains to those waterbodies. The freshwater objectives and limits need to be set in each of the freshwater management units. The activities that affect land and water within the boundaries of these FMUs need to be managed in order to meet these freshwater objectives and limits.

Each FMU will have a transparent freshwater accounting system. This means recording information on the measured, modelled or estimated contaminants that are being discharged to fresh water and the amount of freshwater being taken from the FMU. Progress towards the achievement of freshwater objectives in each FMU will be measured at representative sites.

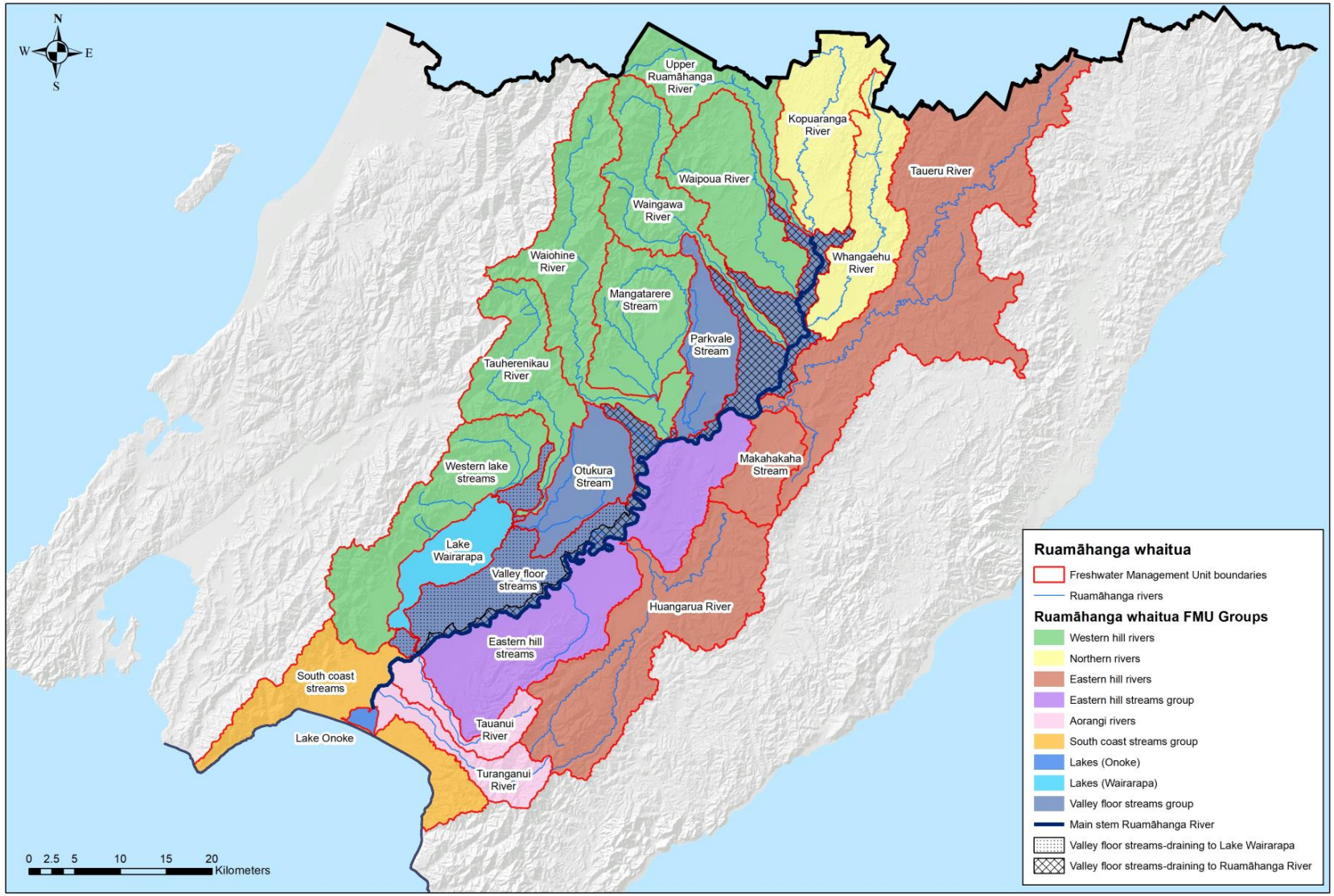
The Committee has identified 21 river freshwater management units and two lake freshwater management units. These reflect the following:

- Recognition of how the Ruamāhanga community values are reflected in freshwater bodies across the whaitua
- The Committee's own knowledge of the similarities and differences of major river systems in the whaitua
- A technical analysis undertaken to group rivers and streams based on their similar biophysical (topography, climate and geology) characteristics[2]
- Considering the existing delineations of ground and surface water zones in the Proposed Natural Resources Plan for managing water allocation
- Bringing this information together into groupings of similar biophysical characteristics, Ruamāhanga values, groundwater and surface water connectivity, surrounding land and its use, fresh water and social environments

Freshwater management units are also grouped into "like" groups for ease of explanation and management. These have similar geology and hydrology, and can be managed in similar ways (see map on Figure 1). For example, Northern Rivers FMU group has two FMUs, Kopuaranga and Whangaehu. The groundwater catchment management sub-units are based on these FMUs and are described in Chapter 8: Flows and Water Allocation.

[2] http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/Defining-a-biophysical-framework-for-FMUs-of-the-Ruamhanga-Whaitua-Report-by-Ton-Snelder-Updated-December-2016.pdf

Figure 2: Map of Ruamāhanga freshwater management unit groups and freshwater management units for lakes and rivers



4.2 Ruamāhanga Whaitua freshwater objectives

Freshwater objectives are set to provide for values in fresh and coastal water bodies. Freshwater objectives describe what environmental outcome is to be achieved, where and when. They can be described narratively or numerically.

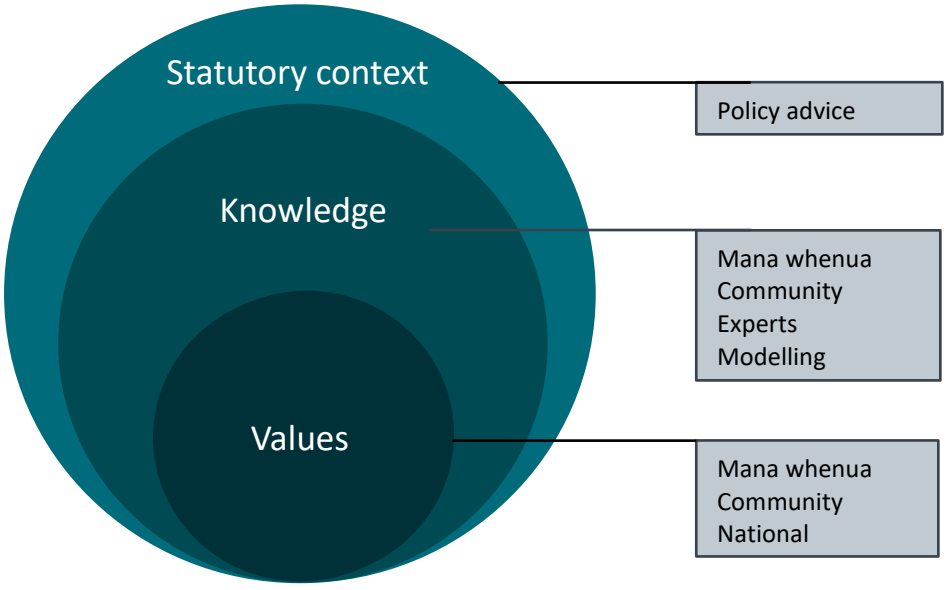
Where the current state of a FMU is below the national bottom line (as defined in the NPS-FM), the overall water quality within that FMU must be improved to at least the national bottom line or better. It is compulsory to set freshwater objectives above the bottom line to provide for compulsory and community values. For the FMU that is above the national bottom line, the attribute states must be either maintained or improved. Where there is no provision for the state 'maintain' means setting freshwater objectives so that the water quality that provides for the value (e.g. mahinga kai) does not end up worse than it currently is.

Establishing freshwater objectives and setting limits go hand in hand. Limits relate to people's use of freshwater resources and how they manage land. Setting limits describes the maximum amount of resource that is available for use (water taken or contaminant discharged) while still enabling a freshwater objective to be met.

The freshwater objectives are set to provide for the Ruamāhanga values and the compulsory national values identified in the NPS-FM, including compulsory attributes that provide for those values.

The Committee's decisions were shaped by many strands of knowledge (Figure 3). This collective knowledge included everything from local knowledge, gained through personal experiences and engaging with the people of Ruamāhanga whaitua, to expert advice and technical information. They also had to understand and operate within the statutory framework governed by the RMA 1991.

Figure 3: Setting objectives



The Committee has identified freshwater objectives for all of the FMUs to deliver on their and the community's vision for the Ruamāhanga whaitua, and fulfil the Committee's Terms of Reference. The Committee placed particular emphasis on the extensive nature and important characteristics of small streams, wetlands and backwaters in providing healthy fish habitat and the conditions for mahinga kai species, places, activities and communities to thrive.

The objectives reflecting the vision and outcomes the Committee set for the Ruamāhanga whaitua fall in four groups:

- Natural character and habitat of rivers and streams objectives
- Fish and mahinga kai objectives, including for specific FMUs Wairarapa Moana and Onoke specific objectives and relating to additional (to the PNRP) outstanding water bodies
- Sediment specific objectives
- Rivers and lakes water quality and ecosystem health objectives

Recommendation 2

The Ruamāhanga Whaitua chapter of the PNRP includes all the objectives for natural character and habitat, fish and mahinga kai, sediment and the water quality and ecological attributes set out below in sections 4.2.1, 4.2.2 and 4.2.3 and Tables 11, 12, 13, 14 and 15 in the appendix.

4.2.1 Natural character and habitat of rivers and streams objectives

- The rivers and streams in the Ruamāhanga whaitua have diverse natural characteristics (e.g. riffles, pools, runs, backwaters, wetlands) suitable to support abundant and healthy indigenous fauna and taonga species, and
- Significant indigenous ecosystems are protected and restored, including the habitat (of lakes and rivers) for threatened/at risk species, migratory fish and inanga spawning (Schedule F in the PNRP)
- Mauri of waterbodies is enhanced by restoring ecological habitats e.g. riparian planting, improving water quality, healthy and abundant mahinga kai is readily available
- Indigenous fish and taonga species are able to access all tributaries of the Ruamāhanga system from the coast and lowland wetlands up to and including first order streams throughout the catchment to complete their life cycle
- Provide adequate habitat space to provide for the life supporting capacity for native fish and other aquatic life in rivers and streams, including at times of low flow.

4.2.2 Fish and mahinga kai objectives

Across the Ruamāhanga whaitua:

- Tuna fishery is restored and population are healthy and can sustain recreational and customary harvest, and
- Wetlands are restored and their extent increased to support thriving mudfish, inanga spawning and tuna populations, and
- Urban streams are protected from development and piping to support tuna, kōkopu and redfin bully, and
- Exotic fish populations are at a level where they are not restricting the vitality of indigenous fish populations and the ability of mana whenua to undertake mahinga kai harvest.
- Marae and mana whenua urban communities have access to abundant and healthy mahinga kai species that are safe to eat and are available in quantities that enable sustainable harvest and support the manaakitanga of Wairarapa marae communities.
- Watercress is abundant and healthy, safe to eat and free from spray and other contaminants.

In the following freshwater management unit groups:

- In Western rivers, ensure habitat supports longfin tuna and deep pool habitats and torrent fish are abundant in riffles, and
- In Eastern rivers, including the Eastern hill rivers and streams groups and the Northern rivers group, reduce sediment and improve habitat to enable tuna to thrive, and
- In the western lowland rivers, including the main stem Ruamāhanga River and the Valley floor streams group, increase habitat to enable inanga spawning and deep pools for tuna and riffles for torrent fish to thrive.

In Wairarapa Moana, including Lake Wairarapa and Lake Onoke:

- Exotic fish populations are at a level where they are not restricting the vitality of indigenous fish populations and the ability of mana whenua to undertake mahinga kai harvest, and
- All age classes of kākahi are present indicative of a sustainable population, and
- Black flounder and other salt water species are abundant, and
- Tuna fishery is restored and population are healthy and can sustain recreational and customary harvest, and
- The Lake Onoke mouth is managed in a way (calendar) that meets the needs of migratory (diadromous) fish species and mahinga kai harvest, and
- Habitat for native fish indigenous fish is restored.

Mahinga kai are abundant and healthy in the following water bodies of significance to Wairarapa marae, mana whenua and the wider Wairarapa community:

- Makoura Stream
- Kuripuni Stream
- Papawai Stream
- Mangarara Stream
- Carters Reserve
- Turanganui River
- Tauanui River

4.2.3 Sediment objectives

Improve stream, river and lake aquatic ecosystem health, including through achieving, by 2050, reductions in sediment loads as follows:

- Reducing stream bank and lake bank erosion in all river and lake freshwater management units in the catchment in accordance with the targets identified in Table 3, and
- Reducing hillslope erosion in the freshwater management units producing the greatest sediment load off non-native land, in accordance with the targets identified in Table 3. These 'top 5' FMUs are the Taueru, Huangarua, Eastern hill streams, Whangaehu and Kopuaranga.

4.3 Water quality, algae and invertebrate freshwater objectives for rivers and lakes

The Committee has set freshwater objectives to meet the Ruamāhanga whaitua and the compulsory national values, identifying a range of attributes that provide for those values including the compulsory attributes for rivers and lakes Wairarapa and Onoke. Some of these attributes are expressed using states A to D as described in the National Objectives Framework of the NPS-FM (the NOF), or using the most appropriate equivalent term (e.g. excellent to poor) for attributes not in the NOF.

A summary table of the current state and freshwater objectives for all these attributes are shown in Table 8 (for rivers) and Table 9 (for lakes) in the appendix (sections 10.2 and 10.3). Translation of each objective into a numeric state or further detail is shown in Tables 11-15 of the Appendix.

The Committee considered many strands of knowledge and information whilst setting freshwater objectives. The current state was described using monitored data were it was available. In the absence of monitored data the current state was based on modelled information or expert advice. The recommended improvements are projected states based on model outputs.

When considering timeframes, the Committee spent significant time discussing wider impacts on the community. They also considered the degree of effort that is needed to make improvements in particular shifts from one state to another, or for some attributes the difficulty of achieving any shifts within the existing state. For some attributes, such as MCI, the modelling showed that achieving changes in state will be extremely difficult. Attributes such as MCI or periphyton are influenced by multiple variables including habitat, a range of different contaminants, temperature, flows, sediment, and shade. Achieving improvements may require time and significant investment and effort by everyone in the community. The timeframes for achieving the FWO are the times by which the water quality must be improved.

The range of modelled mitigations is limited to the currently existing mitigations and their relevant field data collected overtime. Not all mitigations can be modelled. The modelling cannot account for any future technical innovations either. Other opportunities such as new technology, better management practices, and land use planning can and will have impact on reducing the time and cost to make improvements and achieve positive shifts to meet FWO. There are opportunities through new partnerships and attracting Wairarapa specific research, as well as the people of Wairarapa taking up the challenge through innovation and commitment to improving water quality across the Ruamāhanga whaitua.

4.3.1 Western hill rivers freshwater management unit group

In the Western hill rivers, a significant water quality improvement is required for the following NOF attribute:

- The current state for *E. coli* for both Upper Ruamāhanga and Mangatarere freshwater management units fail the national bottom line, with the Committee seeking a significant shift form D to C state and D to B state respectively.

	E. coli		**Periphyton**		**Ammonia toxicity**		**Nitrate toxicity**		**MCI**		**Timeline**
	Now	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	
Upper Ruamāhanga River	D	C	A	A	A	A	A	A	Fair	Good	2040
Waipoua River	B	A	B*	A	A	A	B	A	Fair	Good	2040
Waingawa River	A	A	A	A	A	A	A	A	Good	Good	Maintain
Mangatarere Stream	D	B	C	B, then A	B	top of B	B	A	Fair	Good	2040 (2080 for MCI)
Waiohine River	A	A	A	A	A	A	A	A	Fair	Good	2080
Tauherenikau River	A	A	A*	A	A	A	A	A	Fair	Good	2040

This FMU group is large, with many large rivers (Upper Ruamāhanga, Waipoua, Waingawa, Waiohine and Tauherenikau) and relatively high rainfall headwaters. It is characterised by hard rock and steep catchments in the headwaters in the Tararua Ranges, and low gradient alluvial gravel bed rivers on the valley floor with high connection to groundwater. It has relatively high base flows and frequent flushing events.

Many Western Hill Rivers have high recreational values (swimming, kayaking, and fishing) and are identified as a regionally significant recreational waterways under Schedule H1 of the PNRP. Many of the popular swimming holes dry out during summer or are no longer suitable for contact recreations due to poor water quality. The Ruamāhanga River also contains valued aquatic ecosystems, including significant indigenous fish species (Schedule F1) and birds (Schedule F2). In particular, the stretch between Rathkeale College and the Te Ore Ore Road bridge provides breeding habitat for the entire

population of black-billed gulls in the region. This stretch also provides habitat for banded dotterel, black shag, pied stilt and New Zealand pipit.

Both Mangatarere and Waipoua are identified as having significance for trout spawning and habitat. The Waipoua River is identified in the PNRP (Schedule F1) as having significant biodiversity values for threatened or at risk indigenous fish species. Matewera has been identified as a site of significance for mahinga kai in Schedule C5 of the PNRP.

The confluences with Ruamāhanga River are places often significant to mana whenua, and many other sites along the western rivers are of cultural significance to mana whenua including wāhi tapu, mahinga kai, harvesting materials, baptism.

Waingawa, Mangatarere and Waiohine Rivers provide town water supply and a number of water races which will continue to have no restrictions at low flow. Many of the rivers are impacted by flood management regime and gravel extraction which significantly impact on macroinvertebrate health. The Waiohine River has high water quality contrasted with MCI scores at the very bottom of the fair grade. The rivers in the Western Hills FMU, even though some are of high water quality, are under pressure particularly during summers in part due to abstractions, urban wastewater and storm water discharges, industrial and agricultural discharges and river bed disturbance.

Monitored and modelled data show both the Upper Ruamāhanga and Mangatarere sites fail national bottom line for *E. coli*. Modelling shows that from Silver 2025 scenario onwards, the Upper Ruamāhanga shifts to C state. Modelling also indicates that for Upper Ruamāhanga the estimate of contribution of *E. coli* load from the Kopuaranga River is significant (75-90% derived from Kopuaranga).

4.3.2 Northern rivers freshwater management unit group

In the Northern rivers FMU group significant water quality improvement is required for the following NOF attributes:

- The current state for *E. coli* in both the Kopuaranga and Whangaehu rivers fails the national bottom line and requires a significant shift form D to C, and
- The current state for periphyton in the Kopuaranga fails the national bottom line and requires a shift from D to C. This is also most likely case for Whangaehu.

	E. coli		**Periphyton**		**Ammonia toxicity**		**Nitrate toxicity**		**MCI**		**By**
	Now	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	
Kopuaranga River	D	C	D	C	A	A	A	A	Fair	Good	2040
Whangaehu River	D	C	-	C	A	A	A	A	Fair*	Good	2040

The Northern Rivers FMU group comprises the catchments of the Kopuaranga and Whangaehu rivers. This FMU group is predominantly under pasture with a mixture of sheep and beef, dairy and dairy support land uses. These rivers have moderate rainfall with softer rock catchments, lower summer base flow and less frequent flushing flows.

The confluence of the Kopuaranga River with the Ruamāhanga River, at the Kohekutu Pā and Kairangi Stream, is an important place for mana whenua for pā tuna and mahinga kai. This area is listed as a site of significance for mana whenua in Schedule C5 of the PNRP. The Whangaehu River is identified in the PNRP (Schedule F1) as having significant biodiversity values for threatened or at risk indigenous fish species, including the banded kōkopu, giant kōkopu, longfin eel and upland bully. Both Kopuaranga and Whangaehu Rivers are recognised as having a significant trout fishery and trout spawning values (Schedule I) and are also identified in Schedule H2 as a priority for improvement for secondary contact recreation.

There are concerns that when silt builds up at river confluences it may have effect on fish migration. Reducing sediment in streams will help improve MCI, and along with lowering water temperature better manage algal growth.

Both Kopuaranga and Whangaehu are below the NOF national bottom line for *E. coli* and for periphyton. National targets for improvement in water quality for swimmability (i.e. 90% length of rivers swimmable by 2040) drive the timeframes for improvement in water quality. There is little data for periphyton for Whangaehu, and the FWO for periphyton has been set based on the periphyton information for Kopuaranga.

Modelling outputs show very little shift in water quality attributes under different scenarios, particularly for *E. coli*, periphyton and MCI. This indicates that improving water quality in the catchments will require a significant effort. Modelling for Kopuaranga shows that the mitigations modelled in the scenarios all through to Gold 2080 do not shift *E. coli* from D state. However, it is likely that implementing mitigations to meet *E. coli* objective by 2040, will have benefits of meeting other objectives as well.

4.3.3 Eastern hill rivers freshwater management unit group

In the Eastern hill rivers, a significant water quality improvement is required for the following NOF attribute:

- The current state of periphyton in the Taueru fails the national bottom line and requires a shift from D to C.

	E. coli		**Periphyton**		**Ammonia toxicity**		**Nitrate toxicity**		**MCI**		**By**
	Now	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	
Taueru River	C	C	D*	C	A	A	B	A	Good	Good	2040
Makahakaha Stream	A*	A	-	B	A*	A	B*	A	Fair*	Good	2040 (periphyton 2030)
Huangarua River	B	B	C	B	A	A	A	A	Fair	Good	2040 (2080 for MCI)
Eastern hill streams	-	B	-	B	-	A	-	A	-	Fair	Maintain

The Eastern Hills FMU group is a large group with larger rivers (Taueru and Huangarua), moderate to low rainfall with soft sediment. The rivers and streams in this FMU group are characterised with low

flows, increased instream temperature in summer, lack of flushing flows, and at times high sediment loads.

Many of the streams have significant mana whenua values, including being close to Hurunui o Rangi and Papawai marae. The Taueru River has high mahinga kai values and was once valued for recreation and as tuna fishery. The Taueru and Huangarua rivers are recognised as a significant trout fishery and spawning waters as identified in Schedule I of the PNRP. They are also listed in Schedule H2 of the PNRP as one of the rivers with second priority for improvement of fresh and coastal water quality for contact recreation and Māori customary use.

Riparian planting is inconsistent across the catchment especially in its upper reaches. Planting and shading would help lower the instream temperature, as well as reducing nitrate which would most likely help to improve periphyton. The catchment has limited monitoring data. There is some intensive farming and irrigated dairy, sheep and beef, and viticulture.

The modelling outputs show that a shift in periphyton is possible. The cost of change is likely to be significant because the FMU has predominantly sheep and beef farming. Sheep and beef farming would require incentives and support to implement the level of mitigations required for improvement. Economic analysis shows that the sheep and beef industry has the largest reduction in net revenue and bares the largest total mitigation cost in the agricultural sector.

4.3.4 Eastern hill streams freshwater management unit group

The Eastern hill streams freshwater management unit is characterised by small streams with very low flows that often dry out in summer. This catchment has some of the lowest average annual rainfall of any catchment in the North Island. The catchment is mix of soft and hard sediment.

	E. coli		Periphyton		Ammonia toxicity		Nitrate toxicity		MCI		By
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	
Eastern hill streams	-	B	-	B	-	A	-	A	-	Fair	Maintain

There is no observed data for any of the streams in the Eastern Hill Streams group. Based on the local and expert knowledge a proxy site (Huangarua at Ponatahi Bridge) has been used to set objectives for this FMU group.

4.3.5 Valley floor streams freshwater management unit group

The Valley floor streams freshwater management unit group requires a significant water quality improvement for the following NOF attributes:

- The current state of *E. coli* in the Parkvale Stream fails the national bottom line and requires a significant shift from E to C band, and
- The current state of *E. coli* in the Otukura Stream fails the national bottom line (modelled) and requires a significant shift from D to C band.

	E. coli		Periphyton		Ammonia toxicity		Nitrate toxicity		MCI		By
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	
Parkvale Stream	E	C	B	B	B	A	B	A	Fair*	Good	2040
Otukura Stream	D*	C	?	B	B*	A	B*	A	?	Fair	2040
Other Valley floor streams	?	C	?	B	?	A	?	A	?	Good	2040

The Valley Floor Streams FMU group has a dry climate. It is characterised by small streams with hard sediment and some silty bed channels predominantly spring fed. Two sub-catchments – the Parkvale and Otukura stream – have been identified as their own FMUs, with all other streams and catchments (including Papawai, Makoura, Kuripuni, Mangarara streams and Carters Reserve) are grouped as 'Other Valley floor streams'.

The Parkvale Stream is identified in Schedule H2 of the PNRP as a second priority water body for improvements for secondary contact recreation. There are strong signals by community and mana whenua to improve the Parkvale Stream water quality. The stream is also known for traditional mahinga kai gathering (watercress).

Farming is predominately dairy and dairy support. Due to characteristically thin soils, groundwater and closely connected surface water are exposed to pollution by highly soluble contaminants such as nitrates. Habitat is poor in many Valley floor streams and sometimes over-dominated by macrophytes. The habitat can be enhanced through riparian planting, and wetland restoration and considering the impact of flows. Both FMUs (Parkvale Stream and Otukura Stream) are smaller than some of the other FMUs and it is potentially easier to mitigate some of the effects.

The Parkvale Stream fails the national bottom line for *E. coli*, which is a national driver for improvement in water quality for swimmability. Modelling shows high *E. coli* levels are driven through high rainfall. This indicates mitigation efforts should focus on managing overland flow and management of critical source areas. The stream is used for supplying stock water so the improvements in *E. coli* will have a positive effect on this economic value (stock health) as well as other values.

The Parkvale Stream has the highest nitrate levels of any monitored waterway in the Ruamāhanga whaitua. Investigations indicate that may be attributable to a range of activities, including current industrial discharges and farming.[3] The stream is also impacted by low flows and a lack of shading, providing optimal conditions for periphyton growth. There are concerns about the potential impact of winter grazing activities in the Parkvale catchment. Other contaminants from industrial areas are also likely to be present in the Parkvale Stream.

Improvement for the Parkvale Stream is likely to be economically more feasible than in some of the other FMUs. The farm systems in the catchment are highly productive, meaning fencing and riparian

[3] http://www.gw.govt.nz/assets/Our-Environment/Environmental-monitoring/Environmental-Reporting/Waingawa-Groundwater-Quality-Study.pdf

planting cost may have lesser economic impact on the farm business. It is a small stream where reducing nutrient concentrations coupled with shading may result in significant water quality improvement.

The Otukura Stream does not have any SOE monitoring and the current state and objectives have been based on best knowledge of the catchment and information of similar FMUs (other streams in the Valley floor FMU). The modelling outputs shows it is hard to improve *E. coli* levels in this stream, but improvement is needed as it is modelled as being below the national bottom line. The modelling through to Gold 2080 scenario only shifts *E. coli* C state.

The 'Other Valley floor streams' include the Papawai, Makoura, Kuripuni, Mangarara streams and Carters Reserve. There are many places of high cultural and ecological values e.g. Carters Reserve. The streams are small in length and area, and it would be less costly to mitigate. The habitat is poor in many of the Valley floor streams and sometime dominated by macrophytes. An absence of modelling or monitoring information means the current state and objectives of this FMU have been based on best knowledge of the catchment and looking at information of similar FMUs i.e. the Otukura and Parkvale streams.

4.3.6 Aorangi rivers freshwater management unit group

The Aorangi rivers require significant water quality improvement for the following NOF attributes:

- The current state of periphyton in the Tauanui and Turanganui rivers requires shift from an estimated C or D state to B state.
- The current state for *E. coli* in the Tauanui River fails the national bottom line and requires a significant shift from D to the Committee's recommendation of an A state.

	E. coli		**Periphyton**		**Ammonia toxicity**		**Nitrate toxicity**		**MCI**		**By**
	Now	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	**Now**	**Objective**	
Tauanui River	D*	A	C/D*	B	A*	A	A*	A	Fair*	Good	2040
Turanganui River	B*	B	C/D*	B	A*	A	A*	A	Fair*	Good	2040

The Aorangi Rivers FMU group is a relatively steep catchment with forested upper reaches. The Tauanui and Turanganui rivers characterise this FMU group. The Turanganui River provides water used in intensive dairying, and sheep and beef farming. In recent years, driven both by drying climate and water abstractions (some not restricted at low flows), both rivers have experienced very low flows and drying up, impacting on the Pirinoa community water supply (the well was contaminated by *E. coli* for the last two summers), recreational values (swimming holes drying out), and putting pressure on the native fish population.

The modelling for the Tauanui River shows potential for sizable shift in *E. coli* concentrations with implementation of a range of mitigations[4]. The national targets for improvement in water quality for swimmability (i.e. 90% length of rivers swimmable by 2040) drive the timeframes for improvement in *E. coli* and periphyton.

There is anecdotal evidence of periphyton present in the Tauanui River. The upper reaches of the catchment are actively deforested impacting on sediment discharge. There are a number of sites of significance for mana whenua along both rivers. Both rivers are listed in Schedule F1 of PNRP as having significant indigenous ecosystems with habitat for indigenous threatened/at risk fish species and habitat for migratory indigenous fish species. This is a small catchment with a short reach and the improvements might be easier to achieve.

4.3.7 Ruamāhanga River main stem freshwater management unit group

The Ruamāhanga river main stem freshwater management unit group comprises the river channel itself downstream of the confluence with the Kopuaranga River (see Figure 2). For the purposes of setting objectives, the Committee has divided the main stem into five locations (Wardells, Gladstone, Waihenga, Pukio and above the confluence with the outlet from Lake Wairarapa).

The Ruamāhanga river main stem requires significant water quality improvement for the following NOF attribute:

- The current state of *E. coli* in the Ruamāhanga River at Gladstone Bridge fails the national bottom line and requires a significant shift from D to C band

Ruamāhanga River main stem at	*E. coli*		Periphyton		Ammonia toxicity		Nitrate toxicity		MCI		By
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	
Wardells	C*	C	B*	B	B*	A	A*	A	Fair*	Fair	2040
Gladstone Bridge	D	C	B	B	B	A	A	A	Fair*	Fair	2040
Waihenga	A	A	B	B	B*	A	A*	A	Fair*	Fair	2040
Pukio	B	B	?	B	A*	A	A*	A	Good*	Good	Maintain
Upstream of confluence with Lake Wairarapa outlet[2]	B*	B	?	B	A*	A	A*	A	Fair*	Fair	Maintain

Where there is an absence of modelling or monitoring data to the establish current state, objectives have been established by comparing the FMU with water bodies in the same or similar FMU group as indicated by the footnote number: 2 From other Main stem Ruamāhanga river characteristics

The Ruamāhanga River is the largest river in the whaitua with relatively high rainfall in headwaters. It is characterised with hard rock and steep catchment in the headwaters in the Tararua Ranges, and low gradient alluvial gravel bed on the valley floor with high connection to groundwater. It has relatively high base flows and frequent flushing events. It is the receiving water body for the streams and rivers of the catchment discharging directly into the Lake Onoke.

[4] http://www.gw.govt.nz/assets/Modelling-Farm-scale-Mitigation-Options-for-the-Ruamahanga-Whaitua-Collaborative-Modelling-Project-June-2016.pdf

Being the major river of the catchment, the objectives for the Ruamāhanga River main stem are largely driven by management of the catchments that feed into it. Several municipal wastewater treatment plants discharge directly or indirectly into the river or a tributary and/or onto adjacent land. The main stem is popular for trout fishing and recreation such swimming and kayaking. Popular swimming spot the Cliffs is often impacted by increased *E. coli* levels.

The Ruamāhanga River main stem FMU is defined for the purposes of this WIP as the river below Double Bridges – the upper reaches are part of the Upper Ruamāhanga FMU. Reflecting its size and importance and the role of multiple sub-catchments on the outcomes in the main stem, five locations have been identified to set freshwater objective at along its journey to Lake Onoke.

Monitoring data for Ruamāhanga at Gladstone Bridge shows the site fails national bottom line for *E. coli*. The Committee's FWO for *E. coli* for the Ruamāhanga at Gladstone requires shift from D to C state. Modelling shows it is difficult to improve *E. coli* levels. The simulations through to Gold 2080 scenario indicate that the site remains in C state.

The national target for improvement in water quality for swimmability (i.e. 90% length of rivers swimmable by 2040) drives the timeframes for improvement in *E. coli*.

The state of periphyton in the main stem is also difficult to improve due to the nutrient loads coming from catchments upstream and the river being too wide for shading as a management option. The loss of natural character as a result of flood management results also in habitat loss especially for fish. Mana whenua sent a strong signal they want to see an improvement in particular the Ruamāhanga at Wardells, as it was once a site of high cultural use and recreational value.

4.3.8 South coast streams freshwater management unit group

	E. coli		Periphyton		Ammonia toxicity		Nitrate toxicity		MCI		By?
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	
South coast streams	-	A	-	A	-	A	-	A	-	Fair	Maintain

The South coast streams FMU covers a series of small catchments that flow directly to the sea at the very south of the whaitua and include streams such as the Wharekauhau and Whangaimoana streams. These are a mix of steep and low land streams, with many of the steeper streams having forested or scrub in their upper catchments.

An absence of modelling or monitoring information means the current state and objectives of this FMU have been based on best knowledge of the catchment and looking at information of similar FMUs and waterbodies i.e. the Western hill rivers.

4.3.9 Lake Wairarapa

The current state of phytoplankton and total phosphorus in Lake Wairarapa fail the national bottom lines and require significant shifts from D to C state.

The Committee is seeking that progressive improvements are made in the health of Lake Wairarapa, so that these significant shifts in objectives are reached by 2080.

NOF attributes

	E. coli		Phytoplankton		Total nitrogen		Total phosphorus		Ammonia toxicity	
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective
Lake Wairarapa	A	A	D	C	C	C	D	C	A	A

Non-NOF attributes

	Trophic level index		Total suspended sediment		Macrophytes	
	Now	Objective	Now	Objective	Now	Objective
Lake Wairarapa	Very poor	Poor	Poor	Fair	D	C

Lake Wairarapa is greatly valued for its community and mana whenua values, including mahinga kai, fish populations and bird habitats. Both lakes are significant sites for mana whenua.

Lake Wairarapa is below national bottom lines for phosphorus and phytoplankton levels, with the lake rated as being in a supertrophic state. Due to the large shallow nature of Lake Wairarapa, it is very susceptible to sediment resuspension. A key priority will be to reduce sediment and phosphorus deposited from the catchment upstream (i.e. rather than reducing nitrogen), particularly through focussing on reducing the re-suspension of sediment already in the lake.

Modelling shows it is difficult to improve the lake's health by focusing on reducing the catchment sediment load only. However, 'in-lake methods' modelled, such as restoring the flows of the Ruamāhanga River below median flow into Lake Wairarapa and maintaining higher lake levels, show promising results. When those options are coupled with reducing the catchment sediment load, the health of the lake shows promising improvement and also potential to establish macrophytes. A further investigation of 'in-lake methods' is required.

4.3.10 Lake Onoke

The Committee is seeking that progressive improvements are made in the health of Lake Onoke so that objectives are reached by 2040.

NOF attributes

	E. coli		Phytoplankton		Total nitrogen		Total phosphorus		Ammonia toxicity	
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective
Lake Onoke	B/C	A	B	B	C	B	B	B	A	A

Non-NOF attributes

	Trophic level index		Total suspended sediment		Macrophytes	
	Now	Objective	Now	Objective	Now	Objective
Lake Onoke	Poor	Average	Poor	Fair	D	C

Lake Onoke is a significant indigenous ecosystem. It has significant recreational values (important recreational fishing) and mana whenua values, as well as is significant for migratory fish.

Modelling shows it is difficult to improve lake's health by focusing on reducing the catchment sediment load only. However, it shows potential in reducing sediment inputs and improving the ability of the lake to flush to improve sediment, TLI and macrophyte outcomes.

Modelling shows nutrients levels can be improved and at least maintained, but that the health of Lake Wairarapa will limit the health of Lake Onoke.

4.4 Achieving periphyton and macroinvertebrate objectives

4.4.1 Periphyton

Analysis of modelling outputs demonstrates that to achieve periphyton objectives, managing only nitrogen and phosphorous will not achieve the desired objectives. For example, to meet the desired 'A' attribute state at the Mangatarere River at SH2 a 99.51% reduction in TN and/or a 99.56% reduction in DRP from the current baseline is needed[5]. Other factors, such as flow regimes (i.e., minimum flow and allocation limits), frequency of flushing flows, riparian condition, water temperature, photosynthetic active radiation (PAR) and habitat are significant variables regulating periphyton biomass.

The Committee recognises that in order to meet the periphyton objectives identified in this chapter multiple management options need to be implemented across the whaitua. The Committee's specific recommendations around the policy approach to achieving these reductions are identified in the subsequent policy package chapters. In order to provide clarity about these multiple dimensions in the subsequent plan change from this WIP, the Committee recommends a policy describing these parts.

Recommendation 3

The PNRP includes a policy that describes how the periphyton objectives in this WIP will be achieved by the following approaches:

- Meeting the in-stream nutrient criteria set out in Table 1, and
- Achieving the nutrient targets for diffuse sources in Table 2 and for point source load reductions in Table 7, and
- Achieving the sediment load reductions in Table 3, and
- Undertaking extensive riparian planting for the purposes of creating suitable shading of streams to reduce temperatures and photosynthetic active radiation, and
- Ensuring any consented in-stream works or activities maintain or restore flushing flows suitable to avoid nuisance periphyton build up.

[5] http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/Setting-nutrient-criteria-to-achieve-desired-periphyton-attribute-states-in-Ruamhanga-Whaitua-January-2018.pdf

4.4.2 Macroinvertebrate community health

The condition of the macroinvertebrate community (MCI) is one of the main indicators used internationally and in New Zealand to assess the overall ecological health of a stream or river. Macroinvertebrate communities are sensitive to a wide range of stressors including degradation of water quality and habitat. The effects of these stressors can be both direct (e.g. nitrate toxicity) and indirect (e.g. increase in nutrients cause periphyton blooms that reduce habitat quality) and operate at both local (e.g., removal of riparian margin) and catchment scales (e.g. eutrophication from upstream agricultural land use). Modelling scenario outputs do not show much improvement in MCI health. This is predominantly due to no changes to deposited fine sediment which is controlled primarily by flood management regime of the rivers (which does not change under any scenarios). It is important to note that suspended sediment reduction under all scenarios have no influence on deposited fine sediment (research shows there is very weak empirical evidence for such a relationship).

The modelling restoration of macroinvertebrate communities, and improvements of state of macroinvertebrate community health, is influenced by the multitude of stressors and the different scales at which these stressors may impact on stream health. Habitat restoration, such as developing mature riparian margins and introduction of submerged woody debris can take decades to achieve.

We need to manage many things in order to achieve MCI objectives including flows (minimum and allocation limits), nutrients (because these affect periphyton which in turn indirectly affects invertebrates), sediment (because it affects invertebrate habitat) and riparian condition (affects habitat as well as periphyton).

Recommendation 4

The PNRP includes a policy that describes how the macroinvertebrate community health (MCI) objectives in this WIP will be achieved by the following approaches:

- Meeting the in-stream nutrient criteria set out in Table 1, and
- Achieving the nutrient targets for diffuse sources in Table 2 and for point source load reductions in Table 7, and
- Achieving sediment load reductions in Table 3, and
- Undertaking extensive riparian planting for the purposes of creating suitable habitat for macroinvertebrate community health, including shading to reduce water temperatures, and
- Retaining and improving the natural character of water bodies, such as riffles, pools, runs, and
- Ensuring any consented in-stream works or activities are managed to minimise the release of deposited fine sediment, and
- Progressively reduce the frequency and use of in-stream disturbance activities as part of flood protection, drainage and gravel extraction activities.

Table 1: In-stream nutrient criteria

	Nutrient criteria (concentrations)			
	Dissolved inorganic nitrogen (DIN) (mg/L)		Dissolved reactive phosphorus (DRP) (mg/L)	
Freshwater management unit	**Median**	**95th percentile**	**Median**	**95th percentile**
Eastern hill streams	0.23	0.67	0.006	0.029
Huangarua River	0.23	0.67	0.006	0.029
Kopuaranga River	0.82	1.20	0.011	0.018
Makahakaha Stream	0.74	1.52	0.011	0.017
Mangatarere Stream	1.02	1.63	0.018	0.076
Otukura Stream	1.01	1.35	0.004	0.008
Parkvale Stream	1.01	1.55	0.019	0.051
Ruamāhanga River - Gladstone Bridge	0.32	1.01	0.006	0.024
Ruamāhanga River - Pukio	0.33	0.97	0.007	0.021
Ruamāhanga River - upstream of confluence with Lake Wai outlet	0.40	1.01	0.007	0.020
Ruamāhanga River - Waihenga	0.50	0.88	0.006	0.019
Ruamāhanga River - Wardells	0.55	1.29	0.009	0.021
South coast streams	0.04	0.15	0.004	0.005
Tauanui River	0.13	0.35	0.004	0.007
Taueru River	0.71	1.45	0.009	0.021
Tauherenikau River	0.04	0.15	0.004	0.005
Turanganui River	0.16	0.65	0.005	0.021
Upper Ruamāhanga River (at Double Bridges)	0.10	0.45	0.005	0.009
Valley floor streams - draining to Lake Wairarapa	1.01	1.35	0.004	0.008
Valley floor streams - draining to Ruamāhanga River	1.01	1.35	0.004	0.008
Waingawa River	0.07	0.24	0.004	0.006
Waiohine River	0.35	0.87	0.006	0.023
Waipoua River	0.63	1.42	0.003	0.004
Western lake streams	0.04	0.15	0.004	0.005
Whangaehu River	0.48	1.55	0.023	0.045

5. Overarching themes

Across the course of the Committee's extensive work, a number of key themes have emerged that provide a strong underpinning to the whole of the WIP direction. These themes cut across the policy packages and provide the context and directions for the decisions on the objectives and timeframes. These provide insight into the intent of the Committee's direction for land and water management in the whaitua over the next ten years and beyond. These themes cover:

- Ensuring integrated land and water management
- Effective implementation of the whole of the WIP
- Promoting innovation
- Seeking good management practice across sectors and activities
- Efficient use of water in an increasingly constrained water environment
- Being equitable across the community
- Improving how we monitor, account for resource use and review progress

5.1 Integrated land and water management

The Committee supports a comprehensive and integrated land and water management system for the Ruamāhanga whaitua. It is vital that we make better use of the available water resource as we enter an era of increasing shortage under climate change.

In the past, land use, water quality and water quantity tend to have been managed separately. The PNRP pulls these together with combined objectives, policies and rules in one regional plan. The aim of this WIP is to improve the integration of resource management practices reflecting a "whole of catchment" approach.

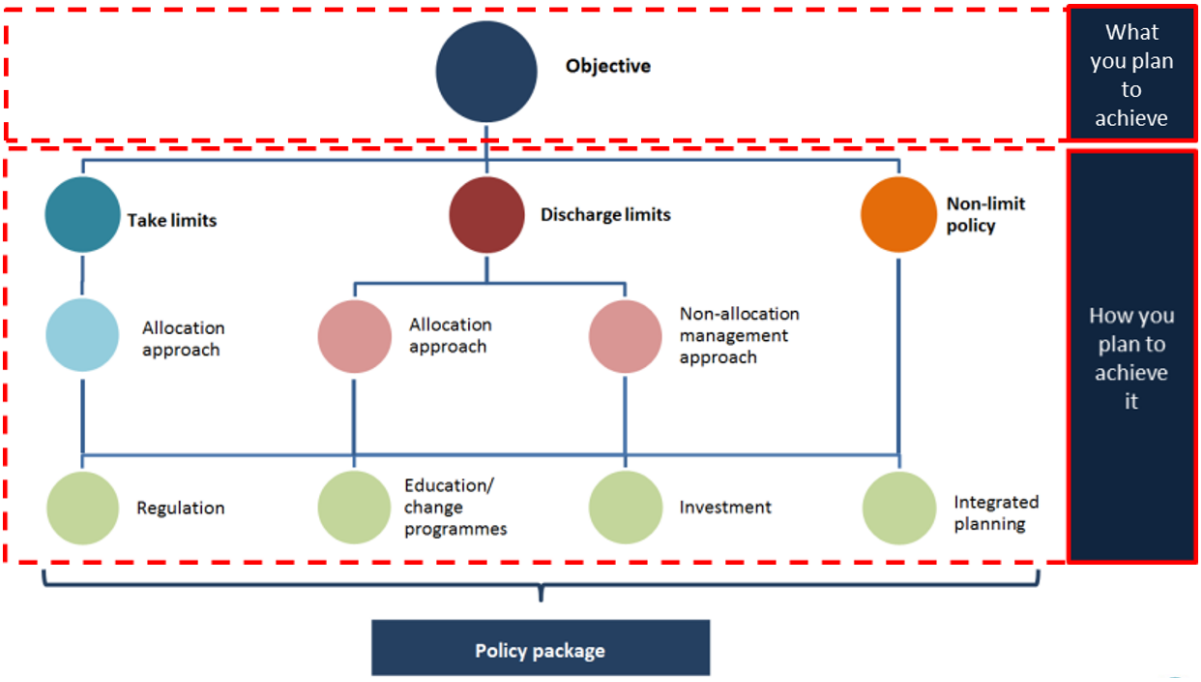
Recommendation 5

The Ruamāhanga whaitua integrated land and water management system should:

- Seek to be an comprehensive, catchment-wide system that increases ecological and social health and wellbeing as well as improving water use reliability, and
- Create resilience to the pressures of changing weather systems under climate change, and
- Empower communities to identify and implement suitable processes and management options in their sub-catchments in order to contribute to the whaitua-wide approach.

In order to create a package of recommendations to deliver on this integrated land and water management approach, the following policy framework has been applied as part developing the WIP recommendations. This 'policy package' diagram describes the tools or levers that be used together to deliver an objective (what you want to achieve). In the case of land and water management and

the policy approach of the NPS-FM, this requires that freshwater objectives are met through both the setting of take limits and discharge limits, as well as other approaches not driven by limits (called here 'non-limit policy). To meet these limits and non-limits policies, further choices lay in whether to allocate limits to individuals and then in the tools that are used to deliver on the policy package choices above, whether through regulation, education and change programmes, investment or further planning (e.g. sub-catchment planning, farm planning).



In developing this WIP package, the Committee has considered options and ideas from all parts of this policy package framework. Ultimately, the ability to achieve an objective depends on the combinations and interactions of the various tools across the package.

5.2 Effective implementation of the whole of the WIP

For implementation of the WIP to be effective GWRC, partners and stakeholders need to work together to successfully deliver on the breadth of the Committee's recommendations in order to seek the opportunities and innovations that exist. The Committee has stated strongly that the chances of the implementation of the WIP 'sticking' requires the whole communities' participation.

- The responsibility to achieve freshwater objectives and limits has been devolved to the sub-catchment or FMU level so that people that are living within an FMU will need to work together to meet the objectives and limits.

- An FMU implementation framework will need to be developed so there is a mechanism for people to work together to ensure limits within an FMU are met. It could involve the forming of FMU catchment groups who develop their own sub-catchment plans about how to manage within limits in their FMU. Catchment implementation groups are a key component of implementing the whaitua policy framework. They are fundamental in achieving environmental outcomes, but also contribute significantly to social and economic outcomes.

The involvement of iwi partners is critical in the development of the FMU framework and implementation programme, and mana whenua hapū/marae in freshwater management at a FMU-scale (local people in local areas), in order to achieve the freshwater objectives and limits.

Recommendation 6

In order to see the effective implementation of the whole of the objectives, limits and policy packages described in this WIP, the Committee supports:

- A programme of actions where rural and urban catchments have a collective responsibility to make a change and improve water quality, and
- A mainly non-regulatory approach to staying within discharge limits for diffuse contaminants, and
- An emphasis on the use of integrated planning tools (sub-catchment groups, farm planning tools and user groups), supported by education and incentives, and
- Regulation of point sources, land use controls and water takes, and
- Seeking means for promoting and ensuring continuous improvement and innovation to occur across all sectors and communities, and
- Collecting and making available information on resource use in the whaitua as a way of enabling better decision making at all scales.

Recommendation 7

GWRC, along with iwi and other partners, develop a coherent Freshwater Management Unit Implementation Framework which results in effective and successful managing to limits at an FMU-scale, both within rural and urban environments, to achieve freshwater objectives.

Recommendation 8

GWRC resources the Freshwater Management Unit Implementation Framework sufficiently to support the development of an implementation work programme.

5.3 Promoting innovation

Change is imperative in order to achieve a healthy vibrant future for the Wairarapa. In seeking a different way of managing the land and water of the Ruamāhanga whaitua, the Committee has been clear that there needs to be culture of innovation and changing practice, backed up by institutional structures and operations that support innovation.

Innovation is defined as looking for opportunities beyond tradition or identifying a new or untested approach. It often involves questioning rules, routines and assumptions. Innovation depends on both individual creativity and organisational culture. It can be construed as thinking outside the box.

For innovation to succeed, there are a number of prerequisites that must occur:

- We must establish a clear sense of direction

- Tolerating a certain degree of failure as a necessary part of growth is an important part of encouraging innovation. Innovation is a risk.
- Leaders of organisations that sustain innovation offer multiple opportunities for communication. In catchment leadership, communicating the catchment needs or performance on a regular basis allows individuals and entities to ascertain if change is required.
- Processes within GWRC need to reflect the desire to support innovation. This may include internally rewarding 'bright ideas' and establishing/fostering internal practices that support and reward innovation.

The Committee recognises that reviewing the progress of the implementation of the WIP and activities driven by it provides the opportunity to bring in new knowledge into how both GWRC operates and how the community learns. Reviews of operational practice also provide the opportunity to help shape future research and direction.

Recommendation 9

Innovation in land and water management practice in the Ruamāhanga whaitua should be encouraged and actively facilitated by GWRC, including by:

- Including a policy in the Ruamāhanga whaitua chapter of the PNRP to be considered in resource consent processes that recognises the value of innovative practice in the achievement of the objectives of the Ruamāhanga whaitua, and
- Avoiding resource consent conditions that would prevent trialling of alternative management approaches where change and future proofing is a known driver, while also recognising the need to mitigate risk, and
- Taking opportunities for on-going plan changes to provide for innovative practice, and
- Actively reviewing the effectiveness of the implementation of GWRC operational activities and planning practices and of the recommendations in this WIP in order to promote continued improvement and learning, and to ease bottlenecks.
- The management processes within GWRC need to reflect the desire to support innovation. This may include internally rewarding 'bright ideas' and establishing/fostering internal practices that support and reward innovation.

5.4 Seeking good management practice across sectors and activities

In the Ruamāhanga catchment there is wide scope for better practice to be adopted. What constitutes good management practice (GMP) varies with different land uses, soil types and climatic zones, and is constantly evolving allowing for continuous improvement. The practices, procedures or tools that are effective at achieving the desired performance, while providing for desired environmental outcomes. An example of GMP may be introducing technology such as precision agriculture to apply nutrients more efficiently. In this context good management practices relate to achieving water quality and habitat outcomes, and water use efficiency.

The adoption of GMP applies equally to the operations of both district councils and GWRC.

Recommendation 10

The Committee recommends that:

- Good management practice (GMP) is emphasised and innovation is fostered as part of every farm plan and by the operational practices of regional and district councils, and
- Industry guidelines are the primary source of GMP guidance, and
- Where there is no industry GMP, sub-catchment groups, communities and farm scale planning will help to develop and build on making GMP specific to the Ruamāhanga whaitua, and
- All sectors should be actively designing and progressively implementing GMP, not just the primary sector, and
- As GWRC cannot implement GMP on its own, partnership with industry, stakeholders and communities is essential, and
- Industry must lead the way developing Ruamāhanga relevant guidelines and persuading members to adopt GMP through tools like accords.

5.5 Improving efficient use of water in an increasingly water-constrained environment

Management of water use in the whaitua already includes efficiency measures but the Committee also considers that there are significant benefits in becoming more efficient. In fully allocated catchments, using water more efficiently means water can be freed up and made available to users who would otherwise have no access. Being able to free up water is a reason why efficient use is so important and is now specifically directed by the Regional Policy Statement (RPS) for the Wellington Region and the NPS-FM.

The Committee also recognises that 'efficiency' has meaning that is more complex than is expressed in the PNRP and should be broadened to also recognise the productive the use of water (e.g. recognising efficiency in terms of financial return on water use volume). The Committee further recognises that highly efficient water use systems may also mean significant trade-offs of other values and avoiding such trade-offs may be preferable to the use of the most efficient systems. For instance, while irrigation guns are not particularly efficient, their use can mean that rural landscapes can be more diverse and riparian planting maintained as their operation does not require the landscape scale removal of vegetation pivot irrigation systems may.

Similarly, the water races of the Wairarapa are very inefficient from the perspective of losses to groundwater and evaporation. However, their leakiness to groundwater has benefits to local groundwater users and to puna/freshwater springs. In this sense, analysis of the efficiency of a system needs to sometimes be nuanced by allowing for the recognition of the value of less efficient systems. Careful analysis is needed to determine the appropriateness of such systems in a water-constrained environment.

Recommendation 11

The Committee recommends water use efficiency is improved by all water users in the Ruamāhanga whaitua, including by:

- Local councils (as suppliers of water) improve water conservation by residential, commercial and industrial users, establish appropriate demand management strategies during water shortage, improve resilience and reduce demand in issuing of consents for new builds and subdivision, and investigate opportunities for water re-use, and
- Group and community water suppliers appropriately managing demand during water shortages and supporting improved resilience of supply, and
- Irrigation users meet at least 80% efficiency of application and further improvement of practice through recognised programmes, and
- GWRC recognising that exceptions to 80% efficiency of application may be appropriate where the financial return on a less efficient water application can be shown to be high (i.e. the water use is highly economically efficient) or where there is meaningful benefits to the environment of a less efficient water use, effectively offsetting the benefits to being 80% efficient, and
- GWRC and District Councils work together to develop long term plans for management of water races in the Ruamāhanga that meets the objectives of this WIP and provides for the values of the waterbodies and communities, and
- Increasing education opportunities across types of water users.

5.6 Being equitable across the community

The Committee has expressed that as a Ruamāhanga community we are responsible for the state of land and water management as it currently stands and that the whole of the community and its institutions are part of the solution of working to achieve a glistening waters future.

Recommendation 12

All people of the whaitua need to be involved in efforts to ensure water is used efficiently and with care, and that the burden of change in order to improve water quality should be borne across communities.

5.7 Improving how we monitor, account for resource use and review progress

The Committee has identified monitoring and the use of good data as a key component of implementation of this WIP. Monitoring includes the state of rivers and lakes, and hence achievement of freshwater objectives. Resource use monitoring is also required to show that limits (both take and discharge limits) are being met. Some land use data is useful to indicate that actions (mitigations) on the land are making a difference (e.g. riparian planting information). The Committee has identified the need to collect more information to improve understanding and enable more informed decision making in the future.

The collection of better contaminant information will help better inform future limit setting processes and will provide greater transparency of what is happening in the catchment to the community. It will also help individuals understand how what they do on their property relates to the ability of a sub-catchment to operate within the discharge limit. Collection of resource use information will be vital when reviewing the effectiveness of the policy regime and to make necessary adjustments including such things as whether a nutrient allocation regime should be implemented in 10 years' time.

The NPS-FM requires the Council to monitor in each FMU and to have a monitoring plan which outlines how it will do this (Policy CB1 of the NPS-FM). The NPS-FM also requires the Council to establish methods for responding to monitoring that indicates that freshwater objectives will not be met.

It is important to make all information easily accessible (required by the NPS-FM to be public) for use by individuals and the community for them to make better management decisions, determine priorities at a range of scales, and to ensure regulatory compliance where this is necessary.

The Committee's approach to managing contaminants is largely non-regulatory and focuses on community responsibility and working together to achieve change. As part of this approach monitoring is likely to be undertaken by individuals or groups within the catchment (citizen science). People may want to monitor for a number of reasons, e.g. catchment communities may want to collect information to assess the effectiveness of their actions. Hapū and marae will develop their own indicators for health (as detailed in Recommendation 1). These indicators will be used to report on progress towards meeting freshwater objectives.

A monitoring regime should include more than environmental indicators. Measuring the effectiveness of policies and actions requires the measurement of social and economic indicators to get a full picture of impacts (both positive and negative). Analysis of policy effectiveness is fundamental to any review. Changes to policy can then be made. A first step in this process is identifying appropriate indicators and includes them in the monitoring plan.

GWRC is also required by Policy CC1 of the NPS-FM to establish and operate a freshwater accounting system at a level of detail in line with the issues in that FMU. To operate an appropriate accounting system, contaminant information and water use data will need to be collected to the smallest scale practical, e.g. sediment data can be collected down to an FMU scale, while nutrient discharge data could be collected at a smaller scale. Water use data is required to be collected at an individual resource consent scale. The Council has some way to go to establish this system. This requires resourcing and urgent action. This is a key tool for implementation which must be put in place as soon as possible.

It is good policy practice to continually review the effectiveness of the land and water management system, and to report on the pathway to achieving freshwater objectives. Where policies are shown to be ineffective or where there have been unintended consequences, these need to be changed. If they are significant then changes should be made at the first plan change opportunity, or alternatively wait to the next plan review which will be 10 years post the plan being operative.

Recommendation 13

GWRC establishes, as an urgent priority, and actions a monitoring plan as required by Policy CB1 of the NPS-FM for the monitoring in each FMU.

Recommendation 14

GWRC establishes, as an urgent priority, and operates a freshwater quality accounting system as required by the NPS-FM (Policy CC1). The existing water take accounting system should be upgraded so that it is compatible with the quality system and is accessible to the public and water users. GWRC collects representative farm-scale information on nutrient inputs and losses suitable for the development of FMU-scale freshwater accounting of nutrients and to effectively benchmark property-scale nutrient loss.

Recommendation 15

GWRC develops a suitable monitoring programme(s) to establish in-river sediment loads and/or concentrations, including confirming relationships to sediment loads off land and the effectiveness of mitigations. GWRC requires the progress of actions to mitigate sediment loss, including riparian planting and hill slope erosion practices to be regularly reported.

Recommendation 16

GWRC establishes a data protocol and reporting plan to ensure all aggregated data collected is publically available and provided in a fit for purpose and transparent manner.

Recommendation 17

GWRC supports community monitoring and the wider integration of monitoring results to support FMU outcomes.

Recommendation 18

GWRC undertakes a review of flow monitoring sites in the Ruamāhanga whaitua. Where necessary, to ensure that the network is fit for purpose in implementing this WIP, make changes to the network including the establishment of new sites

Recommendation 19

GWRC establishes a social and economic monitoring and assessment framework with indicators agreed by the community. GWRC includes social and economic monitoring in the monitoring plan for the Ruamāhanga whaitua.

Recommendation 20

GWRC undertakes a full review of the land and water management system at the next regional plan review (10 years) and make appropriate changes to the Plan.

6. Managing rivers and lakes in the Ruamāhanga Whaitua

6.1 Background – key issues and drivers

The physical habitat of rivers, streams, lakes and their margins is important in determining the way ecosystems function and how the relationship between people and waterbodies flourish.

This chapter outlines the recommendations relating to how activities in and around the rivers and lakes of the Ruamāhanga whaitua should managed to improve their health. This includes giving consideration to riparian margins, wetlands, river form, natural character, fish passage and habitat, as well as recognising the role of the management of contaminants and the abstraction of water on river and lake health, recommendations on which are found in Chapters 7 and 8.

The Committee's recommendations in this chapter are a critical part of meeting the Ruamāhanga freshwater objectives identified in Chapter 4. This chapter outlines the changes to high level policy, policy for consent processing, research, investment and implementation methods needed to deliver on these and the integrated water management story of the Ruamāhanga WIP.

Current state of our rivers, streams and lakes

The health of rivers and streams across the Ruamāhanga whaitua is mixed, from usually very good states in the fast flowing rivers of the bush-clad Tararua hills, to sometimes quite poor in the streams and rivers that run from the east and across the valley floor. As set out in Table 8 in the appendices, the current state of most rivers FMUs are below the communities and Committee's expectations, and sometimes below national bottom lines. In particular, a number of water bodies fall below the *E. coli* national bottom lines and are currently not suitable for recreation – this includes the Ruamāhanga River in two locations, the Kopuaranga, Whangaehu and Tauanui rivers, and the Parkvale, Otukura and Mangatarere streams. In other water bodies, the national bottom line for periphyton is not met.

From a broader ecological perspective than just those attributes in the NOF, the Committee has also set objectives to improve macroinvertebrate community health and native fish and mahinga kai values (see section 4.2.2). Across the whaitua, the health of macroinvertebrate communities is somewhat diminished, with most river FMUs currently falling in the 'fair' state, below the Committee's objectives for most water bodies to be in a 'good' state (see Table 8).

The two major lakes of the whaitua, Lake Wairarapa and Lake Onoke, can be described as currently being in a poor or mixed state from an ecosystem health perspective (see Table 9). In particular, Lake Wairarapa's health is in general very poor, being defined as supertrophic and having very poor macrophyte cover, and being below the NPS-FM national bottom lines for phytoplankton and total phosphorus. Both lakes have been, over a long period of time, and continue to be impacted by a range of land use, drainage, engineered management and in-river activities. This has led, in particular, to the extent of the lakes and wetlands being significantly reduced, the disconnection of the Ruamāhanga River from the lake and lake levels being artificially managed for the purposes of maintaining flood protection for farms and communities. Modelling for the Committee has suggested that improving the health of the lakes is likely only possible through a combined approach

of both reducing the contaminants reaching the lakes and changing the hydrodynamics (e.g. the mixing, depth and flow) of the lakes.[6]

Mana whenua relationships

Te Awa Tapu o Ruamāhanga (the Ruamāhanga River) and Wairarapa Moana (Lake Wairarapa and Lake Onoke and surrounding wetlands) are considered taonga by Ngāti Kahungunu and Rangitāne o Wairarapa. As described in Schedule B: Ngā Taonga Nui a Kiwa of the PNRP, te hā o te ora (the breath of life) was placed in the river at the beginning of time and 'remains a pantry, chemist and encyclopaedia to be utilised for sustenance and knowledge transmission'.[7] For the people of the papa kāinga, marae and hapū across the Ruamāhanga valley, the rivers, streams, wetlands, puna and lakes they are beside provide valued and important places for cultural use, collection of mahinga kai and recreation. Once home to a great tuna fishery, the mahinga kai values of Wairarapa Moana have been diminished over the past two centuries, though it remains a greatly valued place for marae and individuals to visit for cultural, recreational, environmental and commercial reasons.

The forthcoming Treaty settlement between the Crown and Ngāti Kahungunu ki Wairarapa Tāmaki Nui-ā-Rua[8] and the 2016 deed of settlement between the Crown and Rangitāne o Wairarapa[9] will initiate the creation of the Wairarapa Moana Statutory Board. This board, comprising five mana whenua members and five members from central and local government, will be a guardian of Wairarapa Moana and the Ruamāhanga catchment, for the benefit of present and future generations.

The board will play a crucial and integrating role in the future management of the lakes, their margins and the catchment. The board's powers include the ability to establish a sub-committee to create and recommend to the board a natural resources document to identify the vision and outcomes for Wairarapa Moana and Ruamāhanga catchment. In future, the regional council must recognise and provide for the content of the natural resources document in RMA plans, and give particular regard to this document in the preparation of annual and long term plans. The board will also have the ability to determine the operational management of the Wairarapa Moana reserves.

Mana whenua and community feedback

Mana whenua wish to see their values reflected in all parts of the WIP, including the management of rivers and lakes. Mana whenua have been clear that their values will not have been protected in full if timeframes for the improvement of the health of the rivers and lakes stretch out to 2080 and they wish to see an acceleration of the timeframes for improvement. Throughout their engagement with the Committee mana whenua have signalled strong support for increased riparian planting on all water bodies, increased wetland restoration and a renewed approach to river management that focuses on managing the river for the river.

[6] http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/A-coupled-hydrodynamic-ecological-model-to-test-management-options-for-restoration-of-lakes-Onoke-and-Wairarapa.pdf
[7] http://www.gw.govt.nz/assets/Plans--Publications/Regional-Plan-Review/Proposed-Plan/Chapter-12-Schedules_2.pdf
[8] https://www.govt.nz/dmsdocument/6424.pdf
[9] https://www.govt.nz/dmsdocument/6556

Engagement with the whaitua community asked people to indicate their preferred management approaches to seeing improved natural character in rivers and lakes while recognising the role of flood protection activities in protecting people and assets. Very strong support was indicated for improved floodplain planning, a process that aims to align strategic and operational planning and works with the outcomes community wish to see for their rivers. This engagement also indicated strong support for planting of floodplain areas, riparian planting and the use of wetlands to improve habitat.

Under the current regional plans, the majority of the area of Lake Onoke is considered part of the coastal marine area (CMA). This means that the NZCPS also plays an important role in the management of the lake as decisions in the WIP and any changes to the PNRP must give effect to the NZCPS. Directions in the NZCPS to consider include the need to recognise the role of tangata whenua as kaitiaki, including incorporating mātauranga Māori into sustainable resource management, to restore water quality where it currently compromises use and ecosystem health and to ensure that land use activities are managed in relation to their impacts on coastal sedimentation.[10]

Habitat of trout and salmon

Under Section 7(h) of the RMA, regional plans are required to have particular regard to the protection of the habitat of trout and salmon. Objective O25 in the PNRP to maintain and improve trout fishery and spawning values (as defined in Schedule I) is considered to appropriately provide for specific trout fishery values. Further, the water quality and quantity objectives recommended in this WIP will provide for ecosystem health values across freshwater environments in the whaitua, including for native fish values. As such no further changes for the provision of trout fishery and spawning values are recommended in this WIP.

6.2 Objectives for healthy rivers and lakes

The river and lake management policy package recognises that the achievement of freshwater objectives is dependent on the health of a water body being addressed as a whole. This package and the water allocation and the managing contaminants packages knit together to provide for the achievement of the Ruamāhanga freshwater objectives.

The Ruamāhanga whaitua modelling outputs indicate that improving habitat in rivers and lakes is critical to achieve some water quality objectives. Improving water quality alone without improving habitat will often not improve ecological health. The Committee has learned that improved and more integrated management of the habitat of streams, rivers and lakes will be necessary to achieve the whaitua objectives for periphyton, MCI and lake health and to reduce sediment loads in all freshwater management units in the whaitua.

The Committee has identified nine of river FMUs where improvement is required for periphyton outcomes and thirteen of river FMUs where improvement is required for MCI outcomes. For both sets of objectives, the river and lake management package and its implementation will be crucial to achieving these objectives.

[10] https://www.doc.govt.nz/Documents/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement-2010.pdf

The specific Ruamāhanga freshwater objectives for which this rivers and lakes policy package are most important are:

1. Sediment – information from modelling shows that approximately 20% of the fine sediment loads moving through the catchment each year is coming from the erosion of stream, river and lake beds and banks. Sediment impacts a range of ecosystem health, cultural and human use values. Locking up this sediment by managing the banks and beds (e.g. through riparian planting) will be a major contributor to reducing sediment loads to meet the targets identified in section 7.3.3.

2. Macroinvertebrate community health (MCI) – modelling of the impacts of the different scenarios on the MCI shows how important habitat disturbance and suspended and deposited sediment are to MCI outcomes, even when other water quality attributes are very good. For example, the Waiohine River has very good water quality, but MCI outcomes are at the very bottom of the 'fair' band.

3. Periphyton – shading of waterbodies is necessary to help achieve the Ruamāhanga whaitua periphyton objectives identified in Section 4.4, as these objectives will not be achieved through nutrient reductions alone. Increasingly, evidence is suggesting managing temperature and sunlight incidence on rivers and streams is a driving parameter in periphyton growth, alongside excessive nutrients.[11]

4. Native fish and mahinga kai – in combination with the implementation activities to achieve improvements for sediment, MCI and periphyton outcomes, restoring in-river and in-lake habitat is necessary for the achievement of the Committee's objectives for native fish and mahinga kai. Policy approach for river and lake management

6.2.1 Te Ara Wai – Caring for the path of the water – River management for the river, lake management for the lake

The Committee has clearly stated that they wish to see a significant change in how rivers and lakes are managed in the Ruamāhanga whaitua, with the focus becoming the health and vitality of the waterbodies themselves driving the way activities are managed. This focus on the mauri and values of the waterbody itself needs to influence the way that the entire whaitua community and the institutions acting for that community think about investing time, money and effort in river and lake management. The Committee wishes to see 'river management' that actively enhances water attenuation and aquifer recharge across the whaitua and the achievement of periphyton, MCI, native fish and other freshwater objectives.

Te Hauora o te Wai, the health of the waterbody itself is an element of Te Mana o te Wai that is critical to the management of rivers and lakes. While work to improve water often focuses on contaminants or water levels, the integrity of the water body, its bed, banks and vegetation, is sometimes less visible. The opportunity exists for the WIP to give visibility and prominence to this aspect of Te Mana o te Wai, reflecting how mana whenua and the broader whaitua community

[11] http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/Setting-nutrient-criteria-to-achieve-desired-periphyton-attribute-states-in-Ruamhanga-Whaitua-January-2018.pdf

express their value of the life force of water and waterbodies and of the way the integrity and health of the waterbody speaks of the integrity and health of the broader environment and community.

The Committee has heard strong feedback from mana whenua and the whaitua community that improved riparian management, integrated water storage and looking after wetlands and lakes are all crucial to provide for the way people value water in the Ruamāhanga whaitua.

GWRC plays a significant role in how healthy rivers and lakes may be achieved in the Ruamāhanga whaitua. The Council spends significant energy, time and resources in managing flood risk and soil erosion, particularly in the Ruamāhanga. As an integrated land, water and people management plan for the future of the Ruamāhanga whaitua, this WIP sets how GWRC should be aligning any activities rivers and lakes and their catchments. In this way, GWRC activities can deliver and enhance the objectives, key policies and vision of the Committee and whaitua community. This will be achieved through both changes to the PNRP and through changes to the way the Council plans, funds and delivers catchment management activities in accordance with the Ruamāhanga whaitua outcomes.

Recommendation 21

The PNRP includes a policy or policies that identifies that 'river and lake management' is for the health of the water body itself, recognising:

1. The mauri of the water sustains the mauri of the people, and
2. The critical importance of providing for the habitat and natural character of rivers and lakes in achieving the Ruamāhanga freshwater objectives, and
3. The extensiveness and importance of small streams, wetlands and backwaters (in braided rivers) in the whaitua in providing healthy fish habitat and the conditions for mahinga kai species, places and activities to thrive.

Recommendation 22

The PNRP includes an overarching policy to improve, across the whaitua, riparian vegetation of streams, rivers and lakes for erosion and sediment control, bank stabilisation, temperature management (via shading), control of algae and to support other ecosystem health, mahinga kai and indigenous biodiversity outcomes.

Recommendation 23

GWRC plans and implements the Committee's vision for healthy rivers and lakes in the Ruamāhanga whaitua by:

1. Ensuring that river and lake management functions of the council achieve freshwater objectives and targets in each FMU, and
2. Working with mana whenua and communities in co-creating what river and lake management for the health of the river looks like within each FMU.

6.2.2 Slowing water down

The Committee supports an integrated, catchment-wide approach to managing the water bodies of the Ruamāhanga whaitua. Such an approach would aim to increase ecological and social health and wellbeing, as well as improving water use reliability and resiliency to the pressures of changing climate. This would bring together multiple management options over the long and short term, rather than dependency on any one mechanism.

Options for lakes and river management could include attenuation of water in soils, wetlands, lakes and groundwater systems across the catchment. This will improve river base flow and the quality of habitat.

Further discussion and recommendations for attenuation (and other storage mechanisms) can be found in section 8.3.2.

6.2.3 Mana whenua participation in river and lake management

Throughout their work developing this WIP, the Committee heard clearly from mana whenua that they wish to participate in the regulatory, planning and operational elements of activities in the beds of rivers and lakes to a degree greater than they are currently. Feedback from mana whenua has indicated they wish to see greater involvement in consent applications for flood protection and other river works activities such as the removal of gravel, logs and sand from waterways and activities that disturb the beds of lakes and rivers.

The NPS-FM directs that local authorities should take 'reasonable steps' to involve iwi and hapū in freshwater management decision making, including to reflect their values in decision making and to work with iwi and hapū to identify their values and interests.[12] While GWRC has established practices for engagement with iwi authorities in consented activities, including both as a regulator through consent processing and as a consent applicant through operational activities, consideration is needed as to how to further enable the participation by papa kāinga, marae and hapū across the Ruamāhanga whaitua. It is noted that the advent of Mana Whakahone ā Rohe relationships in the RMA in 2017 may be a suitable mechanism for this.[13]

Recommendation 24

GWRC identifies and implements methods for further enabling mana whenua participation in land and water resource management, including with papa kāinga, marae or hapū (as appropriate), to ensure the values of mana whenua are appropriately reflected in freshwater planning and regulatory processes and in flood protection strategic and operational planning and implementation.

[12] See Section D, NPS-FM 2014 (amended 2017) http://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/nps-freshwater-ameneded-2017_0.pdf
[13] http://www.mfe.govt.nz/rma/manawhakahono

6.2.4 GWRC's role in providing for healthy rivers and lakes

Improving the habitat of rivers, lakes and wetlands will be a vital part of achieving the Ruamāhanga whaitua freshwater objectives. For example, enhancing riparian margins will play a role in increasing stream shade and reducing water temperature, which in turn reduces nuisance algae growth. Enhancing natural character could include improved riparian vegetation for bank stabilisation, increased shading, and improved pool, run, riffles sequences in rivers, thus improving habitat for fish.

The Committee has recognised that GWRC has a significant role in influencing the way activities which affect rivers, lakes and wetlands are carried out, in particular through flood protection planning and operational works. This includes managing the gates controlling water levels in Lake Wairarapa and the Lower Valley drainage scheme. Another example is the Te Kāuru floodplain planning process currently underway which aims to develop a Floodplain Management Plan (FMP) setting out a long-term strategy for managing flooding and erosion risk in the Upper Ruamāhanga.[14] This FMP would inform consent applications and operational activities affecting rivers in the Upper Ruamāhanga for the coming decades, as well as identifying works to provide for a healthy environment and the funding requirements to do so. GWRC also has a major role in implementation of activities impacting rivers and lakes, including offering financial support and advice, through land management and resource consenting functions.

The Committee has expressed very clearly that GWRC should review the ways in which it undertakes planning, investment and operational activities affecting the health of rivers, lakes and wetlands. There is concern that current activities and practices are not suitable to deliver on the objectives of this WIP.

The Committee strongly recommends that GWRC considers how they might implement innovative approaches and provide leadership to the whaitua community in achieving healthy of rivers and lakes.

[14] http://www.gw.govt.nz/assets/Democratic-Services/TKURRFMPS-Approved-Terms-of-Reference-for-2016-19-triennium.pdf

Recommendation 25

The PNRP includes a policy that promotes restoration of rivers, lakes and wetlands to achieve the Ruamāhanga freshwater objectives, and that recognises that activities in the beds of river, lakes and wetlands are supported when undertaken for these restoration purposes.[15]

Recommendation 26

GWRC reviews current planning and implementation activities relevant to the health of lakes and rivers in order to:

1. Identify the changes to planning, practice and investment necessary to deliver the Ruamāhanga whaitua objectives through river and lake management, and
2. Identify new multi-disciplinary systems to deliver integrative river and catchment management, and
3. Progressively implement the findings of this review work.

'Activities' could include institutional delivery structures and the alignment of future relevant land and water programmes and investments.

Recommendation 27

GWRC seeks and takes opportunities to enhance natural character of rivers, streams and lakes, and in promoting wetland restoration, across the whaitua, including by:

1. Actively aligning planning and operation of flood management activities (e.g. floodplain planning) with the Ruamāhanga whaitua objectives and policies, and
2. Identifying and implementing management options to enhance natural character and to achieve the Ruamāhanga freshwater objectives when undertaking operational works (e.g. willow removal and gravel extraction), and
3. Actively aligning and supporting farm planning and farm plan implementation with the Ruamāhanga whaitua objectives, and
4. Investing in riparian planting for shading and stream bank erosion management and in wetland restoration.[16]

6.3 Methods for river and lake management

6.3.1 Restoring Lake Wairarapa and Lake Onoke with an emphasis on "in-lake" methods

For both Lake Onoke and Lake Wairarapa, the existing in-lake contaminant loads, changes to hydrodynamics and contaminant loads entering the lakes all contribute to poor ecosystem health and much diminished mana whenua values.

[15] Note connection to Recommendation 9 in relation to consenting processes recognising value of innovative practice
[16] Note connection to Recommendation 37 in relation to sediment targets from managing stream bank erosion

Restoring ecosystem health will require: nutrient stripping within the lake, a reduction in the suspension of sediment, establishment of macrophytes on lake beds, lake edge wetland restoration, and reduction in sediment loads from the catchment into the lakes.

Restoring the connection between the Ruamāhanga River and Lake Wairarapa will be a critical part of restoring the relationship between, and mauri of, both water bodies.

Modelling for the Committee has illustrated that improving the health of the lakes will rely on both reducing contaminant inputs and on improving the existing in-lake contaminant loads. In particular, modelling of different scenarios has shown that the attributes in Lake Wairarapa that are below the national bottom lines in the NPS-FM (e.g. total phosphorus) are unlikely to shift with reductions in catchment loads alone.[17]

By contrast, modelling of the reconnection of the Ruamāhanga River with the lakes showed potential to be an effective strategy in reducing the internal nutrient load. Modelling to see the impacts of increasing the depth of Lake Wairarapa show that under conditions of 1m extra depth, macrophyte reestablishment is possible. The modelling points to the role of 'in-lake' management methods in restoring the health of the lakes alongside reductions of contaminants reaching the lakes from land use activities and discharges.

Recognising the size of the challenge of the existing ecosystem problems with the lakes and potentially long timeframes to create change in catchment loads and potentially in lake hydrodynamics, the Committee has identified a longer timeframe for achieving the objectives for Lake Wairarapa in particular. This timeframe has been met by some concern for being too long, including by mana whenua. The Committee has acknowledged that it would be preferable to restore the health of the lakes as early as possible and as such recommends that efforts to improve lake health start immediately and are progressively implemented over time.

It is also important to note that this modelling has also indicated that improvements to some attributes might come at the detriment of other attributes. For example, improvements in sediment in Lake Wairarapa may also have the potential to increase nuisance phytoplankton growth, unless other mitigation options, such as macrophyte re-establishment, were implemented. There is therefore a need to further explore and bundle options for the improvement of the health of the lakes in order to meet the Ruamāhanga whaitua objectives and provide the whaitua values. The Committee has signalled strong interest in ensuring that this recent knowledge is built on as a key part of a commitment to restoring the health of Lake Wairarapa and Lake Onoke over time.

[17] http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/A-coupled-hydrodynamic-ecological-model-to-test-management-options-for-restoration-of-lakes-Onoke-and-Wairarapa.pdf

Recommendation 28

The PNRP includes a key policy to restore health of Wairarapa Moana by 2080, including to provide for mahinga kai, support native fish populations and to restore health of the Wairarapa Moana wetlands.

Recommendation 29

GWRC commits to the restoration of the health of Wairarapa Moana, including Lake Wairarapa and Lake Onoke, by undertaking research, investigations, and experiments in management approaches, strategic planning and changes to operational activities to progressively improve the lake health and to reach the objectives in this WIP by 2080 at the latest.

Recommendation 30

GWRC undertakes feasibility studies of 'in-lake' management options for the purposes of providing for the communities values of Wairarapa Moana and achieving the freshwater objectives identified in this WIP. Options to investigate include:

- Re-routing the Ruamāhanga River into Lake Wairarapa, particularly at flows below the median flow, with higher flows bypassing the lake, and
- Alternative management regimes of the lake-level gates Lake Wairarapa , and
- Alternative management regimes for Lake Onoke including in relation to the timing, location and operation of lake mouth openings, and
- Experimenting with other alternative management options, such as temporarily holding Lake Wairarapa at higher levels than current practice, as a means of testing proof of concepts for potential broader application.

6.3.2 Investigations into restoring the health of Lake Wairarapa and Lake Onoke

As discussed above, modelling has shown positive signs that changing the hydrodynamics of Lake Wairarapa could be an effective way of improving the health of the lake from its currently very poor state and to move towards the vision of glistening waters. Changing the lake's hydrodynamics could include restoring the river flow into the lake, maintaining higher lake levels and different lake opening regimes.

The Committee recommends further investigation and implementation of options to improve the lakes' health, including identifying methods to reduce re-suspension of sediments already in the lakes in order to improve clarity and create conditions suitable for macrophytes to survive and thrive. Options could include techniques used elsewhere in New Zealand (e.g. Lake Waihora, Kaituna), mitigation of the impact of wave action (e.g. use of shelter belts on western shores of Lake Wairarapa), restoring macrophytes, wetland restoration and the use of floating wetlands to reduce fetch and remove nutrients. Substantial further investigation should be undertaken to explore these options, the impacts of any such changes and to identify feasible options for mana whenua and the community to consider further.

The Committee also recognises the extent and value of current research (see text box above) in helping expand understanding of the history, dynamics and pressures on the two lakes and recommends GWRC recognises and supports this work in contributing to investigation into management options for the future of the lakes as well as in other implementation processes.

Current lakes research projects

Lakes 380

Combining traditional environmental reconstruction techniques and contemporary methods (e.g. environmental DNA and core scanning) to characterise current lake health and explore rates and causes of change over the last 1,000 years.

Lake Wairarapa aquatic plants

Aquatic macrophyte surveys to assess the current quality and extent of the macrophyte community in Lake Wairarapa – aquatic macrophytes are considered a key indicator of shallow lake health.

Lake Wairarapa sediment/nutrient investigation

An assessment of nutrients bound to lakebed sediments of Lake Wairarapa to assess their potential availability for phytoplankton growth.

Kākahi monitoring

Ongoing citizen science monitoring of kākahi health at Lake Wairarapa

Recommendation 31

GWRC investigates further options for restoring the health of Wairarapa Moana, including to restore the Ruamāhanga River flow into Lake Wairarapa, including to:

- Mitigate the impact of wave action, and
- Reduce re-suspension of sediments in order to improve clarity, and
- Create conditions suitable for macrophytes to survive and thrive, and
- Remove nutrients and sediments, and
- Restore the health of mahinga kai species, and
- Enhance the health of wetlands.

Recommendation 32

GWRC recognises and supports research being undertaken by external groups, mana whenua and the whaitua community into means to improve the health of Lake Wairarapa and Lake Onoke and actively considers application of new knowledge in the management of activities impacting the lakes, including through planning, consent practice and operational management practices.

6.3.3 Native and introduced fish management

An integral component of ecosystem health and mahinga kai values is the health and abundance of both native fish and non-native fish in the rivers and lakes in the whaitua. The management of these native fisheries for commercial purposes is managed through the quota management system by the Ministry of Primary Industries. The management of non-native fisheries is the responsibility of the Department of Conservation under the Freshwater Fisheries Regulations and the regional council.[18]

The Committee has indicated that the management of the commercial native fisheries, such as whitebaiting and tuna harvest, and the management of non-native fish could, in Lake Wairarapa, Lake Onoke and some rivers, play a valuable role in the achievement of the whaitua objectives. For example, rudd and perch play a role in the continued poor health of macrophyte beds in Lake Wairarapa. There may be a role for GWRC to inform and liaise with the responsible agencies of the whaitua objectives and their potential role in helping achieve these, as well as to ensure GWRC's own pest management processes are aligned with the whaitua objectives.

Recommendation 33

GWRC works to inform and liaise with external agencies to link management of commercial and non-native fisheries with the Ruamāhanga whaitua outcomes.

[18] http://www.doc.govt.nz/Documents/conservation/threats-and-impacts/animal-pests/nz-invasive-fish-management-handbook.pdf

7. Managing contaminants in the Ruamāhanga whaitua – discharges and land uses

7.1 Background – key issues and drivers

Rivers, lakes, wetlands and streams within the whaitua are highly valued for a number of reasons by the community, including for recreation, mahinga kai and stock water which can all be impacted by poor water quality and reduced supply resulting from land use activities.

The National Policy Statement for Freshwater Management (NPS-FM) requires water quality to be maintained or improved, and improvements must be made where national bottom lines are not being met. The Ruamāhanga whaitua has several rivers where national bottom lines aren't being met for certain measures. This includes rivers in the whaitua that don't meet the definition of 'swimmable' as it relates to *E.coli* such as the Parkvale Stream, and rivers where periphyton is below national bottom lines such as the Kopuaranga River.

There are significant sediment issues in the whaitua with approximately 1.3 million tonnes of sediment lost from land and moving through water each year. Five FMU's contribute just over 65% of the total annual sediment load coming off 'non-native' land. Much of this sediment is negatively impacting the health of Lake Wairarapa, Lake Onoke and the South Wairarapa coast.

Both Lake Wairarapa and Lake Onoke are in very poor health as a result of being impacted by the accumulated effects of contaminants and sediment from the entire Ruamāhanga catchment. Historic changes to the lake and surrounding wetland habitat has also had a significant impact. Both lakes have water quality that doesn't meet national bottom lines e.g. for phytoplankton or total phosphorus.

The Committee's recommendations in this chapter are a prerequisite to meeting the freshwater objectives identified in section 4.4. This chapter emphasises that it is both how we manage land and the contaminants that we discharge in the catchment that directly impact our water quality. The recommendations include a mix of regulatory and non-regulatory approaches to managing land and the discharge of contaminants.

7.2 Objectives for managing contaminants

The policy package to manage contaminants recognises that the achievement of freshwater objectives for water quality, periphyton, MCI and fish is dependent on reducing the amount of contaminants reaching our waterways. Some management actions will also contribute to the achievement of habitat objectives e.g. riparian planting.

7.3 Water quality limits

Policy A1 of the NPS-FM requires freshwater quality limits to be set for all freshwater management units (FMUs) to give effect to the objectives in the NPS-FM and specifically to achieve the freshwater objectives identified in this WIP. In the Ruamāhanga Whaitua load limits and targets will be set for nitrogen, phosphorus and sediment, and concentration limits and targets will be set for *E. coli.* See sections 7.3.1, 7.3.2 and 7.3.3 for tables showing the limits in each FMU within the Ruamāhanga whaitua.

Other contaminants such as zinc, copper or hydrocarbons which are not such a problem for the Ruamāhanga whaitua will not have limits set for them at an FMU scale. These contaminants will instead be managed through the methods used to manage other contaminants and through the application of good management practice, such as stormwater management.

The NPS-FM also requires that over-allocation – where an objective or limit is currently not being met – is avoided (Policy A1). The work of the Committee has established that a number of water bodies do not currently meet their objectives and, in some cases, do not meet national bottom lines under the National Objectives Framework. Where discharges contribute to those objectives not being met, this policy package outlines methods to reduce over-allocation over time.

Recommendation 34

GWRC sets water quality limits and targets for nutrients and sediment loads as rules in PNRP for each freshwater management unit within the Ruamāhanga whaitua, in accordance with Tables 2 and 3 below.

Recommendation 35

GWRC sets water quality limits and targets for *E. coli* concentrations as rules in the Natural Resources Plan for each freshwater management unit within the Ruamāhanga whaitua to meet the attribute states described in Table 11 in Section 10.5 of the Appendix.

7.3.1 Limits and targets for nutrients from diffuse source discharges

Reducing nutrient loads is important to safeguard life-supporting capacity, ecosystem processes and indigenous species. Nutrients also play a role in the growth of periphyton with many rivers in the catchment needing to reduce periphyton levels.

Based on the Committee's objectives identified in section 4.3, limits on the annual amount of nutrients to reach water from diffuse sources (i.e. leached through soil and into groundwater) have been identified for each river FMU in the following Table 2. This table describes both the current load (the 'limit') and the load to be reached in the future (the 'target') in order to meet the Ruamāhanga whaitua objectives by 2040 (note that some timeframes are longer).

The current loads (the 'initial limits') were calculated by combining the leaching loads associated with land use activities in the catchment and the direct inputs from the five wastewater treatment plants (in the four FMUs where this is relevant).

The targets were calculated using the same method of combining leaching loads and WWTP discharges, and were based on the freshwater objectives. The target loads for the wastewater treatment plants were based on the SILVER2040 scenario – all wastewater treatment plant discharges to land by 2040. Leaching loads were calculated using the Overseer scenario map relevant to that FMU to achieve the freshwater objective e.g. the Taueru River scenario is SILVER2040 so the Overseer Silver 2040 leaching map was used.

More information on the methodology can be found in the Jacobs report – 'Ruamāhanga catchment modelling – Water quality freshwater objectives and load setting'.

Table 2. Nutrient limits and targets for diffuse sources of nitrogen and phosphorus in the Ruamāhanga whaitua to be achieved by 2040.

NB. 'Limit' = current load
Loads are un-attenuated

	Nitrate (NO3-N)			Total phosphorus (TP)		
River freshwater management unit	**Limit load (t/yr)**	**Target load (t/yr)**	**% load reduction**	**Limit load (t/yr)**	**Target load (t/yr)**	**% load reduction**
Eastern hill streams	484	479	1.0	18.6	16.4	11.4
Huangarua River	406	403	0.7	26.6	24.7	7.1
Kopuaranga River	339	298	12.2	38.2	9.5	75.3
Makahakaha Stream	80	71	10.6	3.5	1.9	47.4
Mangatarere Stream	324	289	10.9	17.8	11.5	35.4
Otukura Stream	267	216	19.2	6.7	4.2	38.0
Parkvale Stream	251	217	13.4	9.2	6.2	33.2
South coast streams	202	201	0.6	8.4	7.9	5.9
Tauanui River	66	63	5.1	2.3	1.5	32.9
Taueru River	443	393	11.3	18.5	8.2	55.6
Tauherenikau River	102	101	0.3	5.4	5.3	2.3
Turanganui River	85	83	2.3	3.1	2.8	10.0
Upper Ruamāhanga River	101	101	0.0	8.2	8.0	1.4
Valley floor streams (to Lake Wairarapa)	275	205	25.5	11.4	5.0	55.7
Valley floor streams (to Ruamāhanga River)	379	334	11.9	15.1	11.5	23.7
Waingawa River	124	124	0.5	8.1	8.0	1.3
Waiohine River	122	121	1.0	9.0	8.6	5.0
Waipoua River	348	317	9.1	25.5	9.3	63.5
Western lakes streams	227	224	1.5	26.1	25.4	2.7
Whangaehu River	242	212	12.1	10.7	4.4	58.8

7.3.2 Limits and targets for *E. coli*

Reducing *E. coli* concentrations will increase the number of rivers and lakes that are considered suitable for primary contact. The NPS-FM requires 90% of rivers and lakes to be suitable for primary contact by 2040, with *E.coli* being one of the human health attributes used to determine this. Reducing *E.coli* also contributes to providing for other values like recreation, mahinga kai and Maori customary use.

Limits and targets for *E.coli* have been set using instream concentrations rather than loads as the amount of *E.coli* in a stream at a given time is what impacts on whether people get sick. They are based on a concentration in a waterbody at one time, rather than a load over time. The limits are

based on the current state concentrations for each FMU, and the targets on the *E.coli* concentrations to be achieved by 2040 (the freshwater objectives). These can be found in Table 11 in Appendix 10.5.

The Committee is aware that the mitigations used in modelling *E.coli* scenarios may not always be sufficient to achieve FMU objectives. Real time locally distinct variables for each FMU will require local solutions made up of a range of mitigations at all scales.

7.3.3 Limits and targets for sediment

Reducing the sediment load can improve conditions for macroinvertebrate community health and play a role in native fish health. Reductions also contribute to providing for recreational and cultural values. Sediment has a role in releasing nutrients, most notably phosphorous. Much of the sediment produced within the Ruamāhanga whaitua ends up in Lake Wairarapa and Lake Onoke with impacts on fish communities and on cultural and recreational values.

Due to the limited amount of data available, instream concentrations for sediment were not set so a different process was used to calculate limits and targets. To calculate current loads (the 'limit'), sediment loads from native and non-native land uses for each FMU were calculated. This included a split between the relative contributions from hillslope and streambank erosion. More information can be found in the Jacobs report – 'Ruamāhanga catchment modelling – Water quality freshwater objectives and load setting'.

The outputs from the baseline and scenario modeling were used to rank the FMUs based on their contributions to the overall non-native sediment load. From this the Committee has identified a sediment reduction target for the Ruamāhanga whaitua based on two parts:

1. In each of the five FMUs producing the greatest load from non-native land (the 'top 5' FMUs), reduce annual sediment loads in accordance with the BAU2080 scenario reductions plus an additional 20% of the reductions seen under the SILVER2080 scenario.

   This means the sediment loss target from the 'top 5' FMUs would be approximately 390,000 tonnes per annum by 2050, or a reduction of 37% from the current load.

2. For all other FMUs, reduce annual sediment loads in accordance with the reductions seen under the BAU2080 scenario.

   This means the sediment loss target from these FMUs would be approximately 560,000 tonnes per annum by 2050, or a reduction of 21% over the current load.

Table 3 describes both the current sediment load (the 'limit') and the sediment load to be reached by 2050 (the 'target') for each FMU. In total, this would see an approximately 30% reduction in the total annual sediment load across the whaitua.

Table 4 below shows sediment loads from non-native land to Lake Wairarapa are reduced by around 60% by 2050, and loads off non-native land to Lake Onoke reducing by around 40% by 2050.

The Committee's position was to reach these targets by 2050, meaning that any planting mitigations would need to be in place between 7-15 years before this time in order to be effective. The Committee noted that it would be suitable to review the progress of implementation of these

targets after ten years including to identify if the targets were still considered appropriate (particularly recognising the lack of data currently available in the whaitua on sediment loss and impact) and to identify whether changes in implementation practice are required.

Table 3. Total annual sediment loads from non-native land for each Ruamāhanga whaitua river and lake freshwater management unit – limits and targets to be achieved by 2050

NB. 'Limit' = current load
* denotes a 'top 5' FMU
ǂ shows load from netbank erosion of lake edge, does not include loads from river catchments to the lake

River freshwater management unit	Limit load (t/yr)	Target load (t/yr)	Load reduction (t/yr)	% load reduction
Eastern hill streams*	85,169	51,439	33,730	40
Huangarua River*	144,136	88,010	56,126	39
Kopuaranga River*	67,149	54,897	12,252	18
Makahakaha Stream	20,367	17,211	3,156	15
Mangatarere Stream	17,787	9,396	8,391	47
Otukura Stream	4,694	1,215	3,479	74
Parkvale Stream	7,060	2,389	4,671	66
South coast streams	38,039	26,019	12,020	32
Tauanui River	3,585	1,103	2,482	69
Taueru River*	229,931	130,315	99,616	43
Tauherenikau River	10,004	6,387	3,616	36
Turanganui River	10,343	3,114	7,230	70
Upper Ruamāhanga River	30,977	25,088	5,888	19
Valley floor streams (to Lake Wairarapa)	9,166	2,643	6,523	71
Valley floor streams (to Ruamāhanga River)	45,641	13,506	32,135	70
Waingawa River	18,310	8,729	9,581	52
Waiohine River	22,184	16,434	5,750	26
Waipoua River	43,190	30,228	12,962	30
Western lakes streams	7,441	3,019	4,422	59
Whangaehu River*	71,510	45,170	26,340	37
Lake freshwater management unitǂ	**Limit load (t/yr)**	**Target load (t/yr)**	**Load reduction (t/yr)**	**% load reduction**
Lake Onoke	4,901	990	3,910	80
Lake Wairarapa	10,034	2,011	8,023	80

Table 4. Total annual sediment loads from non-native land in river and lake FMUs summed to major waterbodies and load reductions under Committee's recommended targets

Total loads from non-native land to	Sum of limit loads (t/yr)	Sum of target load (t/yr)	Load reduction (t/yr)	% load reduction
Ruamāhanga River catchment	817,339	497,029	320,311	39
Lake Wairarapa catchment	41,339	15,276	26,064	63
Lake Onoke catchment	863,579	513,295	350,285	41
Entire Ruamāhanga whaitua	901,619	539,314	362,305	40

Table 5. Total annual sediment loads from all land for each Ruamāhanga whaitua river and lake freshwater management unit – limits and targets to be achieved by 2050

NB. 'Limit' = current load
* denotes a 'top 5' FMU
ǂ shows load from netbank erosion of lake edge, does not include loads from river catchments to the lake

River freshwater management unit	Limit load (t/yr)	Target load (t/yr)	Load reduction (t/yr)	% load reduction
Eastern hill streams*	93,040	59,130	33,370	36
Huangarua River*	155,174	99,047	56,127	36
Kopuaranga River*	67,822	55,570	12,252	18
Makahakaha Stream	20,367	17,211	3,156	15
Mangatarere Stream	38,255	26,797	11,458	30
Otukura Stream	4,694	1,215	3,479	74
Parkvale Stream	7,060	2,389	4,671	66
South coast streams	75,088	61,772	13,316	18
Tauanui River	9,061	6,497	2,564	28
Taueru River*	231,273	131,658	99,616	43
Tauherenikau River	51,370	47,453	3,917	8
Turanganui River	18,071	10,603	7,469	41
Upper Ruamāhanga River	80,491	74,162	6,329	8
Valley floor streams (to Lake Wairarapa)	9,166	2,643	6,523	71
Valley floor streams (to Ruamāhanga River)	45,641	13,506	32,135	70
Waingawa River	99,177	89,001	10,176	10
Waiohine River	137,234	130,841	6,393	5
Waipoua River	56,431	42,447	13,984	25
Western lakes streams	38,203	28,159	10,045	26
Whangaehu River*	71,510	45,170	26,340	37
Lake freshwater management unitǂ	**Limit load (t/yr)**	**Target load (t/yr)**	**Load reduction (t/yr)**	**% load reduction**
Lake Onoke	4,901	990	3,910	80
Lake Wairarapa	10,034	2,011	8,023	80

Table 6. Total annual sediment loads from all land in river and lake FMUs summed to major waterbodies and load reductions under Committee's recommended targets

Total loads from all land to	Sum of limit loads (t/yr)	Sum of target load (t/yr)	Load reduction (t/yr)	% load reduction
Ruamāhanga River catchment	1,130,606	804,207	326,400	29
Lake Wairarapa catchment	113,467	81,480	31,987	28
Lake Onoke catchment	1,248,974	886,677	362,297	29
Entire Ruamāhanga whaitua	1,324,062	948,449	375,612	28

Recommendation 36

By 2050, reduce sediment loads in the five FMUs producing the greatest sediment load off non-native land, as modelled under the baseline (current state), in accordance with the targets set in Table 3. These 'top 5' FMUs are:

- Taueru
- Huangarua
- Eastern hill streams
- Whangaehu
- Kopuaranga

Recommendation 37

A priority in implementation in the 'top 5' catchments should be on establishing farm plans on properties where they don't presently exist.

Recommendation 38

By 2050, reduce sediment loss from netbank erosion across all other freshwater management units in the Ruamāhanga whaitua in accordance with targets set in Table 5.

Recommendation 39

GWRC reviews the progress of achieving these targets 10 years after the notification of the Ruamāhanga Whaitua Plan Change, including describing the extent of mitigation work undertaken and the modelled and/or monitored impact on water quality in rivers, streams and lakes in the whaitua.

Recommendation 40

Across the whaitua, GWRC supports and drives improve management of critical source areas and high-risk land uses in line with good management practice, including through working with industry partners.

Recommendation 41

In the 'top 5' freshwater management units, GWRC undertake further sub-FMU scale planning with local communities to establish the locations of highest priority to undertake sediment mitigation works on in order to achieve the targets in Table 5.

Recommendation 42

GWRC aligns planning, funding and support of sediment mitigation activities, including both riparian restoration and hill slope erosion and sediment control, with the identified priority areas, targets and the suitable mitigation approaches.

Recommendation 43

GWRC promote uptake of sediment mitigation through connection with new research sediment mitigation measures, practices and adoption mechanisms, and GWRC, industry and community extension services to enable uptake of constantly improving practice.

7.4 Policies and methods to achieve water quality limits

7.4.1 Policy approach

A non-allocation approach is one where there is no allocation of a discharge limit for contaminants, including sediment, nutrients and pathogens at a property scale. The allocation of pathogen and sediment loads at a property scale is technically difficult or impossible at present. The decision as to whether to allocate nutrients, or not, is a complex and contentious issue as there is increased awareness within the community of the serious effects of diffuse discharges on water quality and a sense that land managers should be made accountable for the effects of their activities. There is another view, equally strongly held, that holds that our current science is not able to account for contaminant discharge at a property scale at this time and that an allocation based approach to managing this discharge is counter-productive.

The Committee did not feel that the science supported property scale allocation of nutrients and that the emphasis should be on enabling and encouraging improved practice. In a catchment where all three contaminants are an issue, and sediment is the most significant issue in a lot of places, it makes sense to manage all contaminants in a similar way. This is different to some other regions where nutrients are the most significant issue. This approach aligns with the Committee's wish to empower the community to work together and innovate to make their own change, rather than having a focus on regulation. The Committee considered that a regulatory approach encouraged landowners to do the minimum to meet the limit rather than changing practice to meet community objectives for local water quality within FMUs.

The non-allocation approach relies on an FMU implementation framework to create a mechanism by which people work together to operate within limits. Within an FMU the emphasis is on working together within catchment communities, the operation of good management practice, and the use of farm plans and farm planning. Within the WIP a range of mitigations including riparian management, afforestation and retirement are strongly supported as management tools. Current land use practices will continue to be regulated through rules in the PNRP and other national regulation e.g. national environment standards. Land use change will also be regulated to ensure changes do not cause limits to be exceeded.

This approach does not apply to point source discharges e.g. from wastewater treatment plants which will continue to be regulated, and will be subject to discharge standards.

The recommendations outlined in section 5.7 that specify monitoring, accounting and use of information are also a vital part of this approach to managing contaminants to achieve discharge limits.

7.4.2 Reviewing whether to implement a nutrient allocation regime in the future

It is important to measure progress towards the achievement of freshwater objectives in each FMU and review the need for a nutrient allocation regime should limits not be met and objectives not achieved. The Committee supports a review of whether a nutrient allocation regime should be implemented in 10 years' time. The review would consider whether limits and objectives were being achieved, whether the tools to administer an allocation regime were adequate and whether alternative management methods would be more appropriate.

If a nitrogen allocation regime was to be introduced in the future, the Committee considers it should be based on an equal allocation regime or allocation based on soil type and/or leaching risk (land use suitability). Grandparenting should not be considered an appropriate nitrogen allocation approach.

Recommendation 44

GWRC reviews the need for a nutrient allocation regime 10 years post plan change, or by 2029. NOTE: Grandparenting would not be considered a suitable allocation regime if one was to be implemented.

7.4.3 Farm planning

Farm plans (now called Farm Environment Plans) have been a key feature of the work of GWRC with farmers largely in the hill country of the Wairarapa since the 1960s with a focus on soil conservation and the use of poplar poles. More recently, farm plans have been developed with farmers on more intensively farmed valley floor farm land. While these farm plans have achieved much in terms of soil stability, bush retirement and water quality improvements and have led to strong and respected relationships between GWRC and many farmers, the Committee is keen to build on and strengthen this work and move to a more holistic farm planning approach. It is recognised that farm planning has multiple benefits including being good business planning.

The approach that the Committee is proposing is a shift to farm planning with a focus on achieving not just environmental outcomes but cultural, economic and social outcomes. This new approach to farm planning would include managing on-farm water quality issues, a sharper focus on critical source areas, and more extensive riparian and wetland restoration, looking at more efficient water use, protecting cultural values and further incorporating good management practice actions. Farm planning would also look at ways to support and foster on-farm innovation.

The Committee considered a range of options for the future of farm environment plans including making them compulsory. After considerable discussion with partners and stakeholders the Committee agreed that any potential benefits from compulsory farm environment plans were outweighed by the administrative burden.

The Committee considers that farm planning is a critical element in meeting FMU limits and promotes their development. Considerable support for farmers from council and industry organisations will be necessary to facilitate this. As part of this process land owners must share information at an FMU scale to identify issues and mitigations to alleviate their effects.

Recommendation 45

GWRC and industry promote and support the implementation of farm planning as a primary tool of management at a farm scale.

Recommendation 46

GWRC further incentivise and promote the adoption of farm planning and the activation of existing farm plans.

7.4.4 Good management practice

Good management practice (GMP) is the continuation of improving practices (both urban and rural) to minimise the impact of land use activities on water bodies and the environment more generally. As knowledge changes, GMP continues to evolve.

GMP is considered the minimum level people should be operating at. In some areas more than GMP will be needed to achieve the freshwater objectives, so getting everyone operating GMP is the first step.

In the rural space, there is much existing industry good management practice guidance already developed that can be a useful source of information which can help to manage the impacts of various activities on the environment.

In terms of managing to limits and achieving freshwater objectives within FMUs, there are also opportunities for tailored GMP guidance to be developed by FMU groups to work on FMU specific issues and work on solutions. GMP can also be incorporated into farm planning to improve farming practices and efficiencies.

In the urban environment, GMP can also be used to improve land use practices such as managing municipal wastewater and water supply and GMP can be applied to the management of natural resources such as river management activities such as gravel extraction.

Recommendation 47

GWRC, along with iwi partners and industry, work together to promote and implement 'good management practice' in both the rural and urban context. Appropriate GMP for the Ruamāhanga catchment should be defined.

Recommendation 48

'Good management practice' should be emphasised as part of farm planning.

7.4.5 Practices currently regulated

Many land use practices are already controlled under different legislation and regulation in New Zealand. For example, forestry planting and harvesting are managed through the recent Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 (NES-PF). These regulations control many activities associated with forestry including earthworks, river crossings, harvesting and replanting, and directs where resource consents are required either through regional or territorial authorities. It is not effective planning to also include rules in a regional plan that is covered by an NES as NES' set the requirements.

The PNRP also controls some land use activities that have the potential for adverse effects on the environment including cultivation, break-feeding and livestock access to water bodies, earthworks and vegetation clearance. Some of these activities are permitted provided certain thresholds and conditions are met. If the thresholds and/or conditions cannot be met resource consent is required.

Recommendation 49

GWRC reviews the land use rules structure, including for break feeding, cultivation and livestock exclusion, to ensure the requirements are clear to resource users when resource consent is required.

Recommendation 50

GWRC actively promotes and enforces the requirements of the permitted activity rules for break feeding, cultivation and livestock exclusion.

7.4.6 Regulating land use change

The change from one land use type to another has the potential to exceed water quality limits set in particular FMUs depending on the new land use activity proposed, the intensity of the activity and particular climate and soil characteristics of the site etc. When there is a change in a type of land use activity (e.g. from arable to dairy), the potential impacts of this new land use activity on water quality need to be analysed through a resource consent process to ensure that the limit for the FMU is not exceeded. Conditions may be placed on the new activity to ensure this occurs.

This approach provides the ability to prevent certain land use changes (decline resource consent) that would otherwise lead to water quality limits not being met in an FMU and associated non-compliance issues for the wider FMU communities. Offsetting could be considered as part of a land use change resource consent application. Land use changes that result in a reduction in contaminant load should be encouraged (do not require resource consent).

Recommendation 51

GWRC provides a new rule for land use changes where that land use results in an increase in contaminant load as a discretionary activity in the PNRP. A land use change that results in a decrease in contaminant load shall be a permitted activity.

7.4.7 Riparian management

Riparian planting can provide many benefits for water quality including providing shading to rivers and streams which decreases water temperature and reduces the growth of periphyton. Riparian planting can also improve the instream oxygen available leading to improvements in the macroinvertebrate community index scores which in turn can improve fish populations. Stream bank erosion issues can also be resolved through the use of riparian planting, as the planting can act as a deterrent to stock and reduces trampling. Other studies have shown that riparian vegetation can help reduced the amount of nutrient (phosphorus and nitrogen), sediment and faecal pathogen (as indicated by *E. coli*) entering water.

Recommendation 52

GWRC expands support of extensive, whaitua-wide riparian planting for management of stream bank erosion and for in-stream benefits (e.g. shade to reduce periphyton), including through:

- Priority in farm planning design and implementation, and
- Increasing funding for riparian planting, as well as improving access to and awareness of these funds, and
- Producing plants (e.g. Akura nursery) or assisting communities to produce plants fit for such a programme

7.4.8 Managing point source discharges

Point source discharges are those from a single, identifiable point, e.g. from a property, or from a pipe or ditch. This makes them easier to manage than diffuse discharges.

In the Ruamāhanga whaitua point source discharges will be managed through the introduction of discharge standards consistent with limits. An allocation system will reflect current loads and targets for each major discharge. See Table 7 for the current loads and targets for the five wastewater treatment plants in the catchment. The targets are based on wastewater being discharged appropriately to land by 2040. An allocation based approach to management of point source discharges has been strongly supported by the community.

Urban stormwater will be managed through the consenting process in the PNRP. It requires local authorities to apply for a 'global' consent to manage all their stormwater network discharges together, to ensure cumulative effects are managed. The two-stage consenting process requires data gathering, and then management of the stormwater network to address issues affecting water quality. Stormwater from large sites like state highways, and from land use, like subdivision, are managed through other provisions in the PNRP.

The District Councils are moving to land disposal of wastewater. This will take some time and incur significant expenditure. Carterton District is well down this path. One potential road block is the potential need to consent individual discharges to land particularly where this may occur on multiple private properties. Irrigation of wastewater onto farm land is common in many jurisdictions around the world. Where the effluent is sufficiently high standard, and is applied in the right place, this should be promoted. An appropriate permitted activity status rule in the regional plan would achieve this.

The nutrient allocations for wastewater discharges are detailed in Table 7. These have been calculated from information provided by the District Councils and are sourced from the nutrient modelling work. The targets assume 100% land disposal by 2040. Some of these figures are likely to be inaccurate and 100% land disposal may not be possible. These target allocations will need to be progressively reviewed.

Recommendation 53

Wastewater discharges reduce to the target allocations detailed in table 7. Target allocations are to be met by 2040.

Recommendation 54

The nutrient allocations in Table 7 are reviewed and changed accordingly when plan reviews occur.

Recommendation 55

GWRC works with territorial authorities to ensure wastewater is discharged appropriately to land by 2040, recognising that direct discharges to water may occasionally be acceptable but only in exceptional circumstances and only at high flows (e.g. 3x median flow).

Recommendation 56

GWRC work with District Councils on a suitable permitted activity rule for irrigation of wastewater onto farm land. This should include conditions on the standard of the discharged effluent, discharge rates and timing, and any restrictions on where this irrigation should occur.

Recommendation 57

GWRC introduce discharge standards for all point source discharges.

Recommendation 58

Urban stormwater is managed in accordance with good management practice and progressive improvement and in the Proposed Natural Resources Plan policies and rules.

Table 7. Nutrient limit and target allocations for wastewater discharges to water and to land entering water

Target date: 2040

		Nitrate-N (kg/yr)			Total phosphorus (kg/yr)		
Wastewater treatment plant	**River freshwater management discharge to**	**Current allocation**	**Target allocation**	**% reduction**	**Current allocation**	**Target allocation**	**% reduction**
Carterton	Mangatarere Stream	129	41	68%	4271	163	96%
Featherston	Western lake streams	685	94	86%	1957	0	100%
Greytown	Valley floor streams to Ruamāhanga River	293	85	71%	1720	118	93%
Martinborough	Eastern hill streams	176	46	74%	1604	110	93%
Masterton	Valley floor streams to Ruamāhanga River	858	211	75%	6629	426	94%

7.5 Successful implementation of water quality limits

7.5.1 Emergent and existing catchment communities

In the rural environment, there are emergent catchment community groups coming together largely wanting to improve water quality and biodiversity on a catchment scale, with some wanting to get ahead of regulation coming in the PNRP. Some groups are having their first meetings, while others have been operating for many years. They are largely driven by a desire to improve their local environment and build and maintain a social connection with each other. One example is the Ponatahi Ecozone.

In the urban environment, community groups (often called care groups) have also been working together often for many years, also primarily focussed on a particular stream or bush area, driving for environmental restoration and protection. Historically, these groups both in the rural and urban spaces are self-determined and have not been driven by regulatory responsibilities. One example is the Mangatarere Restoration Society.

Recommendation 59

GWRC along with iwi and other partners supports the formation and coordination of catchment communities in both the urban and rural environment to support the achievement of their self-determined objectives.

Recommendation 60

GWRC support and contribute to the continued development of the Wairarapa Catchment Communities/Pukaha to Palliser Project that aims to bring catchment community groups together and "make it easier" for them to achieve desired outcomes for their communities, whether they are environmental, social, cultural or economic outcomes.

Recommendation 61

GWRC support and contribute to the development of a multi-agency delivery platform that will effectively respond and deliver resources effectively and efficiently to the needs of catchment communities. This agency coordinated response will enable communities to make changes ahead of regulation and support innovation.

7.5.2 Compliance and enforcement

Managing compliance of a brand new regime will always be challenging, and in the case of devolved decision-making and managing to limits at a FMU scale, compliance with provisions in the PNRP will also need to be addressed by the community who will need to self-monitor the activities in their sub-catchments. The Committee is confident that this new regime will lead to greater compliance, as communities will feel a sense of moral responsibility and ownership over their local issues.

There are areas where compliance of the existing regime could be improved. The committee note that compliance checking of permitted activities is largely absent. In places where the main management tool is a permitted activity rule there is the potential for poor performance to continue.

Recommendation 62

GWRC writes a compliance plan with the community.

Recommendation 63

GWRC implement good compliance systems e.g. strategic compliance across activities (prioritising compliance on higher risk activities).

7.5.3 Further and continuing investigations

Recommendations around monitoring, accounting and review are included in the over-arching themes section 5.7. In addition to this a number of further investigations will need to be completed in specific areas to better understand effects and/or to establish causality to better inform future decision making.

Recommendation 64

GWRC undertakes a prioritisation exercise to determine further investigations to be completed in the catchment to better understand effects and/or to establish causality to inform future management. The priorities identified in the following recommendation should also be included.

Recommendation 65

The following investigations should be considered a priority:

- Establishing sedimentation rates (plus other information on impact of sediment on lake health) for Lake Onoke, including to establish a relationship between catchment loads and lake health
- Complete further investigation, including via modelling, of sediment loads lost from land use activities, including to identify how loads are changing over time.

7.5.4 External support of mitigation activities

The Committee recognises that the scale of change required by some of these mitigations is significant. Access to external funding, including from central government, is going to be central to supporting these mitigations and should be prioritised e.g. applying for funding as part of the one billion trees programme.

Recommendation 66

GWRC advocates for, and actively seeks out, alternative funding models for mitigation measures in order to promote successful and extensive implementation.

Recommendation 67

Central Government should actively seek and promote external capital investment, such as carbon offsetting programmes, in assisting land owners in extensive uptake of sediment mitigations across the whaitua.

8. Flows and water allocation in the Ruamāhanga whaitua

8.1 Background – key issues and drivers

We value our fresh water in many different ways, whether it is the water's life supporting capacity, recreational values or the economic value water brings to the region. How we manage and use fresh water to provide for the range of values is a challenge.

Fresh water within a watercourse provides the life supporting capacity for the natural ecosystems that live in and around a watercourse, whether it be invertebrates, plant life or fish species.

Fresh water also has a multitude of uses outside the watercourse including for drinking water, irrigation, industrial use and household use for bathing and washing. Many of these uses are not only a necessity for life, but also enable the economic prosperity of the region.

The community also values water within a watercourse for recreational purposes such as swimming, fishing, wading and boating.

The Committee is mindful of the huge range of values that fresh water holds in the Ruamāhanga whaitua and has set a range of objectives (described in the Freshwater management units and objectives chapter) to provide for those values. The Committee also recognises that the achievement of the freshwater objectives is dependent on the health of a river being addressed as a whole, and consequently the need to integrate policy tools for river management and managing discharges and land use together with water allocation policies.

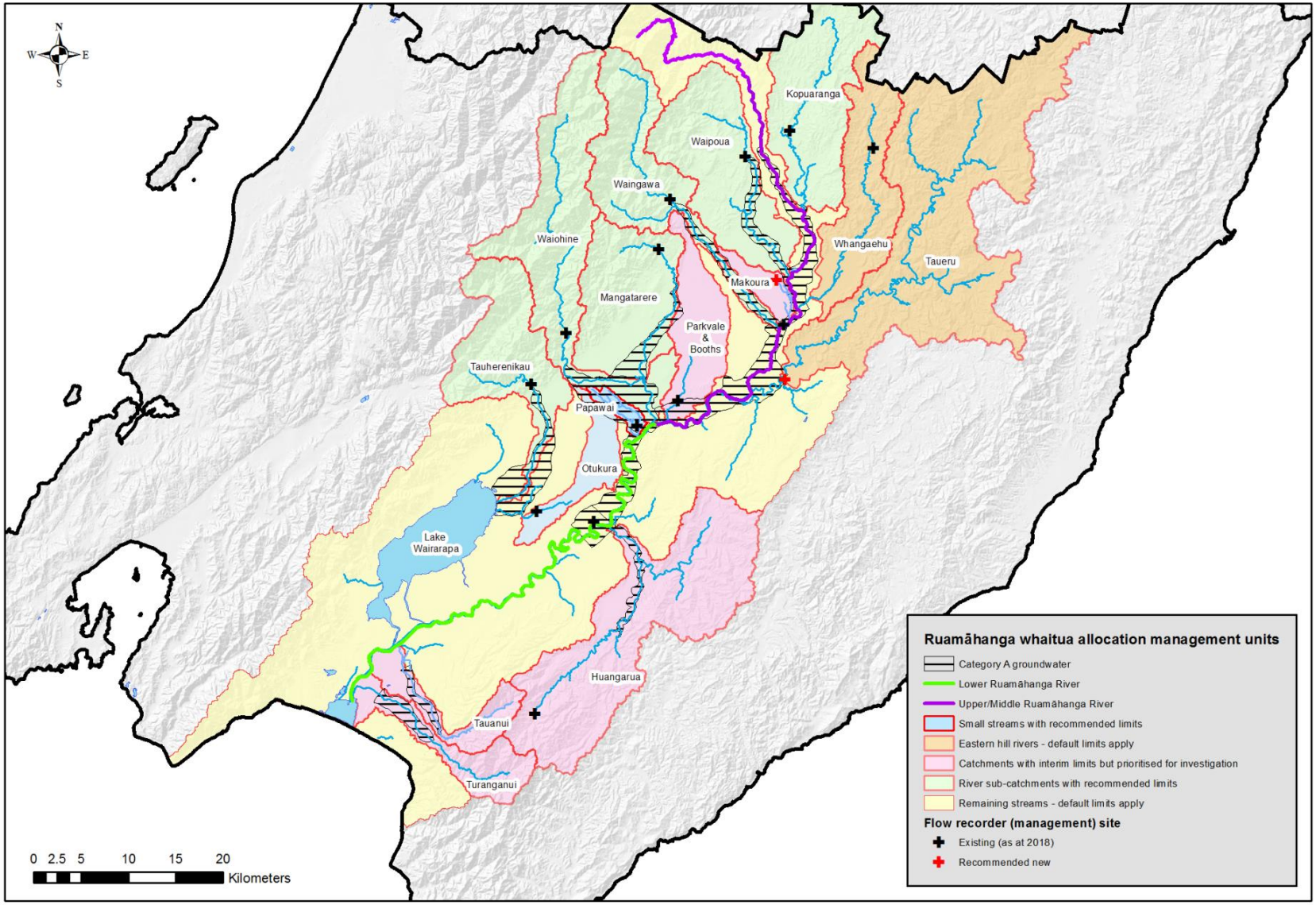
8.2 Water quantity management units

The water quantity freshwater management units for surface water differ slightly to the FMUs for water quality described in chapter 4. The main reason for the differences is to account for Category A groundwater resources as part of the surface water management unit.

For groundwater, the PNRP defines allocation limits for catchment management units and catchment management sub-units. The catchment management units and sub-units are the equivalent of groundwater water management units required under the NPS-FM. The Committee is not recommending any changes to the groundwater units described in the PNRP.

Maps of water allocation freshwater management units for surface water and Category A groundwater are shown in Figure 4.

Figure 4: Map of Ruamāhanga water allocation freshwater management units



8.3 Policy approach to achieving water quantity limits

The NPS-FM requires allocation limits and minimum flows (or minimum water levels) to be set for freshwater management units. The limits need to be set in order to meet the freshwater objectives. The PNRP already sets allocation amounts and minimum flow levels for the rivers, streams and groundwater in the Ruamāhanga whaitua. The Committee considers the existing framework for water allocation in the PNRP is largely appropriate, but where they see the need for change recommendations have been made.

The Committee has reviewed the limits set in the PNRP for each water quantity management unit to ensure they are set at a level to provide for the values and objectives they have identified. The allocation limits and minimum flows that the Committee have recommended have been based on ecological values, but recognise that in providing for ecological values many other values such as cultural and recreational are also provided for.

The Committee considers there are other measures in addition to allocation limits and minimum flows such as efficient use, good management practices and storage that are required in order to maximise the use of water available in the Ruamāhanga whaitua. Ensuring these measures are implemented also builds the communities resilience to the pressures of a drying climate and reducing flows under climate change. As discussed in previous sections, the Committee is of the view that the whole community within the Ruamāhanga whaitua, whether urban, industrial or rural will need to work together and each do their part to ensure water is used in an efficient and effective manner.

8.3.1 Equity and good practice

Water is used by all sectors of the community whether it is for the basic necessities of life, watering a garden or irrigating a crop. The Committee is of the view that every water user must do their bit to use water efficiently, especially during times of low flow, and it not be left to one sector of the community to make all the efficiency gains. See recommendation 10 in section 5.6.

8.3.2 New water – attenuation, storage and harvesting

It is vital that we make better use of available water resource as we enter an era of increasing shortage under climate change. The Committee sees that a combination of tools such as improved efficiency together with future storage and attenuation options will improve reliability of supply and increase resilience for the community.

As discussed in previous sections, the Committee supports an integrated, catchment-wide approach to managing the water bodies of the Ruamāhanga whaitua. Attenuation of water in soils, wetlands, lakes and groundwater not only assists with improving reliability of supply during the dryer months, but also enhances river or stream base flow and the quality of habitat and ecology across the whaitua.

As an example, a high level analysis of managed aquifer recharge (MAR) mechanisms indicated that MAR is potentially a feasible management option from a geological and hydrological perspective.[19]

[19] http://www.gw.govt.nz/assets/Managed-Aquifer-Recharge-Exploration-Scenario-Modelling-Summary-Paper-27-July-2017.pdf

This analysis showed how water could be infiltrated into shallow aquifers in parts of the whaitua without causing significant ponding.

Water storage and harvesting can occur at a range of scales, from a large centralised storage facility to on-farm storage or individual household rainwater tanks. While these forms of storage increase the reliability of supply, they are unlikely to provide other instream benefits such as habitat improvement.

The Committee has clearly stated that no single mechanism (attenuation, storage or harvesting) will provide the sole solution to improve the reliability of water supply across the Ruamāhanga whaitua. Multiple mechanisms and opportunities will need to be pursued. The Committee therefore wants to ensure a variety of attenuation, water storage and harvesting options (and efficiency measures) are enabled in order to improve resilience and the reliability of supply.

The Committee recognises that their recommendations to increase minimum flows in certain rivers and further restrict Category A groundwater takes (see section 8.4), reduces the reliability of water supply for those particular users. It is therefore vital that the community works together to explore the options available.

The PNRP contains polices (Policy P11 and Policy P120) on water storage. The Committee considers these policies together with the recommendations below provide the necessary support for a variety of attenuation and storage options that can help improve reliability and resilience.

Recommendation 68

To improve water supply reliability the Ruamāhanga whaitua integrated land and water management system should:

- Integrate multiple management options for water retention, including attenuation, storage and harvesting at a range of scales, and efficient use over the long and short term, rather than dependency on any one mechanism, and
- Actively promote attenuation of water in soils, wetlands, lakes and groundwater systems across the catchment, and
- Ensure an equitable approach to improved water storage and water use efficiency by both rural and urban users.

Recommendation 69

The PNRP includes a policy that recognises the importance of the role of attenuation of water in soils, wetlands and lakes and their riparian margins in the whaitua to support groundwater recharge and wetland restoration and help build resilience in communities.

Recommendation 70

The PNRP includes a policy that recognises the benefits of multiple mechanisms (such as storage, harvesting, attenuation, aquifer recharge) that increase resilience and the reliability of supply of water.

Recommendation 71

The PNRP includes a policy or amends existing policy to provide for circumstances where water may be taken at higher flows for purposes wider than storage e.g. aquifer recharge.

Recommendation 72

GWRC further investigate integrated solutions to water reliability. This should include integrating storage, harvesting, attenuation and managed aquifer recharge, and consider pilot projects to prove feasibility.

8.3.3 Efficient use

Efficient use of water refers to the quantity of water being used. It is the actions of the individual or organisation using water that are important. Efficient use includes not wasting, applying at the right time, using efficient technologies and changing uses to generate a higher return for a similar or lesser amount. Efficient water use relates to the performance of the water use system.

Present management of water use already includes efficiency measures in the PNRP, but there are significant benefits in becoming more efficient. In fully allocated catchments, using water more efficiently means water can be freed up and made available to users who would otherwise have no access. Being able to free up water is the reason why efficient use is so important and is now specifically directed by NPS-FM.

Under the PNRP, surface water in the Ruamāhanga whaitua and 8 of 14 groundwater management units are now fully allocated. The Committee is therefore keen to ensure all water is used efficiently in order to maximise the use of the resource available and potentially 'free up' water for new users.

The main consumptive users of water in the Ruamāhanga whaitua are group and community water supplies, irrigation and water races. The Committee considers that efficiencies can be made by each of these groups.

Recommendation 73

Require users of water to manage their take and use in a more equitable manner and to ensure good management practice, including to:

- Seek efficiency gains when consents are renewed across all water use activities, and
- Promote small-scale storage on urban and rural properties in order to increase resilience and to encourage everyone to take part in improving water use efficiency, and
- Require takes from directly connected groundwater to reduce and cease at times of low flows in rivers in the same way that surface water takes are managed, and
- Require community supply takes to do more to reduce take at minimum flows, while protecting the ability to take water for people's domestic needs, and
- Reduce water races takes at minimum flows to only that water required to provide for people's domestic needs and stock drinking needs.

8.4 Water take limits – minimum flows and allocation amounts

Policy B1 of the NPS-FM requires minimum flows and allocation limits to be set to give effect to the objectives in the NPS-FM.

FMUs (for water allocation) were split into two main groups for the review of minimum flows and allocation limits by the Committee. One group contained the larger, faster flowing gravel-bed rivers including the main stem of the Ruamāhanga itself. The other group contained the smaller valley floor streams and rivers rising in the eastern hills. The smaller valley streams are discussed in section 8.4.10 below.

For the group of gravel-bed rivers, the minimum flow assessment focused on ecological values, and especially the amount of physical habitat available to fish at low flows. In these types of rivers it is considered more likely that habitat space becomes a limiting factor for some fish communities before other factors such as water temperature increases and oxygen level depletion.

To provide for ecological values and to better protect rivers from the pressure of climate change that will, over time, drive drier summers and lower flows in rivers, the Committee looked at the minimum flows currently set in the PNRP for the rivers and streams in the Ruamāhanga whaitua.

In order to determine the level of habitat protection the minimum flow should provide, the Committee considered a range of species of fish (both native species and trout) found in the Ruamāhanga whaitua and their habitat requirements. The Committee selected the panoko

(torrentfish) as an appropriate measure as panoko are found widely throughout the Ruamāhanga whaitua and are a species with relatively high flow demands. A minimum of 90% of the habitat available at the natural mean annual low flow (MALF) was selected to be an appropriate level of protection; at this level there is high confidence that physical habitat will not be a limiting factor for existing fish populations. Torrentfish flow demands and habitat preferences are similar to those of adult trout. Therefore, trout are well catered for by the objectives set for torrentfish.

Most of the minimum flows set in Table 7.1 of the PNRP are applied in such a way that they are close to or already achieve the desired level of protection for the rivers and streams in the Ruamāhanga whaitua. Where significant changes in the minimum flows are required in order to meet the objectives, the Committee want to ensure water users have time to adapt and prepare for the change and have therefore recommended the changes occur over time.

The Committee recognises that raising the minimum flows reduces the reliability of water for users during the dryer months resulting in economic impacts for those users, particular if water users do not make any changes to how they operate. The Committee wants to encourage and see innovation developed and shared by water users and communities.

The Committee is recommending changes to seven major water quantity FMUs (Kopuaranga, Waingawa, Upper/Middle Ruamāhanga, Mangatarere, Waiohine, Tauherenikau and lower Ruamāhanga) – these recommendations are outlined below. The existing consented allocation amounts discussed in the paragraphs below are based on consents granted as at June 2018.

A summary of all recommended minimum flows for the major water quantity FMUs and how these will inform the way different takes (i.e. surface water, Category A, community supply and water races) are restricted and/or must cease at these flows, is shown in Table 10 in the appendix (section 10.4).

8.4.1 Kopuaranga River

The existing minimum flow in the Kopuaranga River (270 L/s) almost provides for the level of fish habitat protection (90% habitat available at MALF) the Committee are seeking. Combined with the PNRP allocation limit (180 L/s), this minimum flow is likely to result in only marginal changes to key indicators of low to mid flow regime (i.e. increase in duration of low flows and reduction in median flows). However, a small increase to the minimum flow of 10 L/s to 280 L/s was seen as desirable to more fully meet the 90% habitat objective. In-stream benefits of this small change alone are unlikely to be substantial; correspondingly the impact on reliability for existing users is unlikely to be significant.

The Committee supports recommending capping allocation amounts at the existing consented use (150 L/s). The apparent headroom in water availability in this catchment (30 L/s) under the PNRP regime is almost all taken up by existing permitted activities (estimated to be about 20 L/s). The Committee felt that when the level of permitted activity use is taken into account, no further consented use can reasonably be justified. Together this cap on allocation amount and the tightening of minimum flow is considered appropriate to afford the river with a greater level of future resilience (including under a drying climate).

Recommendation 74

For the Kopuaranga River:

1. Increase the minimum flow from 270 L/s to 280 L/s, and
2. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 150 L/s)

8.4.2 Waipoua River

The existing minimum flow (250 L/s) for the Waipoua River provides for a relatively low level of fish habitat protection (about 70% habitat available at MALF) compared with other rivers. The Committee preference is to increase the minimum flow to 340 L/s, a level at which 90% of habitat is protected and the risk of adverse instream impacts is reduced.

Supporting the recommendation to increase the minimum flow on the grounds of habitat protection is a Committee wish to treat the Waipoua as a 'model river' for urban and rural good management practice. It is a river with high visibility and value to a broad cross section of the Wairarapa community. It is also characterised by very low summer flows (drying reaches in some places), warm water temperatures, poor water quality at times (including toxic algae blooms) and a degradation of recreational opportunities (e.g. Tanks Pool). While minor flow augmentation by way of increasing the minimum flow will not solve these issues, small gains in the amount of water held in the channel at low flows is considered an important part of the overall package to improve the river condition. Furthermore, the Waipoua River is expected to experience more severe summer flow recessions in a warming climate and the increased minimum flow will provide some additional counter measure to this (by at least reducing the extent to which abstractions exacerbate low flows).

Similarly to the Kopuaranga River, the Committee wishes to cap allocation in the Waipoua River at existing consented use (116 L/s) rather than allow the additional 29 L/s that is potentially available under the PNRP to be taken up. This provides for a better level of risk management of the river coming under pressure from a drying climate. Further, permitted activity use is estimated to be about 10 L/s and almost fully accounts for the available headroom in allocation, meaning no further consented use can reasonably be justified.

The number of existing consent holders (nine) affected by an increase in minimum flow in the Waipoua catchment is relatively modest. However, the reduction in reliability of supply for these individuals may be significant. With this in mind, the Committee is recommending that the change to minimum flow be brought in progressively over time rather than taking immediate effect.

Recommendation 75

For the Waipoua River:

1. Increase the minimum flow from 250 L/s to 340 L/s over time as follows:
   a. 5 years after plan change (or in 2024) increase the minimum flow to 300 L/s
   b. 10 years after plan (or in 2029) increase the minimum flow to 340 L/s

   and,
2. Retain the current step down level at which takes shall reduce at 300L/s until the first minimum flow increase in 1 above occurs, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 116 L/s)

8.4.3 Waingawa River

Allocation from the Waingawa River is relatively high compared to other rivers in the whaitua. About two thirds of the water being taken is for town supply (Masterton) and the Taratahi water race. A proportion of these large takes continues below minimum flows in order to provide water for domestic and stock drinking needs. Several minimum flow thresholds are described in the PNRP (1900 L/s, 1700 L/s and 1100 L/s)[20] to ensure all other types of takes in the catchment are progressively reduced as river flow drops.

The Committee wish to retain the existing PNRP the step down level of 1900 L/s and the minimum flow for all uses at 1700 L/s. These are considered to represent an appropriate balance between giving effect to the 90% habitat protection objective while maintaining existing reliability of supply for users.

The Committee considers the PNRP minimum flow (1100 L/s) should be removed. Using the 1100 L/s minimum flow to manage takes would let flows fall well below the habitat objective threshold. The Committee consider that all reasonable efforts to reduce takes in the catchment should have been made before this flow is reached. Further, the 1100 L/s threshold is currently used to manage only two existing consents (Masterton municipal supply and the Taratahi water race); restrictions and cease takes are implemented at the higher thresholds in all other consents. Therefore the Committee recommendations effectively formalise the status quo minimum flow management levels. At the minimum flow of 1700 L/s, the Masterton municipal supply would be required to reduce the amount of water taken to that required for the health needs of people and water race takes reduce to the amount of water required for domestic use and stock drinking water.

Existing allocation from the catchment (1184 L/s) is above the default allocation amount in the PNRP. The Committee has some concern about the amount of water that continues to be taken below minimum flows from the Waingawa River. These takes are primarily for public supply and water race but also includes Category A groundwater users taking for other purposes. The Committee has noted that the Waingawa River is impacted by a lack of summer flow and loss of

[20] Schedule R of the pNRP

braiding at times across the plain near Masterton. This is further exacerbated by natural losses of the river to groundwater. Rather than reduce the overall amount allocated to existing users, the Committee's recommendation is to ensure that more water is retained in channel during times of water stress. This is to be achieved by increasing restrictions on taking water to just volumes necessary to provide for domestic and stock water needs and includes the requirement that Category A groundwater users taking for other purposes reduce (and cease take in the future) at the same time as surface water takes.

Recommendation 76

For the Waingawa River:

1. Remove the existing PNRP 'lower' minimum flow of 1100 L/s, and
2. Increase the minimum flow to the existing PNRP[21] 'higher' minimum flow of 1700 L/s over 10 years as follows:
   - 5 years after plan change (or in 2024) increase the minimum flow to 1400 L/s for all takes for community and group water supplies and water races, and
   - 10 years after plan change (or in 2029) increase the minimum flow to 1700 L/s for all takes, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 1184 L/s)

8.4.4 Upper/Middle Ruamāhanga River

In the PNRP the Ruamāhanga River is split into three management units; the Upper river is defined as reaches upstream of the confluence with Waingawa River, the Middle river is defined as the reaches between the Waingawa and Waiohine rivers and Lower river is all reaches downstream of the Waiohine confluence to the coastal boundary. Consents in both the Upper and Middle Ruamāhanga in the PNRP are controlled by a single management point 'Ruamāhanga River at Wardells' and a common minimum flow (2,400 L/sec). Discrete allocation limits are set in the PNRP for the Upper and Middle Ruamāhanga units, but the limits are very similar, as are existing levels of allocation.

Given the similarity between the Upper and Middle Ruamāhanga units in terms of both river characteristics and management practice, they were considered as a single unit (called the Upper/Middle Ruamāhanga) during the review of the allocation regime.

The existing minimum flow (2400 L/s) for the Upper/Middle Ruamāhanga River reach provides for a relatively low level of fish habitat protection (about 70% habitat available at MALF) compared with other rivers. The Committee's preference is to increase the minimum flow to 3250 L/s, a level at which 90% of habitat is protected and the risk of adverse instream impacts is reduced.

Supporting the recommendation to increase the minimum flow on the grounds of habitat protection is recognition that the Ruamāhanga River is highly valued by a broad cross section of the Wairarapa

[21] Schedule R of the pNRP

community and that currently some values are considerably compromised at times of low flow. In particular, recreational opportunities (e.g. swimming) and cultural values have been degraded. Minor flow augmentation by way of increasing the minimum flow may not solve these issues but gains in the amount of water held in the channel at low flows is considered an important part of the overall package to improve the river's health. Furthermore, the Ruamāhanga River is expected to experience more severe summer flow recessions in a warming climate and the increased minimum flow will provide some additional counter measure to this (by at least reducing the extent to which abstractions exacerbate low flows).

The Committee recommends capping allocation at existing consented use (1910 L/s) rather than allowing the additional 530 L/s that is potentially available under the PNRP to be taken up. Further allocation beyond current consented use is incompatible with the Committee's view on the existing condition of the river and extent to which some values have already been eroded. Furthermore, the PNRP allocation amount is over generous when viewed in the context of likely natural flow reductions under climate change.

The Upper/Middle Ruamāhanga River reach is recognised as a very important source of water for a substantial number of existing consent holders (about 60). These users will all be affected by an increase in minimum flow. The reduction in reliability of supply for these individuals may be significant. The economic consequences of increasing the minimum flow have been considered by the Committee and with this in mind they recommended that the change to minimum flow be brought in progressively over time rather than taking immediate effect.

Recommendation 77

Combine the Upper Ruamāhanga and Middle Ruamāhanga catchment management units in PNRP to a single water quantity freshwater management unit.

Recommendation 78

For the Upper/Middle Ruamāhanga catchment:

1. Increase the minimum flow level from 2400 L/s to 3250 L/s over time as follows:
   - No change for 10 years
   - 10 years after plan change (or in 2029) increase to 2700L/s
   - 15 years after plan change (or in 2034) increase to 2970 L/s
   - 20 years after plan change (or in 2039) increase to 3250 L/s

   and,
2. Retain the current step down level at which takes shall reduce at 2700L/s until the first minimum flow increase in 1 above occurs, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 1910 L/s)

8.4.5 Mangatarere Stream

The Mangatarere Stream is split into an upper and lower catchment for the purposes of allocating water. The existing minimum flows for both parts of the stream are set well above MALF (240 L/s in the upper catchment and 200 L/s in the lower) in the PNRP. These flows provide for a level of fish habitat protection that is more protective than other rivers in the whaitua. The Committee habitat objective is already met by these minimum flows and no justification was seen for increasing the minimum flows further, especially given the relatively low reliability of supply water users already experience in this catchment.

The Mangatarere Stream is highly allocated, with existing consented use of 465 L/s equating to significantly more than the MALF at the bottom of the catchment. The stream is also known to suffer from poor water quality and ecological health at times. The highly protective minimum flows are intended to offset to some extent the worst impacts of the high level of allocation. The Committee considered that a reduction of the minimum flows could therefore only be considered if allocation was significantly reduced.

While the high level of allocation and poor water quality of the catchment is recognised, there is no clear pointer to the size of reduction in allocation that would be required to see meaningful improvement in the stream. Reduction to the PNRP default amount (110 L/s) would have a very significant impact on existing users. For these reasons the Committee preference is to keep the default allocation amount in the PNRP and as resource consents are renewed, the efficiency and unused water policies of the PNRP are applied, the amount of water allocated to users in the Mangatarere catchment will reduce.

It is expected that some mitigation of the impacts of high allocation may be achieved by requiring Category A groundwater takes to cease at minimum flow. Category A groundwater takes collectively account for about 95 L/s and retaining this flow in the stream during the lowest flow periods is considered an important part of the recommended policy package for this catchment. Furthermore, other parts of the policy package such as supporting the Mangatarere Restoration Society efforts and strengthening restrictions at low flows on town supply and the Carrington water race are also seen as preferable to reducing allocation amount by the Committee.

8.4.6 Waiohine River

Like the Waingawa River, the Waiohine River supports large town supply and water race takes. A proportion of these large takes continues below the minimum flows in order to provide water for domestic and stock drinking needs. Two minimum flow thresholds are prescribed in the PNRP (3040 L/s and 2300 L/s) to ensure takes for other purposes are progressively reduced as river flow drops.

The Committee wish to retain the higher minimum flow of 3040 L/s. The Committee considers this threshold represents an appropriate balance between giving effect to the habitat objective while largely maintaining existing reliability of supply for users. However, it is recommended that the lower PNRP minimum flow (2300 L/s) is removed. This minimum flow is well below that which would provide for the habitat objective (2990 L/s). The Committee consider that all reasonable efforts to reduce takes in the catchment should have been made before 2300 L/s is reached.

Currently the 2300 L/s threshold is used to manage the town supply and water race takes, with some amount of reduction in take required at this flow. Other than these takes, the Committee

recommends the PNRP minimum flow. The Committee recommends that town supply and water race takes should further reduce their takes from current levels at the 3040 L/s minimum flow to just those volumes necessary for the health needs of people and stock drinking needs.

Total existing allocation from the catchment (950 L/s) is moderate but below the default allocation amount in the PNRP (1590 L/s). The Committee view the PNRP allocation amount as too generous and recommend capping allocation at the existing level of use. The reasoning for this is similar to the other rivers in which there is potentially some allocation headroom on paper; further allocation would be incompatible with the Committee's view that more resilience needs to be built into the river management regime to counteract the likely future impacts of climate change. Furthermore, the Waiohine River is high value waterway, especially for recreation and water quality, and the Committee do not want to accept the risk that further allocation may erode these values.

Recommendation 79

For the Waiohine River:

1. Remove the existing PNRP 'lower' minimum flow of 2300 L/s, and
2. Retain the 'higher' minimum flow level of 3040 L/s, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 950 L/s).

8.4.7 Tauherenikau River

Two minimum flow thresholds are given in the PNRP (1300 L/s and 1100 L/s)[22] to ensure takes from the Tauherenikau River catchment are progressively reduced as flows drop.

The Committee wish to retain the 1300 L/s minimum flow level as this is considered to represent an appropriate balance between giving effect to the habitat objective while largely maintaining existing reliability of supply for users. However, it is recommended that the lower PNRP minimum flow (1100 L/s) is removed. This flow would be below the 90% habitat objective threshold for this river (1200 L/s). The Committee consider that all reasonable efforts to reduce takes in the catchment should have been made before 1100 L/s is reached. As only one existing resource consent uses the 1100 L/s flow, this recommended change is minor – all other consents are required to cease at 1300 L/s. The reason the minimum flow is recommended to be above the 90% habitat objective (by 200L/s) is to recognise that a significant take, the Longwood water race, will continue to occur below the minimum flow.

Total existing allocation from the catchment (234 L/s) is moderate but below the default allocation amount in the PNRP (410 L/s). However, the Committee view the PNRP allocation amount as not protective of reducing low flows in a drying climate and recommend capping allocation at the existing level of use. The reasoning for this is similar to the other rivers where there is potentially some allocation headroom on paper; further allocation would be incompatible with the Committee's view that more resilience needs to be built into the river management regime to counteract the likely future impacts of climate change.

[22] Schedule R of the PNRP

Recommendation 80

For the Tauherenikau River:

1. Remove the existing 'lower' PNRP minimum flow of 1100L/s, and
2. Retain the existing 'higher' PNRP minimum flow of 1300 L/s, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 234 L/s).

8.4.8 Lower Ruamāhanga

The existing minimum flow (8500 L/s) in the Lower Ruamāhanga reach (which extends from the Waiohine River confluence to the Lake Wairarapa outlet) looks at first glance to provide a relatively low level of fish habitat protection (just under 70% habitat available at MALF) compared with other rivers. However, recent flow/habitat calculations by the Cawthron Institute have shown that this minimum flow is still meeting the 90% fish habitat objective set by the Committee. This is because the morphology of the Ruamāhanga River in the lower reaches is quite different to the upper reaches and tributary rivers, having more runs and pools than riffles. This difference in morphology means lower flows can still support a good amount of fish habitat. Therefore the Committee is not recommending any changes to the existing minimum flow.

Allocation from the Lower Ruamāhanga River reach is high (1883 L/s) as a proportion of low flow and higher than the PNRP default amount (1475 L/s[23]). The Lower Ruamāhanga River is unusual in the whaitua in that the overall impact of abstractions on this reach is determined more by the ratio of total upstream allocation with river flow than by the takes specifically within its length. When a comparison of overall catchment takes is made, existing allocation is close to the PNRP allocation amount for the full river catchment.

The Committee considered what changes to allocation amounts may be necessary in the Lower Ruamāhanga. The difference between the PNRP allocation amount and existing use is in the order of 400 L/s. There is no clear evidence to suggest an adjustment to the allocation from the lower river reaches will result in meaningful benefits. This is especially so because most of the allocation in this zone occurs in the bottom half (below Waihenga) where the form of the river comprises connected runs and pools, even at low flows. The Committee's preference is to achieve improvements in overall river condition in the lower reaches through the cumulative effect of all policy implementation in the catchment, rather than shifting the allocation amount.

Recommendation 81

For the Lower Ruamāhanga catchment, retain the existing PNRP minimum flow and allocation amounts.

[23] The default allocation for the Lower Ruamāhanga (1475 L/s) in the pNRP is likely to change due to the movement of the Category A/B groundwater boundary in the Lower Ruamāhanga groundwater zone

8.4.9 Category A takes across the Ruamāhanga Whaitua

Category A groundwater takes are considered to be those groundwater takes that have a direct connection to the nearby river or stream, i.e. pumping from the bore has an effect on the nearby river, stream or lake. The Committee considers that allowing Category A groundwater users to continue to take water and affect the nearby stream when the flows are low does not provide for instream values, nor is it equitable with surface water users who must cease taking at the minimum flows. It also does not meet the objectives of the NPS-FM to avoid any further over allocation of fresh water.

The Committee recognises that for Category A groundwater users, a cease take at minimum flows will have a significant impact. For this reason, the Committee is recommending that the cease take does not occur immediately, but after a period of time to allow users to adapt, use innovation and prepare for the change.

The Committee is also aware of the discontent of some Category A users, who consider their groundwater take is not directly connected to the nearby river or stream. To ensure the cease take provisions only apply to those Category A groundwater users where there is a direct connection, the Committee is recommending GWRC undertake further investigations to ensure those groundwater takes classified as Category A do have a direct connection with a nearby river, stream or lake.

Recommendation 82

In 10 years' time (or in 2029) those takes classified as Category A groundwater must cease their take when the nearby river or stream reaches its minimum flow.

Recommendation 83

GWRC undertakes further investigations to ensure those groundwater takes classified as Category A do have a direct connection with a nearby river, stream or lake.

8.4.10 Small streams

Under the provisions of the PNRP many of the smaller streams and rivers have been incorporated within the larger parent catchment and therefore the minimum flow and allocation amount for the parent catchment apply to the smaller stream or river. For example the Huangarua River is included within the Lower Ruamāhanga and subject to the minimum flows and allocation amounts for the Lower Ruamāhanga. The Committee consider that in some cases, the minimum flow for the parent catchment does not provide adequate protection for the smaller rivers and streams as the correlation of when low flows occur in the parent catchment may not be reflected in the tributary. The Committee therefore recommends that investigations are undertaken to determine the specific minimum flow requirements and allocation limits for smaller streams and river where particular pressures are occurring.

The Committee also recommends separating tributaries of the Ruamāhanga River in the Eastern hills rivers, Eastern hills streams and Valley floor streams FMUs from the minimum flow and allocation limits set for the Lower Ruamāhanga River.

Recommendation 84

GWRC undertake targeted investigations in the Parkvale Stream, Booths Creek, Makoura Stream, Kuripuni Stream, Tauanui and Turanganui Rivers to determine the specific minimum flow requirements and allocation limits for each river or stream, within three years of the plan notification or by 2022.

In the interim set the following minimum flows and allocation limits:

1. For Parkvale Stream and Booths Creek, retain the current allocation limits and minimum flows in the PNRP, and
2. For Makoura and Kuripuni streams, separate from the Upper Ruamāhanga limits currently in the PNRP and set allocation limits at current consented allocation and minimum flow at 100L/s based on the management point Colombo Road on the Makoura Stream, and
3. For the Tauanui River, separate from Lower Ruamāhanga limits currently in the PNRP, and set an allocation limit at current consented allocation and minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (correlations indicate this represents 90% of MALF in the Tauanui and Turanganui), and
4. For the Turanganui River, set allocation limit at current consented allocation (number to be confirmed) and set minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (correlations indicate this represents 90% of MALF in the Tauanui and Turanganui), and
5. Separate out the Huangarua River from Lower Ruamāhanga PNRP limits (upstream of the Ruamāhanga River confluence), retain existing PNRP allocation of 110 L/s and set minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (headwaters of the Huangarua River).

Recommendation 85

Set minimum flows and allocation amounts in the PNRP for small streams and rivers in the Ruamāhanga whaitua as follows:

1. Retain current allocation limits and minimum flows in the PNRP for the Papawai and Otukura streams, and
2. Separate out the Makahakaha Stream from Middle Ruamāhanga PNRP limits (upstream of Ruamāhanga Category A groundwater boundary) and set allocation limit at current allocation (number to be confirmed) and a minimum flow at 90% of MALF, and
3. Separate out the Taueru River (upstream of the Kourarau Stream confluence) from Middle Ruamāhanga PNRP limits, and set allocation at current consented allocation (number to be confirmed) and minimum flow at 65 L/s at upstream confluence, and
4. Separate out the Whangaehu River from Upper Ruamāhanga PNRP limits (upstream of the Poterau Stream confluence), and set allocation at current consented allocation (number to be confirmed) and the minimum flow at 18 L/s at Whangaehu River at Waihi management site, and

5. For the streams and their tributaries that drain directly to Lake Wairarapa or the South Coast, retain existing default provisions in the PNRP (90% MALF minimum flow, 30% MALF allocation limit), and
6. For all other tributary streams of the main stem Ruamāhanga River that are not listed elsewhere (primarily in the Eastern Hills, Valley floor streams FMUs) separate from the Lower Ruamāhanga PNRP limit, and set default allocation limits of 30% MALF and default minimum flows of 90% MALF.

8.4.11 Groundwater allocation

The Committee considers the groundwater allocation limits in the Ruamāhanga whaitua in the PNRP are set at an appropriate level to ensure the objectives are met. The Committee has expressed a need to have more robust groundwater monitoring information available in order to be better able to assess groundwater consent applications and the health of groundwater resources. Where there is limited information available on a groundwater resource the Committee recommends a precautionary approach is taken when assessing and issuing resource consents to use that resource.

Recommendation 86

GWRC establishes fit for purpose information about the size and nature of groundwater resources, particularly in the Pirinoa Terraces, Parkvale, Waiohine and Waingawa parts of the whaitua.

Recommendation 87

The PRNP includes a policy to ensure a precautionary approach is taken to the issuing of resource consents for groundwater takes where information on the nature of the resource is limited.

8.5 Implementation of water quantity limits package

8.5.1 New minimum flow requirements

To ensure the changes to minimum flows are effective, the Committee wishes to see the new minimum flow requirements reflected in the resource consents issued to take water. For consents that are expiring in the short term, the new minimum flow requirements can be incorporated as part of the consent renewal process. However, for consents that have recently been issued, or that have a long duration, the Committee felt it was important that these consents also were subject to the new minimum flow requirements.

Recommendation 88

GWRC implements the new minimum flow levels in resource consents for the Ruamāhanga whaitua by the following methods:

Implementing minimum flow levels in resource consents		
New Consents	**Existing consents**	
	Expire within 5 years of Whaitua plan change	**Expire more than 5 years after Whaitua plan change**
At consent application	At consent renewal	At consent review, 5 years after Whaitua plan change

Recommendation 89

GWRC uses the review of resource consent conditions (RMA s.129) and water shortage directions (RMA s.329) especially where adverse effects are occurring. This includes recognising that when adverse effects are occurring in a particular river or stream, water shortage directions may be issued to further restrict both consented and permitted water use.

8.5.2 Permitted activities

Permitted activities do not require resource consent for the activity to take place, provided the activity complies with any conditions specified for the permitted activity. Water users are able to take water for reasonable domestic use and animal drinking water without requiring resource consent provided the taking or use does not, or is not likely to, have an adverse effect on the environment[24]. The Committee felt that the current provisions of the PNRP do not provide certainty for users that water is available for reasonable domestic use and animal drinking water, nor does it provide guidance as to help define or quantify reasonable domestic use or animal drinking water needs.

Recommendation 90

Amend permitted activity rule or introduce new permitted activity rule in the PRNP to ensure users have certainty that water can be taken for reasonable domestic use and animal drinking water (provided the taking does not, or is not likely to, have adverse effects on the environment).

Recommendation 91

Identify in policy using narrative and (possibly) numbers (unit/volume/day) the meaning of domestic and stock water use, e.g.:

- Water for an individual's reasonable domestic needs is the amount sufficient to provide for hygiene, sanitary and domestic requirements.
- Water for the reasonable needs of a person's animals for drinking water is the amount sufficient to provide for the animals' health and welfare.

[24] Resource Management Act 1991 Section 14(3)(b)

In addition to reasonable domestic and animal drinking water uses, the PNRP allows water users to take an additional 20 m^3/day other uses. The Committee considers a volume of 20m^3/day is hard to justify where, in the Ruamāhanga whaitua, most catchments are at, or in some cases, above full allocation. To ensure the requirements of the NPS-FM are met and allocation limits are not exceeded, the Committee recommends reducing the amount of water available under the permitted activity rule and ceasing the takes at minimum flows.

Modelling information was used to help quantify the use of water allowed by the RMA and permitted activities in the Ruamāhanga whaitua. To comply with the requirements of the NPS-FM and account for all water used, the Committee felt it was necessary to have better information available on the use of water, particularly with regard to permitted activity and stock and domestic use.

Recommendation 92

Amend relevant permitted activity[25] rule in the PNRP to:

- limit take to 5m^3/day for surface and groundwater takes, regardless of property size
- ensure the water allowed under this permitted activity excludes use for which a person has resource consent i.e. a take under the PA cannot be used to provide an extra 5m3of water for irrigation, if a person has a consent for irrigation
- cease permitted take at minimum flows
- retain the ability for GWRC to require metering
- ensure users have the ability to use water under this rule **in addition** to water available under Recommendation 16

Recommendation 93

GWRC collects better information on water take and use volumes, including for permitted activity takes, in order to provide for more transparent accounting of water use and better management into the future and to ensure the requirements of the NPS-FM are met. Methods to obtain information on permitted activities could include surveys, modelling and metering of takes where adverse effects are observed or in areas of high demand.

In order to create more resilient communities, the Committee considered that the promotion of rain water takes was an important option. The use of rainwater tanks, where a reticulated public supply is not an option for a household, reduces the number of takes that occur from a surface water body or a groundwater resource. In areas where there is reticulated water supply rainwater tanks can be used for garden irrigation and in some cases, non-potable supply to households. This reduces demand on the public supply and the need to treat water to drinking water standard for uses that do not require such a high standard.

[25] Rule R136 of the proposed Natural Resources Plan

Another way of increasing the community's resilience is to promote and encourage the efficient use of water within the household. Options for this are discussed further in the section below – Improving efficiency. The NPS-FM also directs regional councils to identify methods in regional plans to encourage the efficient use of water, which includes permitted takes as well as consented takes.

Recommendation 94

Introduce a new rule in the PNRP to provide for the use and diversion of rainwater from a roof to a tank as a permitted activity.

Recommendation 95

In order to help meet minimum flow requirements, the Committee strongly supports the use of rainwater tanks and encourages territorial authorities to require rainwater tanks in new subdivisions to promote the efficient use of water.

The taking of water for farm dairy wash down and milk-cooling water is a permitted activity under the PNRP and allows for 70 litres per head of water to be taken. The permitted activity rule also requires all practicable measures for recycling of uncontaminated water to be implemented. The Committee considers it appropriate for this take to continue below the minimum flow. However, the Committee wants to ensure that when a river is at or below its minimum flow level, the water taken for dairy shed use is the absolute minimum amount of water required to safely operate the dairy shed.

Recommendation 96

Amend relevant permitted activity rule[26] in the PNRP to ensure that where takes are from surface water bodies, water may be taken below minimum flow levels but it must be reduced to the minimum amount necessary in order to safely operate the dairy shed.

8.5.3 Improving efficiency

Almost all community water supply in the Ruamāhanga whaitua comes from rivers or groundwater directly linked to rivers, so water sources are dependent on rainfall. Such "run-of the river" water supply systems are not particularly resilient to drought especially when the water supplier is relying on a single source of water as in the case of Masterton. Supplementary systems have been put in place for some townships (e.g. Carterton) to ensure adequate water is available in drought conditions but not all towns have such backup. Most have emergency supplies but this may not be enough to ensure that both water supplies and the environment are protected. The Committee considers that greater water storage capacity is a solution that could be looked at in some places. The efficiency and effectiveness of distribution networks in towns can also be improved (water loss from pipes).

The Committee wishes to see a greater awareness by the urban public of where their water comes from and how water can be efficiently and conserved, especially when the flow in the rivers is low.

[26] Rule R137 of the proposed Natural Resources Plan

Recommendation 97

District councils inform and raise awareness of water conservation in their constituencies, such as on their web sites. Information promoting and encouraging water conservation can extend to all sectors of the community such as households, businesses, industry, agriculture and recreational facilities, including reusing greywater.

Recommendation 98

Require group and community water suppliers to provide water conservation plans as part of resource consent applications to take water that include how use will be managed at times of water shortage when restrictions are being placed on other consented water uses (e.g. during summer low flow periods)

Recommendation 99

Support community water supplier moves to manage their networks through metering water users (recognising that some already do so).

Recommendation 100

Support steps by community water suppliers to improve water supply resilience by increasing the number of water sources, including water storage, particularly where a single source is relied on.

Irrigators are adopting more efficient ways of irrigating crops because it is economic to do so. Tools are now available to determine reasonable water use based on daily water balances for a range of crops grown on local soils and in local climates. Irricalc is an appropriate model to determine reasonable water use in the Wairarapa when resource consents are processed but other models are available and have been used successfully. The Committee considers the efficiency criteria for irrigation in the PNRP is set at an appropriate level.

Efficient use of water by irrigators is underpinned by information on how much water is being used and where. RMA regulations require water takes greater than 5 L/sec to be measured and reported. The Committee considers the use of best practice methods for measuring and reporting on water use is essential component of ensuring water is being used efficiently within the whaitua. Best practice methods have been developed by industry (Irrigation New Zealand) through their “Blue tick Accreditation Programme” and should be supported.

Transferring water use from one location to another within the same freshwater management unit can be an efficient way to use water because it provides for increased use of water that has already been allocated. Such transfers mean unused water already allocated can be used where it is most needed. Sharing water is a way of transferring water that is increasing in the Ruamāhanga whaitua. Successful application of transferring water relies on respective users being in the same freshwater management unit (same minimum flows and allocation limits) and having similar or comparable methods for measuring and reporting on their water use. The Committee considers one way of encouraging water transfers is by making the resource consenting process easier for users.

Recommendation 101

Retain the provisions in PNRP requiring an irrigation application efficiency of 80% in demand conditions that occur in nine out of ten years as verified by a field validated model that assesses crop water use, soil water holding capacity, rainfall variability and evapo-transpiration.

Recommendation 102

Reinforce and promote best practice when users are measuring and reporting on their water use - the 'Blue Tick' Accreditation Programme championed by Irrigation NZ is suitable practice for monitoring and reporting on water takes.

Recommendation 103

Explore transferring the taking and use of water (including sharing) from one location to another water with the intention of making it easier for users, including by changing consenting status (e.g. from discretionary to controlled activity).

The Committee considers that to date the efficiency of use of water in Wairarapa water races has not been adequately assessed. Overall there is a lack of information on values and biophysical characteristics of water races to assess their efficiency. Anecdotal estimates suggest only 5% of the water taken from rivers and put into water races is used by surrounding landowners. Much of the remaining water taken is needed to 'drive' and maintain flow throughout the water race. Any hydrological assessment is complicated at many sites where springs and streams flow into or from the water races. Overall, assessing the efficiency of water races is needed for individual water races because of the different influences and physical states of each. The Committee considers that the impacts of water race takes from rivers can be reduced during times of low flow by limiting the use of water from a water race to the health needs of people and animal drinking water.

Recent work on managed aquifer recharge using the Taratahi and Carrington water races (Gyopari 2017) suggests they have a role in recharging aquifers and supporting flows in small streams in the area. The Committee recommends that the way water races are interacting with surrounding groundwater and streams needs to be investigated further when assessing their efficiency.

The Committee also recognises that quality of water deteriorates as it moves down a water race and may impact on the receiving environment. The Committee considers the quality of water being discharge is another important consideration in the assessment and long term management of water races in the Ruamāhanga whaitua.

Recommendation 104

GWRC works with district councils and landowners to collect information and develop long term management of all water races in the Ruamāhanga whaitua.

Recommendation 105

Gather appropriate information and assess it in the order that water races come up for resource consent renewal.

Recommendation 106

Any water race requiring resource consent before appropriate long term management is developed shall get a short term consent until the long term status of the water race is decided. Appropriate information to develop long term management for each water race may include, but is not limited to:

- hydrology of the water race and the interaction with surrounding groundwater and surface water (how much water is in the water race, how much is lost, how much is discharged)
- how much water is used and what is it used for?
- water quality
- social values, ecological values, mana whenua values, heritage values and economic value
- the efficiency of water use and options for increasing efficiency
- the areas of management overlap and opportunities for better integration (regional consents and district bylaws).

9. List of recommendations

Recommendations from Chapter 3: Whaitua implementation and Māori

Recommendation 1

GWRC will:

- Support mana whenua as active partners in the management of the Ruamāhanga whaitua
- Work in partnership with mana whenua to develop a management structure that includes a permanent role for hapū/marae at the FMU level
- Work in partnership with mana whenua to establish and resource a kaitiaki support structure that ensures that Ruamāhanga whaitua hapū and marae are enabled to fully participate in FMU and catchment community planning including;
  - Identification of indicators
  - Monitoring programme
  - Kaitiaki training
  - Development of matāuranga Wairarapa
- Ensure that sufficient funding and dedicated resourcing to enable mana whenua participation is available as soon as the implementation of FMU/FWO framework begins
- Establish operative role for mana whenua, hapū/marae in the management of water quality and quantity and river management activities within the Ruamāhanga whaitua.
- Support hapū and marae to develop their own indicators for each FMU including one for the Ruamāhanga as a whole. This process to start as soon as implementation of FMU/FWO frameworks begins.
- Include hapū/marae indicators in reporting on progress towards meeting FWOs
- Establish and support the process for mana whenua analysis and interpretation of hapū/marae indicators
- Ensure that hapū/marae are informed through multiple channels of any new resource consent applications or renewals of existing consents within their FMU and that their input into the consent process is supported.
- Encourage and work with mana whenua on the development and inclusion of mātauranga Māori innovative regulatory and non-regulatory approaches to achieving improved water quality.
- Include PNRP Schedule B Ngā Taonga Nui A Kiwa which specifies the relationship of Wairarapa mana whenua with Te Awa Tapu o Ruamāhanga within the Ruamāhanga chapter.
- Include PNRP Schedule C sites of significance to Wairarapa mana whenua within the Ruamāhanga whaitua in a specific schedule within the Ruamāhanga Whaitua chapter.

Recommendations from Chapter 4: Freshwater objectives for the Ruamāhanga Whaitua

Recommendation 2

The Ruamāhanga Whaitua chapter of the PNRP includes all the objectives for natural character and habitat, fish and mahinga kai, sediment and the water quality and ecological attributes set out below in sections 4.2.1, 4.2.2 and 4.2.3 and in Appendix 10.3.

Recommendation 3

The PNRP includes a policy that describes how the periphyton objectives in this WIP will be achieved by the following approaches:

- Meeting the in-stream nutrient criteria set out in Table 1, and
- Achieving the nutrient targets for diffuse sources in Table 2 and for point source load reductions in Table 7, and
- Achieving the sediment load reductions in Table 3, and
- Undertaking extensive riparian planting for the purposes of creating suitable shading of streams to reduce temperatures and photosynthetic active radiation, and
- Ensuring any consented in-stream works or activities maintain or restore flushing flows suitable to avoid nuisance periphyton build up.

Recommendation 4

The PNRP includes a policy that describes how the macroinvertebrate community health (MCI) objectives in this WIP will be achieved by the following approaches:

- Meeting the in-stream nutrient criteria set out in Table 1, and
- Achieving the nutrient targets for diffuse sources in Table 2 and for point source load reductions in Table 7, and
- Achieving sediment load reductions in Table 3, and
- Undertaking extensive riparian planting for the purposes of creating suitable habitat for macroinvertebrate community health, including shading to reduce water temperatures, and
- Retaining and improving the natural character of water bodies, such as riffles, pools, runs, and
- Ensuring any consented in-stream works or activities are managed to minimise the release of deposited fine sediment, and
- Progressively reduce the frequency and use of in-stream disturbance activities as part of flood protection, drainage and gravel extraction activities.

Recommendations from Chapter 5: Overarching themes

Recommendation 5

The Ruamāhanga whaitua integrated land and water management system should:

- Seek to be an comprehensive, catchment-wide system that increases ecological and social health and wellbeing as well as improving water use reliability, and
- Create resilience to the pressures of changing weather systems under climate change, and
- Empower communities to identify and implement suitable processes and management options in their sub-catchments in order to contribute to the whaitua-wide approach.

Recommendation 6

In order to see the effective implementation of the whole of the objectives, limits and policy packages described in this WIP, the Committee supports:

- A programme of actions where rural and urban catchments have a collective responsibility to make a change and improve water quality, and
- A mainly non-regulatory approach to staying within discharge limits for diffuse contaminants, and
- An emphasis on the use of integrated planning tools (sub-catchment groups, farm planning tools and user groups), supported by education and incentives, and
- Regulation of point sources, land use controls and water takes, and
- Seeking means for promoting and ensuring continuous improvement and innovation to occur across all sectors and communities, and
- Collecting and making available information on resource use in the whaitua as a way of enabling better decision making at all scales.

Recommendation 7

GWRC, along with iwi and other partners, develop a coherent Freshwater Management Unit Implementation Framework which results in effective and successful managing to limits at an FMU-scale, both within rural and urban environments, to achieve freshwater objectives.

Recommendation 8

GWRC resources the Freshwater Management Unit Implementation Framework sufficiently to support the development of an implementation work programme.

Recommendation 9

Innovation in land and water management practice in the Ruamāhanga whaitua should be encouraged and actively facilitated by GWRC, including by:

- Including a policy in the Ruamāhanga whaitua chapter of the PNRP to be considered in resource consent processes that recognises the value of innovative practice in the achievement of the objectives of the Ruamāhanga whaitua, and
- Avoiding resource consent conditions that would prevent trialling of alternative management approaches where change and future proofing is a known driver, while also recognising the need to mitigate risk, and
- Taking opportunities for on-going plan changes to provide for innovative practice, and
- Actively reviewing the effectiveness of the implementation of GWRC operational activities and planning practices and of the recommendations in this WIP in order to promote continued improvement and learning, and to ease bottlenecks.

- The management processes within GWRC need to reflect the desire to support innovation. This may include internally rewarding 'bright ideas' and establishing/fostering internal practices that support and reward innovation.

Recommendation 10

The Committee recommends that:

- Good management practice (GMP) is emphasised and innovation is fostered as part of every farm plan and by the operational practices of regional and district councils, and
- Industry guidelines are the primary source of GMP guidance, and
- Where there is no industry GMP, sub-catchment groups, communities and farm scale planning will help to develop and build on making GMP specific to the Ruamāhanga whaitua, and
- All sectors should be actively designing and progressively implementing GMP, not just the primary sector, and
- As GWRC cannot implement GMP on its own, partnership with industry, stakeholders and communities is essential, and

- Industry must lead the way developing Ruamāhanga relevant guidelines and persuading members to adopt GMP through tools like accords.

Recommendation 11

The Committee recommends water use efficiency is improved by all water users in the Ruamāhanga whaitua, including by:

- Local councils (as suppliers of water) improve water conservation by residential, commercial and industrial users, establish appropriate demand management strategies during water shortage, improve resilience and reduce demand in issuing of consents for new builds and subdivision, and investigate opportunities for water re-use, and

- Group and community water suppliers appropriately managing demand during water shortages and supporting improved resilience of supply, and
- Irrigation users meet at least 80% efficiency of application and further improvement of practice through recognised programmes, and
- GWRC recognising that exceptions to 80% efficiency of application may be appropriate where the financial return on a less efficient water application can be shown to be high (i.e. the water use is highly economically efficient) or where there is meaningful benefits to the environment of a less efficient water use, effectively offsetting the benefits to being 80% efficient, and
- GWRC and District Councils work together to develop long term plans for management of water races in the Ruamāhanga that meets the objectives of this WIP and provides for the values of the waterbodies and communities, and
- Increasing education opportunities across types of water users.

Recommendation 12

All people of the whaitua need to be involved in efforts to ensure water is used efficiently and with care, and that the burden of change in order to improve water quality should be borne across communities.

Recommendation 13

GWRC establishes, as an urgent priority, and actions a monitoring plan as required by Policy CB1 of the NPS-FM for the monitoring in each FMU.

Recommendation 14

GWRC establishes, as an urgent priority, and operates a freshwater quality accounting system as required by the NPS-FM (Policy CC1). The existing water take accounting system should be upgraded so that it is compatible with the quality system and is accessible to the public and water users. GWRC collects representative farm-scale information on nutrient inputs and losses suitable for the development of FMU-scale freshwater accounting of nutrients and to effectively benchmark property-scale nutrient loss.

Recommendation 15

GWRC develops a suitable monitoring programme(s) to establish in-river sediment loads and/or concentrations, including confirming relationships to sediment loads off land and the effectiveness of mitigations. GWRC requires the progress of actions to mitigate sediment loss, including riparian planting and hill slope erosion practices to be regularly reported.

Recommendation 16

GWRC establishes a data protocol and reporting plan to ensure all aggregated data collected is publically available and provided in a fit for purpose and transparent manner.

Recommendation 17

GWRC supports community monitoring and the wider integration of monitoring results to support FMU outcomes.

Recommendation 18

GWRC undertakes a review of flow monitoring sites in the Ruamāhanga whaitua. Where necessary, to ensure that the network is fit for purpose in implementing this WIP, make changes to the network including the establishment of new sites

Recommendation 19

GWRC establishes a social and economic monitoring and assessment framework with indicators agreed by the community. GWRC includes social and economic monitoring in the monitoring plan for the Ruamāhanga whaitua.

Recommendation 20

GWRC undertakes a full review of the land and water management system at the next regional plan review (10 years) and make appropriate changes to the Plan.

Recommendations from Chapter 6: Managing rivers and lakes in the Ruamāhanga Whaitua

Recommendation 21

The PNRP includes a policy or policies that identifies that 'river and lake management' is for the health of the water body itself, recognising:

1. The mauri of the water sustains the mauri of the people, and
2. The critical importance of providing for the habitat and natural character of rivers and lakes in achieving the Ruamāhanga freshwater objectives, and
3. The extensiveness and importance of small streams, wetlands and backwaters (in braided rivers) in the whaitua in providing healthy fish habitat and the conditions for mahinga kai species, places and activities to thrive.

Recommendation 22

The PNRP includes an overarching policy to improve, across the whaitua, riparian vegetation of streams, rivers and lakes for erosion and sediment control, bank stabilisation, temperature management (via shading), control of algae and to support other ecosystem health, mahinga kai and indigenous biodiversity outcomes

Recommendation 23

GWRC plans and implements the Committee's vision for healthy rivers and lakes in the Ruamāhanga whaitua by:

1. Ensuring that river and lake management functions of the council achieve freshwater objectives and targets in each FMU, and

2. Working with mana whenua and communities in co-creating what river and lake management for the health of the river looks like within each FMU.

Recommendation 24

GWRC identifies and implements methods for further enabling mana whenua participation in land and water resource management, including with papa kāinga, marae or hapū (as appropriate), to ensure the values of mana whenua are appropriately reflected in freshwater planning and regulatory processes and in flood protection strategic and operational planning and implementation.

Recommendation 25

The PNRP includes a policy that promotes restoration of rivers, lakes and wetlands to achieve the Ruamāhanga freshwater objectives, and that recognises that activities in the beds of river, lakes and wetlands are supported when undertaken for these restoration purposes.27

Recommendation 26

GWRC reviews current planning and implementation activities relevant to the health of lakes and rivers in order to:

1. Identify the changes to planning, practice and investment necessary to deliver the Ruamāhanga whaitua objectives through river and lake management, and
2. Identify new multi-disciplinary systems to deliver integrative river and catchment management, and
3. Progressively implement the findings of this review work.

'Activities' could include institutional delivery structures and the alignment of future relevant land and water programmes and investments.

Recommendation 27

GWRC seeks and takes opportunities to enhance natural character of rivers, streams and lakes, and in promoting wetland restoration, across the whaitua, including by:

1. Actively aligning planning and operation of flood management activities (e.g. floodplain planning) with the Ruamāhanga whaitua objectives and policies, and
2. Identifying and implementing management options to enhance natural character and to achieve the Ruamāhanga freshwater objectives when undertaking operational works (e.g. willow removal and gravel extraction), and
3. Actively aligning and supporting farm planning and farm plan implementation with the Ruamāhanga whaitua objectives, and
4. Investing in riparian planting for shading and stream bank erosion management and in wetland restoration.[28]

[27] Note connection to Recommendation 9 in relation to consenting processes recognising value of innovative practice
[28] Note connection to Recommendation 37 in relation to sediment targets from managing stream bank erosion

Recommendation 28

The PNRP includes a key policy to restore health of Wairarapa Moana by 2080, including to provide for mahinga kai, support native fish populations and to restore health of the Wairarapa Moana wetlands.

Recommendation 29

GWRC commits to the restoration of the health of Wairarapa Moana, including Lake Wairarapa and Lake Onoke, by undertaking research, investigations, and experiments in management approaches, strategic planning and changes to operational activities to progressively improve the lake health and to reach the objectives in this WIP by 2080 at the latest.

Recommendation 30

GWRC undertakes feasibility studies of 'in-lake' management options for the purposes of providing for the communities values of Wairarapa Moana and achieving the freshwater objectives identified in this WIP. Options to investigate include:

- Re-routing the Ruamāhanga River into Lake Wairarapa, particularly at flows below the median flow, with higher flows bypassing the lake, and
- Alternative management regimes of the lake-level gates Lake Wairarapa , and
- Alternative management regimes for Lake Onoke including in relation to the timing, location and operation of lake mouth openings, and
- Experimenting with other alternative management options, such as temporarily holding Lake Wairarapa at higher levels than current practice, as a means of testing proof of concepts for potential broader application.

Recommendation 31

GWRC investigates further options for restoring the health of Wairarapa Moana, including to restore the Ruamāhanga River flow into Lake Wairarapa, including to:

- Mitigate the impact of wave action, and
- Reduce re-suspension of sediments in order to improve clarity, and
- Create conditions suitable for macrophytes to survive and thrive, and
- Remove nutrients and sediments, and
- Restore the health of mahinga kai species, and
- Enhance the health of wetlands.

Recommendation 32

GWRC recognises and supports research being undertaken by external groups, mana whenua and the whaitua community into means to improve the health of Lake Wairarapa and Lake Onoke and

actively considers application of new knowledge in the management of activities impacting the lakes, including through planning, consent practice and operational management practices.

Recommendation 33

GWRC works to inform and liaise with external agencies to link management of commercial and non-native fisheries with the Ruamāhanga whaitua outcomes.

Recommendations from Chapter 7: Managing contaminants in the Ruamāhanga whaitua – discharges and land uses

Recommendation 34

GWRC sets water quality limits and targets for nutrients and sediment loads as rules in PNRP for each freshwater management unit within the Ruamāhanga whaitua, in accordance with Tables 2 and 3 below.

Recommendation 35

GWRC sets water quality limits and targets for E. coli concentrations as rules in the Natural Resources Plan for each freshwater management unit within the Ruamāhanga whaitua to meet the attribute states described in Table 11 in Section 10.5 of the Appendix.

Recommendation 36

By 2050, reduce sediment loads in the five FMUs producing the greatest sediment load off non-native land, as modelled under the baseline (current state), in accordance with the targets set in Table 3. These 'top 5' FMUs are:

- Taueru
- Huangarua
- Eastern hill streams
- Whangaehu
- Kopuaranga

Recommendation 37

A priority in implementation in the 'top 5' catchments should be on establishing farm plans on properties where they don't presently exist.

Recommendation 38

By 2050, reduce sediment loss from netbank erosion across all other freshwater management units in the Ruamāhanga whaitua in accordance with targets set in Table 5.

Recommendation 39

GWRC reviews the progress of achieving these targets 10 years after the notification of the Ruamāhanga Whaitua Plan Change, including describing the extent of mitigation work undertaken and the modelled and/or monitored impact on water quality in rivers, streams and lakes in the whaitua.

Recommendation 40

Across the whaitua, GWRC supports and drives improve management of critical source areas and high-risk land uses in line with good management practice, including through working with industry partners.

Recommendation 41

In the 'top 5' freshwater management units, GWRC undertake further sub-FMU scale planning with local communities to establish the locations of highest priority to undertake sediment mitigation works on in order to achieve the targets in Table 5.

Recommendation 42

GWRC aligns planning, funding and support of sediment mitigation activities, including both riparian restoration and hill slope erosion and sediment control, with the identified priority areas, targets and the suitable mitigation approaches.

Recommendation 43

GWRC promote uptake of sediment mitigation through connection with new research sediment mitigation measures, practices and adoption mechanisms, and GWRC, industry and community extension services to enable uptake of constantly improving practice.

Recommendation 44

GWRC reviews the need for a nutrient allocation regime 10 years post plan change, or by 2029. NOTE: Grandparenting would not be considered a suitable allocation regime if one was to be implemented.

Recommendation 45

GWRC and industry promote and support the implementation of farm planning as a primary tool of management at a farm scale.

Recommendation 46

GWRC further incentivise and promote the adoption of farm planning and the activation of existing farm plans.

Recommendation 47

GWRC, along with iwi partners and industry, work together to promote and implement 'good management practice' in both the rural and urban context. Appropriate GMP for the Ruamāhanga catchment should be defined.

Recommendation 48

'Good management practice' should be emphasised as part of farm planning.

Recommendation 49

GWRC reviews the land use rules structure, including for break feeding, cultivation and livestock exclusion, to ensure the requirements are clear to resource users when resource consent is required.

Recommendation 50

GWRC actively promotes and enforces the requirements of the permitted activity rules for break feeding, cultivation and livestock exclusion.

Recommendation 51

GWRC provides a new rule for land use changes where that land use results in an increase in contaminant load as a discretionary activity in the PNRP. A land use change that results in a decrease in contaminant load shall be a permitted activity.

Recommendation 52

GWRC expands support of extensive, whaitua-wide riparian planting for management of stream bank erosion and for in-stream benefits (e.g. shade to reduce periphyton), including through:

- Priority in farm planning design and implementation, and
- Increasing funding for riparian planting, as well as improving access to and awareness of these funds, and
- Producing plants (e.g. Akura nursery) or assisting communities to produce plants fit for such a programme

Recommendation 53

Wastewater discharges reduce to the target allocations detailed in table 7. Target allocations are to be met by 2040.

Recommendation 54

The nutrient allocations in Table 7 are reviewed and changed accordingly when plan reviews occur.

Recommendation 55

GWRC works with territorial authorities to ensure wastewater is discharged appropriately to land by 2040, recognising that direct discharges to water may occasionally be acceptable but only in exceptional circumstances and only at high flows (e.g. 3x median flow).

Recommendation 56

GWRC work with District Councils on a suitable permitted activity rule for irrigation of wastewater onto farm land. This should include conditions on the standard of the discharged effluent, discharge rates and timing, and any restrictions on where this irrigation should occur.

Recommendation 57

GWRC introduce discharge standards for all point source discharges

Recommendation 58

Urban stormwater is managed in accordance with good management practice and progressive improvement and in the Proposed Natural Resources Plan policies and rules.

Recommendation 59

GWRC along with iwi and other partners supports the formation and coordination of catchment communities in both the urban and rural environment to support the achievement of their self-determined objectives.

Recommendation 60

GWRC support and contribute to the continued development of the Wairarapa Catchment Communities/Pukaha to Palliser Project that aims to bring catchment community groups together and "make it easier" for them to achieve desired outcomes for their communities, whether they are environmental, social, cultural or economic outcomes.

Recommendation 61

GWRC support and contribute to the development of a multi-agency delivery platform that will effectively respond and deliver resources effectively and efficiently to the needs of catchment communities. This agency coordinated response will enable communities to make changes ahead of regulation and support innovation.

Recommendation 62

GWRC writes a compliance plan with the community.

Recommendation 63

GWRC implement good compliance systems e.g. strategic compliance across activities (prioritising compliance on higher risk activities).

Recommendation 64

GWRC undertakes a prioritisation exercise to determine further investigations to be completed in the catchment to better understand effects and/or to establish causality to inform future management. The priorities identified in the following recommendation should also be included.

Recommendation 65

The following investigations should be considered a priority:

- Establishing sedimentation rates (plus other information on impact of sediment on lake health) for Lake Onoke, including to establish a relationship between catchment loads and lake health
- Complete further investigation, including via modelling, of sediment loads lost from land use activities, including to identify how loads are changing over time.

Recommendation 66

GWRC advocates for, and actively seeks out, alternative funding models for mitigation measures in order to promote successful and extensive implementation.

Recommendation 67

Central Government should actively seek and promote external capital investment, such as carbon offsetting programmes, in assisting land owners in extensive uptake of sediment mitigations across the whaitua.

Recommendations from Chapter 8: Flows and water allocation in the Ruamāhanga whaitua

Recommendation 68

To improve water supply reliability the Ruamāhanga whaitua integrated land and water management system should:

- Integrate multiple management options for water retention, including attenuation, storage and harvesting at a range of scales, and efficient use over the long and short term, rather than dependency on any one mechanism, and
- Actively promote attenuation of water in soils, wetlands, lakes and groundwater systems across the catchment, and
- Ensure an equitable approach to improved water storage and water use efficiency by both rural and urban users.

Recommendation 69

The PNRP includes a policy that recognises the importance of the role of attenuation of water in soils, wetlands and lakes and their riparian margins in the whaitua to support groundwater recharge and wetland restoration and help build resilience in communities.

Recommendation 70

The PNRP includes a policy that recognises the benefits of multiple mechanisms (such as storage, harvesting, attenuation, aquifer recharge) that increase resilience and the reliability of supply of water.

Recommendation 71

The PNRP includes a policy or amends existing policy to provide for circumstances where water may be taken at higher flows for purposes wider than storage e.g. aquifer recharge.

Recommendation 72

GWRC further investigate integrated solutions to water reliability. This should include integrating storage, harvesting, attenuation and managed aquifer recharge, and consider pilot projects to prove feasibility.

Recommendation 73

Require users of water to manage their take and use in a more equitable manner and to ensure good management practice, including to:

- Seek efficiency gains when consents are renewed across all water use activities, and

- Promote small-scale storage on urban and rural properties in order to increase resilience and to encourage everyone to take part in improving water use efficiency, and
- Require takes from directly connected groundwater to reduce and cease at times of low flows in rivers in the same way that surface water takes are managed, and
- Require community supply takes to do more to reduce take at minimum flows, while protecting the ability to take water for people's domestic needs, and
- Reduce water races takes at minimum flows to only that water required to provide for people's domestic needs and stock drinking needs.

Recommendation 74

For the Kopuaranga River:

1. Increase the minimum flow from 270 L/s to 280 L/s, and
2. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 150 L/s)

Recommendation 75

For the Waipoua River:

1. Increase the minimum flow from 250 L/s to 340 L/s over time as follows:
   a. 5 years after plan change (or in 2024) increase the minimum flow to 300 L/s
   b. 10 years after plan (or in 2029) increase the minimum flow to 340 L/s

   and,
2. Retain the current step down level at which takes shall reduce at 300L/s until the first minimum flow increase in 1 above occurs, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 116 L/s)

Recommendation 76

For the Waingawa River:

1. Remove the existing PNRP 'lower' minimum flow of 1100 L/s, and
2. Increase the minimum flow to the existing PNRP[29] 'higher' minimum flow of 1700 L/s over 10 years as follows:
   - 5 years after plan change (or in 2024) increase the minimum flow to 1400 L/s for all takes for community and group water supplies and water races, and
   - 10 years after plan change (or in 2029) increase the minimum flow to 1700 L/s for all takes, and

[29] Schedule R of the pNRP

3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 1184 L/s)

Recommendation 77

Combine the Upper Ruamāhanga and Middle Ruamāhanga catchment management units in PNRP to a single water quantity freshwater management unit.

Recommendation 78

For the Upper/Middle Ruamāhanga catchment:

1. Increase the minimum flow level from 2400 L/s to 3250 L/s over time as follows:
   - No change for 10 years
   - 10 years after plan change (or in 2029) increase to 2700L/s
   - 15 years after plan change (or in 2034) increase to 2970 L/s
   - 20 years after plan change (or in 2039) increase to 3250 L/s

   and,

2. Retain the current step down level at which takes shall reduce at 2700L/s until the first minimum flow increase in 1 above occurs, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 1910 L/s)

Recommendation 79

For the Waiohine River:

1. Remove the existing PNRP 'lower' minimum flow of 2300 L/s, and
2. Retain the 'higher' minimum flow level of 3040 L/s, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 950 L/s).

Recommendation 80

For the Tauherenikau River:

1. Remove the existing 'lower' PNRP minimum flow of 1100L/s, and
2. Retain the existing 'higher' PNRP minimum flow of 1300 L/s, and
3. Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 234 L/s).

Recommendation 81

For the Lower Ruamāhanga catchment, retain the existing PNRP minimum flow and allocation amounts.

Recommendation 82

In 10 years' time (or in 2029) those takes classified as Category A groundwater must cease their take when the nearby river or stream reaches its minimum flow.

Recommendation 83

GWRC undertakes further investigations to ensure those groundwater takes classified as Category A do have a direct connection with a nearby river, stream or lake.

Recommendation 84

GWRC undertake targeted investigations in the Parkvale Stream, Booths Creek, Makoura Stream, Kuripuni Stream, Tauanui and Turanganui Rivers to determine the specific minimum flow requirements and allocation limits for each river or stream, within three years of the plan notification or by 2022.

In the interim set the following minimum flows and allocation limits:

1. For Parkvale Stream and Booths Creek, retain the current allocation limits and minimum flows in the PNRP, and
2. For Makoura and Kuripuni streams, separate from the Upper Ruamāhanga limits currently in the PNRP and set allocation limits at current consented allocation and minimum flow at 100L/s based on the management point Colombo Road on the Makoura Stream, and
3. For the Tauanui River, separate from Lower Ruamāhanga limits currently in the PNRP, and set an allocation limit at current consented allocation and minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (correlations indicate this represents 90% of MALF in the Tauanui and Turanganui), and
4. For the Turanganui River, set allocation limit at current consented allocation (number to be confirmed) and set minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (correlations indicate this represents 90% of MALF in the Tauanui and Turanganui), and
5. Separate out the Huangarua River from Lower Ruamāhanga PNRP limits (upstream of the Ruamāhanga River confluence), retain existing PNRP allocation of 110 L/s and set minimum flow of 30L/s based on the management point Iraia on the Ruakokoputuna Stream (headwaters of the Huangarua River).

Recommendation 85

Set minimum flows and allocation amounts in the PNRP for small streams and rivers in the Ruamāhanga whaitua as follows:

1. Retain current allocation limits and minimum flows in the PNRP for the Papawai and Otukura streams, and
2. Separate out the Makahakaha Stream from Middle Ruamāhanga PNRP limits (upstream of Ruamāhanga Category A groundwater boundary) and set allocation limit at current allocation (number to be confirmed) and a minimum flow at 90% of MALF, and

3. Separate out the Taueru River (upstream of the Kourarau Stream confluence) from Middle Ruamāhanga PNRP limits, and set allocation at current consented allocation (number to be confirmed) and minimum flow at 65 L/s at upstream confluence, and
4. Separate out the Whangaehu River from Upper Ruamāhanga PNRP limits (upstream of the Poterau Stream confluence), and set allocation at current consented allocation (number to be confirmed) and the minimum flow at 18 L/s at Whangaehu River at Waihi management site, and
5. For the streams and their tributaries that drain directly to Lake Wairarapa or the South Coast, retain existing default provisions in the PNRP (90% MALF minimum flow, 30% MALF allocation limit), and
6. For all other tributary streams of the main stem Ruamāhanga River that are not listed elsewhere (primarily in the Eastern Hills, Valley floor streams FMUs) separate from the Lower Ruamāhanga PNRP limit, and set default allocation limits of 30% MALF and default minimum flows of 90% MALF.

Recommendation 86

GWRC establishes fit for purpose information about the size and nature of groundwater resources, particularly in the Pirinoa Terraces, Parkvale, Waiohine and Waingawa parts of the whaitua.

Recommendation 87

The PRNP includes a policy to ensure a precautionary approach is taken to the issuing of resource consents for groundwater takes where information on the nature of the resource is limited.

Recommendation 88

GWRC implements the new minimum flow levels in resource consents for the Ruamāhanga whaitua by the following methods:

Implementing minimum flow levels in resource consents		
New Consents	**Existing consents**	
	Expire within 5 years of Whaitua plan change	**Expire more than 5 years after Whaitua plan change**
At consent application	At consent renewal	At consent review, 5 years after Whaitua plan change

Recommendation 89

GWRC uses the review of resource consent conditions (RMA s.129) and water shortage directions (RMA s.329) especially where adverse effects are occurring. This includes recognising that when adverse effects are occurring in a particular river or stream, water shortage directions may be issued to further restrict both consented and permitted water use.

Recommendation 90

Amend permitted activity rule or introduce new permitted activity rule in the PRNP to ensure users have certainty that water can be taken for reasonable domestic use and animal drinking water (provided the taking does not, or is not likely to, have adverse effects on the environment).

Recommendation 91

Identify in policy using narrative and (possibly) numbers (unit/volume/day) the meaning of domestic and stock water use, e.g.:

- Water for an individual's reasonable domestic needs is the amount sufficient to provide for hygiene, sanitary and domestic requirements.
- Water for the reasonable needs of a person's animals for drinking water is the amount sufficient to provide for the animals' health and welfare.

Recommendation 92

Amend relevant permitted activity[30] rule in the PNRP to:

- limit take to $5m^3$/day for surface and groundwater takes, regardless of property size
- ensure the water allowed under this permitted activity excludes use for which a person has resource consent i.e. a take under the PA cannot be used to provide an extra 5m3of water for irrigation, if a person has a consent for irrigation
- cease permitted take at minimum flows
- retain the ability for GWRC to require metering
- ensure users have the ability to use water under this rule **in addition** to water available under Recommendation 16.

Recommendation 93

GWRC collects better information on water take and use volumes, including for permitted activity takes, in order to provide for more transparent accounting of water use and better management into the future and to ensure the requirements of the NPS-FM are met. Methods to obtain information on permitted activities could include surveys, modelling and metering of takes where adverse effects are observed or in areas of high demand.

Recommendation 94

Introduce a new rule in the PNRP to provide for the use and diversion of rainwater from a roof to a tank as a permitted activity.

[30] Rule R136 of the proposed Natural Resources Plan

Recommendation 95

In order to help meet minimum flow requirements, the Committee strongly supports the use of rainwater tanks and encourages territorial authorities to require rainwater tanks in new subdivisions to promote the efficient use of water.

Recommendation 96

Amend relevant permitted activity rule[31] in the PNRP to ensure that where takes are from surface water bodies, water may be taken below minimum flow levels but it must be reduced to the minimum amount necessary in order to safely operate the dairy shed.

Recommendation 97

District councils inform and raise awareness of water conservation in their constituencies, such as on their web sites. Information promoting and encouraging water conservation can extend to all sectors of the community such as households, businesses, industry, agriculture and recreational facilities, including reusing greywater.

Recommendation 98

Require group and community water suppliers to provide water conservation plans as part of resource consent applications to take water that include how use will be managed at times of water shortage when restrictions are being placed on other consented water uses (e.g. during summer low flow periods)

Recommendation 99

Support community water supplier moves to manage their networks through metering water users (recognising that some already do so).

Recommendation 100

Support steps by community water suppliers to improve water supply resilience by increasing the number of water sources, including water storage, particularly where a single source is relied on.

Recommendation 101

Retain the provisions in PNRP requiring an irrigation application efficiency of 80% in demand conditions that occur in nine out of ten years as verified by a field validated model that assesses crop water use, soil water holding capacity, rainfall variability and evapo-transpiration.

Recommendation 102

Reinforce and promote best practice when users are measuring and reporting on their water use - the 'Blue Tick' Accreditation Programme championed by Irrigation NZ is suitable practice for monitoring and reporting on water takes.

[31] Rule R137 of the proposed Natural Resources Plan

Recommendation 103

Explore transferring the taking and use of water (including sharing) from one location to another water with the intention of making it easier for users, including by changing consenting status (e.g. from discretionary to controlled activity).

Recommendation 104

GWRC works with district councils and landowners to collect information and develop long term management of all water races in the Ruamāhanga whaitua.

Recommendation 105

Gather appropriate information and assess it in the order that water races come up for resource consent renewal.

Recommendation 106

Any water race requiring resource consent before appropriate long term management is developed shall get a short term consent until the long term status of the water race is decided. Appropriate information to develop long term management for each water race may include, but is not limited to:

- hydrology of the water race and the interaction with surrounding groundwater and surface water (how much water is in the water race, how much is lost, how much is discharged)
- how much water is used and what is it used for?
- water quality
- social values, ecological values, mana whenua values, heritage values and economic value
- the efficiency of water use and options for increasing efficiency
- the areas of management overlap and opportunities for better integration (regional consents and district bylaws).

10. Appendices

10.1 Ruamāhanga Whaitua Community Values

Value group	Description
Māori Use – Mahinga kai	Mai te pae maunga o Tararua tae noa ki Kawakawa moana (from the Tararua mountain range to Palliser Bay) Mauri of our wai supports our people and our place Wairarapa, wairua, wai whakawātea, wai tohi, wai ora, wai tohu; glistening waters, spiritual waters, cleansing waters, baptismal waters, life giving waters, guiding waters Wai tuna, wai pātiki, kourarau: eel waters, flounder waters, abundant crayfish Ngā puna, ngā manga, ngā awa, ngā roto, ngā repo, taku taimoana
Te Mana o Ruamāhanga – Mauri, Habitat, Biodiversity and Natural Character	The unique identity of our rivers, lakes and streams. Their flow, shape, form and colour. • The life force of the water, the geology, plants, fish and animals. • Natural character This includes: • Riparian systems • Wetlands • Groundwater • Indigenous fish and in-stream habitat • Water quality and quantity (flow, depth) • Fish passage and spawning places • Interdependencies between groundwater and surface water, wetlands, forests, attenuation and recharge • Wairarapa Moana • The Conservation Estate • The coastal environment

Our Ruamāhanga River Culture	Our histories, our heritage, our whakapapa. Our traditions, our social activities, our special places related to our waterways, then, now and in the future. Our social activities; camping, weddings, baptisms and barbeques. Our understanding and respect for people's connection to water bodies. To tātou awa – we are shaped by the natural character of our waterways. Assurance that our water is okay, what it looks like, sounds like, smells like, feels like to us.
Ruamāhanga Economic Use, Resilience and Prosperity	He taonga te wai, water is life Water sustains our livelihood; water grows our people and communities. Reliability of water supply supports our; incomes, employment and innovation, our farming, industry, tourism and commercial fishing. Sustainable economic use of water brings resilience and prosperity. In the Wairarapa: • Our livelihood and wellbeing is tied to water quality and quantity • The benefits of water are shared equitably amongst our community • Our water storage can improve security of supply • Our water isn't owned by anybody • Our water is managed by everyone • We value the efficient use of water • Protection of assets through flood management
Ruamāhanga Community Public Health and Wellbeing	Hau ora tangata Wai ora – Water for our health; spirit, mind and body Water for drinking Protection of public safety through flood management Safe management of stormwater and sewage
Ruamāhanga Recreation	Recreation supports our community's health and wellbeing. Currently, swimming, fishing, wading, boating and māhi parekareka ki te wai (enjoying yourself by the water) are important recreational activities in the Ruamāhanga whaitua (catchment). Recreational activities are supported by access to water bodies

10.2 Summary of water quality, algae and macroinvertebrate current state and freshwater objectives for rivers in the Ruamāhanga whaitua (Table 8)

* indicates where current state is based on modelled information or expert best knowledge, otherwise all current state analyses based on monitoring data

	NOF attributes								Non-NOF attributes			
River	*E.coli*	*E.coli*	Periphyton	Periphyton	Ammonia toxicity	Ammonia toxicity	Nitrate toxicity	Nitrate toxicity	MCI	MCI	When by?	FMU group
	Current state	Objective	Current state	Objective	Current state	Objective	Current state	Objective	Current state	Objective		
Tauanui River	D*	A	C/D*	B	A*	A	A*	A	Fair*	Good	2040	Aorangi rivers
Turanganui River	B*	B	C/D*	B	A*	A	A*	A	Fair*	Good	2040	Aorangi rivers
Taueru River	C	C	D*	C	A	A	B	A	Good	Good	2040	Eastern hill rivers
Makahakaha Stream	A*	A	-	B	A*	A	B*	A	Fair*	Good	2040 (periphyton 2030)	Eastern hill rivers
Huangarua River	B	B	C	B	A	A	A	A	Fair	Good	2080	Eastern hill rivers
Eastern hill streams	-	B	-	B	-	A	-	A	-	Fair	Maintain	Eastern hill streams group
Ruamāhanga - Wardells	C*	C	B*	B	B*	A	A*	A	Fair*	Fair	2040	Main stem Ruamāhanga River
Ruamāhanga - Gladstone Bridge	D	C	B	B	B	A	A	A	Fair*	Fair	2040	Main stem Ruamāhanga River
Ruamāhanga - Waihenga	A	A	B	B	B*	A	A*	A	Fair*	Fair	2040	Main stem Ruamāhanga River
Ruamāhanga - Pukio	B	B	-	B	A*	A	A*	A	Good*	Good	Maintain	Main stem Ruamāhanga River
Ruamāhanga - upstream of confluence with Lake Wai outlet	B*	B	-	B	A*	A	A*	A	Fair*	Fair	Maintain	Main stem Ruamāhanga River
Kopuaranga River	D	C	D	C	A	A	A	A	Fair	Good	2040	Northern rivers
Whangaehu River	D	C	-	C	A	A	A	A	Fair*	Good	2040	Northern rivers
Parkvale Stream	E	C	B	B	B	A	B	A	Fair*	Good	2040	Valley floor streams group
Otukura Stream	D*	C	-	B	B*	A	B*	A	-	Fair	2040	Valley floor streams group
Valley floor streams	-	C	-	B	-	A	-	A	-	Good	2040	Valley floor streams group
Upper Ruamāhanga River	D	C	A	A	A	A	A	A	Fair	Good	2040	Western hill rivers
Waipoua River	B	A	B*	A	A	A	B	A	Fair	Good	2040	Western hill rivers
Waingawa River	A	A	A	A	A	A	A	A	Good	Good	Maintain	Western hill rivers
Mangatarere Stream	D	B	C	B, then A	B	B (top of band)	B	A	Fair	Good	2040 (2080 for MCI)	Western hill rivers
Waiohine River	A	A	A	A	A	A	A	A	Fair	Good	2080	Western hill rivers
Tauherenikau River	A	A	A*	A	A	A	A	A	Fair	Good	2040	Western hill rivers
Western lake streams	-	A	-	A	-	A	-	A	-	Good or better	Maintain	Western hill rivers
South coast streams	-	A	-	A	-	A	-	A	-	Fair	Maintain	South coast streams group

Where there is an absence of modelling or monitoring data to establish the current state, objectives have been established by comparing the FMU with water bodies in the same or similar FMU group.

10.3 Summary of water quality, algae, macrophyte and trophic level current state and freshwater objectives lakes in the Ruamāhanga whaitua (Table 9)

	NOF attributes										Non-NOF attributes						When by?
Lake	E.coli	E.coli	Phytoplankton	Phytoplankton	Total nitrogen	Total nitrogen	Total phosphorus	Total phosphorus	Ammonia toxicity	Ammonia toxicity	Trophic level index	Trophic level index	Total suspended sediment	Total suspended sediment	Macrophytes	Macrophytes	
	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	Now	Objective	
Lake Wairarapa	A	A	D	C	C	C	D	C	A	A	Very poor	Poor	Poor	Fair	D	C	2080
Lake Onoke	B/C	A	B	B	C	B	B	B	A	A	Poor	Average	Poor	Fair	D	C	2040

10.4 Water quantity limits for the major quantity freshwater management units in the Ruamāhanga Whaitua (Table 10)

Limits would take affect from the time of plan notification, with exceptions for the Waipoua and Upper Ruamāhanga (see footnotes)

Health needs of people refers to the amount of water needed to adequately provide for people's hygiene, sanitary and domestic requirements

Water quantity FMU	**Objective (Habitat protection)**	**Limits**										
		Allocation (L/s)	**Minimum flow 1**					**Minimum flow 2**				
			Flow (L/s)	What happens to different types of **consented** takes at these flows?				**Flow (L/s)**	What happens to different types of **consented** takes at these flows?			
				Surface water takes (excluding community supply and water races)	Category A groundwater takes (excluding community supply and water races)[32]	Community supply takes	Water races		Surface water takes (excluding community supply and water races)	Category A groundwater takes (excluding community supply and water races)[33]	Community supply takes	Water races
Kopuaranga	90%	150	280	Cease	Cease							
Waipoua[34]	90%	130	340	Cease	Cease	Reduce to health needs of people						
Waingawa	90%	1200	1900	Reduce by 50%	Reduce by 50%	No action	No action	1700	Cease	Cease	Reduce to health needs of people	Reduce to health needs of people & stock drinking needs
Upper/Middle Ruamāhanga[35],[36]	90%	1925	3250	Cease	Cease		Reduce to health needs of people & stock drinking needs					
Mangatarere [top row is upper catchment and bottom row is lower catchment]	90%	475	330	Reduce by 50%	Reduce by 50%		Reduce	240	Cease	Cease	Reduce to health needs of people	Reduce to health needs of people & stock drinking needs
	90%		270	Reduce by 50%	Reduce by 50%	No action	No action	200	Cease	Cease	Reduce to health needs of people	Reduce to health needs of people & stock drinking needs
Waiohine	90%	1005	3040	Cease	Cease	Reduce to health needs of people	Reduce to health needs of people & stock drinking needs					
Lower Ruamāhanga	90%	2445	9200	Reduce by 50%	Reduce by 50%	No action		8500	Cease	Cease	Reduce to health needs of people	
Tauherenikau	90%	235	1300	Cease	Cease		Reduce to health needs of people & stock drinking needs					

[32] The requirement to cease take will not take effect for 10 years
[33] The requirement to cease take will not take effect for 10 years
[34] The Waipoua River minimum flow will be progressively implemented over 10 years
[35] The Upper/Middle Ruamāhanga River extends from the headwaters to the confluence with the Waiohine River
[36] The Upper Ruamāhanga River increase in minimum flow will be progressively implemented over 20 years

10.5 Numeric freshwater objectives for rivers freshwater management units: *E. coli* (Table 11)

			NOF attributes						
			E. coli						
FMU group	**River freshwater management unit**	**Monitoring point**	**Current state**	**Freshwater objective**					**Freshwater objectives to be met by?**
			NOF band	NOF band	% exceedances		Concentration (mg/L) ≤		
					≥540cfu/100mL	≥260cfu/100mL	Median	95th percentile	
Aorangi rivers	Tauanui River	TBC	D*	A	<5%	<20%	127	505	2040
	Turanganui River	TBC	B*	B	5-10%	20-30%	66	565	Maintain
Eastern hill rivers	Taueru River	Taueru River at Gladstone	C	C	10-20%	30-34%	99	1171	Maintain
	Makahakaha Stream	TBC	A*	A	<5%	<20%	51	100	Maintain
	Huangarua River	Huangarua River at Ponatahi Bridge	B	B	5-10%	20-30%	68	921	Maintain
Eastern hill streams group	Eastern hill streams	TBC	-	B	5-10%	20-30%	68	921	Maintain
Main stem Ruamāhanga River	Ruamāhanga - Wardells	Ruamāhanga at Wardells	C*	C	10-20%	30-34%	105	994	Maintain
	Ruamāhanga - Gladstone Bridge	Ruamāhanga at Gladstone Bridge	D	C	10-20%	30-34%	33	1098	2040
	Ruamāhanga - Waihenga	Ruamāhanga at Waihenga Bridge	A	A	<5%	<20%	33	375	Maintain
	Ruamāhanga - Pukio	Ruamāhanga at Pukio	B	B	5-10%	20-30%	40	875	Maintain
	Ruamāhanga - upstream of confluence with Lake Wai outlet	Ruamāhanga at Boat Ramp	B*	B	5-10%	20-30%	130	900	Maintain
Northern rivers	Kopuaranga River	Kopuaranga River at Stuarts	D	C	10-20%	30-34%	130	1200	2040
	Whangaehu River	Whangaehu River at 250m from Confluence	D	C	10-20%	30-34%	130	1200	2040
Valley floor streams group	Parkvale Stream	Parkvale Stream at Renalls Weir	E	C	10-20%	30-34%	130	1200	2040
	Otukura Stream	Otukura Stream	D*	C	10-20%	30-34%	20	1200	2040
	Valley floor streams (to Lake Wai and to Ruamāhanga)	TBC	-	C	10-20%	30-34%	20	1200	Maintain
Western hill rivers	Upper Ruamāhanga River	Ruamāhanga River at Double Bridges	D	C	10-20%	30-34%	13	183	2040
	Waipoua River	Waipoua River at Colombo Rd Bridge	B	A	<5%	<20%	34	540	2040
	Waingawa River	Waingawa River at South Rd	A	A	<5%	<20%	13	183	Maintain
	Mangatarere Stream	Mangatarere River at State Highway 2	D	B	5-10%	20-30%	48	218	2040
	Waiohine River	Waiohine River at Bicknells	A	A	<5%	<20%	15	129	Maintain
	Tauherenikau River	Tauherenikau River at Websters	A	A	<5%	<20%	19	210	Maintain
	Western lake streams	TBC	-	A	<5%	<20%	19	210	Maintain
South coast streams group	South coast streams	TBC	-	A	<5%	<20%	19	210	Maintain

10.6 Numeric freshwater objectives for rivers freshwater management units: Ammonia and nitrate toxicity (Table 12)

			NOF attribute								
			Ammonia (toxicity)				Nitrate (toxicity)				
FMU group	River freshwater management unit	Monitoring point	Current state	Freshwater objective			Current state	Freshwater objective			Freshwater objectives to be met by?
			NOF band	NOF band	Concentration (mg/L) ≤		NOF band	NOF band	Concentration (mg/L) ≤		
					Median	95th percentile			Median	95th percentile	
Aorangi rivers	Tauanui River	TBC	A*	A	0.006	0.043	A*	A	0.13	0.33	Maintain
	Turanganui River	TBC	A*	A	0.009	0.046	A*	A	0.15	0.61	Maintain
Eastern hill rivers	Taueru River	Taueru River at Gladstone	A	A	0.005	0.044	B	A	0.71	1.41	2040
	Makahakaha Stream	TBC	A*	A	0.006	0.019	B*	A	0.73	1.50	2040
	Huangarua River	Huangarua River at Ponatahi Bridge	A	A	0.005	0.014	A	A	0.22	0.66	Maintain
Eastern hill streams group	Eastern hill streams	TBC	-	A	0.005	0.014	-	A	0.22	0.66	Maintain
Main stem Ruamāhanga River	Ruamāhanga - Wardells	Ruamāhanga at Wardells	B*	A	0.011	0.050	A*	A	0.54	1.24	2040
	Ruamāhanga - Gladstone Bridge	Ruamāhanga at Gladstone Bridge	B	A	0.005	0.050	A	A	0.31	0.96	2040
	Ruamāhanga - Waihenga	Ruamāhanga at Waihenga Bridge	B*	A	0.005	0.040	A*	A	0.50	0.84	2040
	Ruamāhanga - Pukio	Ruamāhanga at Pukio	A*	A	0.005	0.030	A*	A	0.33	0.94	Maintain
	Ruamāhanga - upstream of confluence with Lake Wai	Ruamāhanga at Boat Ramp	A*	A	0.009	0.035	A*	A	0.39	0.98	Maintain
Northern rivers	Kopuaranga River	Kopuaranga River at Stuarts	A	A	0.005	0.024	A	A	0.82	1.17	Maintain
	Whangaehu River	Whangaehu River at 250m from Confluence	A	A	0.005	0.050	A	A	0.47	1.50	Maintain
Valley floor streams group	Parkvale Stream	Parkvale Stream at Renalls Weir	B	A	0.012	0.050	B	A	1.00	1.50	2040
	Otukura Stream	Otukura Stream	B*	A	0.005	0.050	B*	A	1.00	1.30	2040
	Valley floor streams (to Lake Wai and to Ruamāhanga)	TBC	-	A	0.005	0.050	-	A	1.00	1.30	Maintain
Western hill rivers	Upper Ruamāhanga River	Ruamāhanga River at Double Bridges	A	A	0.005	0.019	A	A	0.09	0.43	Maintain
	Waipoua River	Waipoua River at Colombo Rd Bridge	A	A	0.005	0.008	B	A	0.63	1.41	2040
	Waingawa River	Waingawa River at South Rd	A	A	0.005	0.023	A	A	0.06	0.22	Maintain
	Mangatarere Stream	Mangatarere River at State Highway 2	B	B (top of band)	0.028	0.128	B	A	0.99	1.50	2040
	Waiohine River	Waiohine River at Bicknells	A	A	0.005	0.015	A	A	0.34	0.85	Maintain
	Tauherenikau River	Tauherenikau River at Websters	A	A	0.005	0.009	A	A	0.04	0.14	Maintain
	Western lake streams	TBC	-	A	0.005	0.009	-	A	0.04	0.14	Maintain
South coast streams group	South coast streams	TBC	-	A	0.005	0.009	-	A	0.04	0.14	Maintain

10.7 Numeric freshwater objectives for rivers freshwater management units: Periphyton and macroinvertebrate community index (Table 13)

* indicates where current state is based on modelled information or expert best knowledge, otherwise all current state analyses based on monitoring data

			Periphyton			Macroinvertebrate community health*				Freshwater objectives to be met by?
FMU group	River freshwater management unit	Monitoring point	Current state	Freshwater objective		River class	Current state	Freshwater objective		
			NOF band	NOF band	Chl *a* (mg/m^2)		Band	Band	Band	
Aorangi rivers	Tauanui River	TBC	C/D*	B	>50 and <120	4	Fair*	Good	≥110 and <130	2040
	Turanganui River	TBC	C/D*	B	>50 and <120	4	Fair*	Good	≥110 and <130	2040
Eastern hill rivers	Taueru River#	Taueru River at Gladstone	D*	C	>120 and <200	3	Good	Good	≥105 and <130	2040
	Makahakaha Stream#	TBC	-	B	>50 and <120	5	Fair*	Good	≥100 and <120	2030
	Huangarua River#	Huangarua River at Ponatahi Bridge	C	B	>50 and <120	4	Fair	Good	≥110 and <130	2080
Eastern hill streams group	Eastern hill streams^	TBC	-	B	>50 and <120	3/6	-	Fair	≥80 and <105	Maintain
Main stem Ruamāhanga River	Ruamāhanga - Wardells	Ruamāhanga at Wardells	B*	B	>50 and <120	4	Fair*	Fair	≥90 and <110	Maintain
	Ruamāhanga - Gladstone Bridge	Ruamāhanga at Gladstone Bridge	B	B	>50 and <120	4	Fair*	Fair	≥90 and <110	Maintain
	Ruamāhanga - Waihenga	Ruamāhanga at Waihenga Bridge	B	B	>50 and <120	4	Fair*	Fair	≥90 and <110	Maintain
	Ruamāhanga - Pukio	Ruamāhanga at Pukio	-	B	>50 and <120	4	Good*	Good	≥110 and <130	Maintain
	Ruamāhanga - upstream of confluence with Lake Wai outlet	Ruamāhanga at Boat Ramp	-	B	>50 and <120	4	Fair*	Fair	≥90 and <110	Maintain
Northern rivers	Kopuaranga River	Kopuaranga River at Stuarts	D	C	>120 and <200	5	Fair	Good	≥100 and <120	2040
	Whangaehu River#	Whangaehu River at 250m from Confluence	-	C	>120 and <200	3	Fair*	Good	≥105 and <130	2040
Valley floor streams group	Parkvale Stream	Parkvale Stream at Renalls Weir	B	B	>50 and <120	5	Fair*	Good	≥100 and <120	2040
	Otukura Stream	Otukura Stream	-	B	>50 and <120	6	-	Fair	≥80 and <105	Maintain
	Valley floor streams (to Lake Wai and to Ruamāhanga)	TBC	-	B	>50 and <120	6	-	Good	≥100 and <120	Maintain
Western hill rivers	Upper Ruamāhanga River	Ruamāhanga River at Double Bridges	A	A	≤50	4	Fair	Good	≥110 and <130	2040
	Waipoua River	Waipoua River at Colombo Rd Bridge	B*	A	≤50	4	Fair	Good	≥110 and <130	2040
	Waingawa River	Waingawa River at South Rd	A	A	≤50	4	Good	Good	≥110 and <130	Maintain
	Mangatarere Stream	Mangatarere River at State Highway 2	C	B, then A	>50 and <120	4	Fair	Good	≥110 and <130	2080
	Waiohine River	Waiohine River at Bicknells	A	A	≤50	4	Fair	Good	≥110 and <130	2080
	Tauherenikau River	Tauherenikau River at Websters	A*	A	≤50	4	Fair	Good	110 and <130	2040
	Western lake streams^	TBC	-	A	≤50	1/2	-	Good or better	Class 1: ≥120 and <130 Class 2: ≥105 and < 130	Maintain
South coast streams group	South coast streams^	TBC	-	A	≤50	1/2	-	Fair	Class 1: ≥110 and <120 Class 2: ≥80 and <105	Maintain

10.8 Numeric freshwater objectives for lakes freshwater management units for NOF attributes: *E. coli*, total nitrogen and total phosphorus (Table 14)

Lake FMU	Monitoring site	NOF attributes												Freshwater objectives to be met by?
		E. coli						Total nitrogen			Total phosphorus			
		Current state	Freshwater objective					Current state	Freshwater objective		Current state	Freshwater objective		
		NOF band	NOF band	% exceedances		Concentration (mg/L)		NOF band	NOF band	Concentration (mg/L)	NOF band	NOF band	Concentration (mg/L)	
				≥540cfu/ 100mL	≥260cfu/ 100mL	Median	95th percentile			Median			Median	
Lake Wairarapa	Lake Wairarapa Site 2	A	A	<5%	<20%	65	300	C	C	>500 and ≤800	D	C	>20 and ≤50	2080
Lake Onoke	Lake Onoke 1	B/C	A	<5%	<20%	130	540	C	B	>160 and ≤350	B	B	>10 and ≤20	2040

10.9 Numeric freshwater objectives for lakes freshwater management units: Ammonia toxicity, phytoplankton, TLI, total suspended sediment and macrophytes (Table 15)

Lake FMU	Monitoring site	NOF attributes								Non-NOF attributes						Freshwater objectives to be met by?
		Ammonia toxicity				Phytoplankton				Trophic level index		Total suspended sediment		Macrophytes		
		Current state	Freshwater objective			Current state	Freshwater objective			Current state	Freshwater objective	Current state	Freshwater objective	Current state	Freshwater objective	
		NOF band	NOF band	Concentration (mg/L)		NOF band	NOF band	Concentration chlorophyll a (mg/m^3)		TLI category		Narrative state		Estimated band[37]		
				Median	95th percentile			Annual median	Annual max							
Lake Wairarapa	Lake Wairarapa Site 2	A	A	0.005	0.023	D	C	>5 and ≤12	>25 and ≤60	>5 Supertrophic	4-5 Eutrophic	Poor	Fair	D	C	2080
Lake Onoke	Lake Onoke 1	A	A	0.010	0.040	B	B	>2 and ≤5	>10 and ≤25	4-5 Eutrophic	2-3 Ogliotrophic	Poor	Fair	D	C	2040

[37] C = 20-50% Ecological communities are moderately impacted from natural condition
D = <20% Ecological communities significantly impacted by reduced macrophyte cover due to loss of habitat, food sources and less sediment stabilisation. Macrophytes have limited ability to buffer nutrient loads and there is a high risk of a regime shift to a persistent, degraded state