

Report 17.216  
Date 8 June 2017  
File CCAB-10-341

Committee Environment Committee  
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## Are we meeting our environmental outcomes in the Ruamāhanga catchment?

### 1. Purpose

To discuss the state of the environment in the Ruamāhanga catchment – particularly with respect to whether GWRC is achieving its desired environmental outcomes.

### 2. Background

The Ruamāhanga catchment (Wairarapa Valley) is the agricultural powerhouse of the region. Dairying, drystock farming, orchards and vineyards all play a significant role in the area's economy.

The area covers a massive 3,555m<sup>2</sup> (44 percent of the region's land area) and is home to around 37,000 people (eight percent of the region's population). Most of the people reside in the towns of Masterton, Carterton, Greytown, Featherston and Martinborough.

The Ruamāhanga River is a central feature – with its headwaters in the Tararua Ranges north of Pukaha Mount Bruce, the river flows south and then southwest for 130km before emptying into Palliser Bay via Lake Onoke.

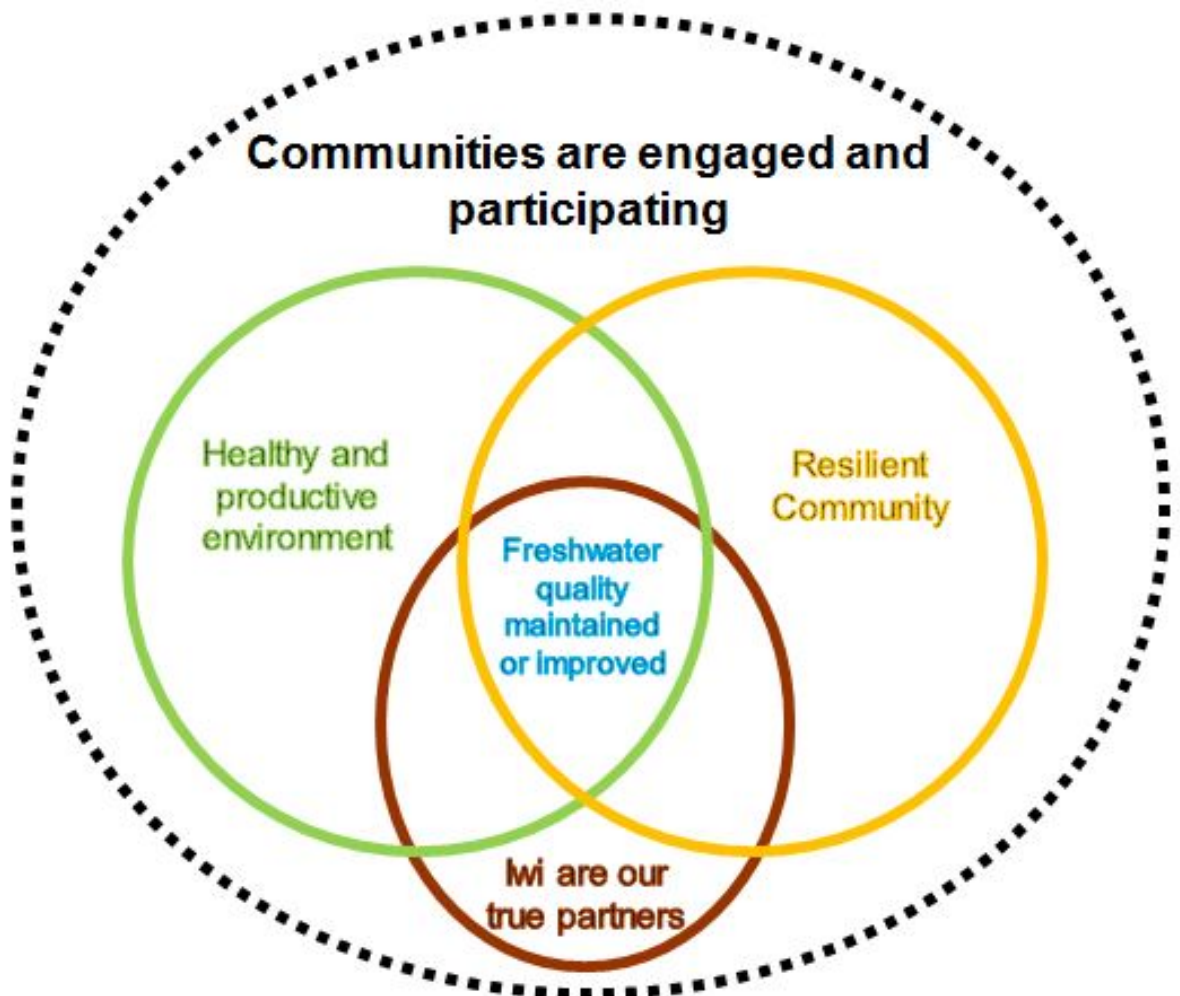
### 3. What are the environmental outcomes we are trying to achieve?

The Environment and Catchment Management groups have come up with five **draft** shared outcomes that are the driving basis for our work. These are shown in the diagram below.

All five outcomes are inextricably linked, but some key points to note are:

- In terms of our operational activities, they are largely directly working towards achieving the three outcomes *Resilient community*, *Healthy and productive environment* and *Partnering with iwi*. Note that some activities will span multiple outcomes.

- *Maintaining or improving water quality* does not happen in isolation. Water quality is in fact driven by everything we do “Te uta te kai” (from the mountains to the sea). The diagram represents the fact that improving water quality is not something that can happen in isolation, but will be a result of everything else we do – most importantly, how we manage our land-based activities.
- To achieve all this, GWRC cannot do this alone. Everyone has their part to play, so we must ensure that *Our communities are engaged and participating*.
- Not all of the outcomes can be evaluated by traditional science measures. Determining whether we are being successful in achieving the outcomes *Partnering with iwi* and *Our communities are engaged and participating* will require social measures.



## **4. Policy context**

It is clear from the debate over the government's recent swimmability proposal and reaction following the Havelock North drinking water incident that New Zealand's societal awareness and expectations around clean water have shifted.

The National Policy Statement for Freshwater Management (NPS-FM) was introduced in 2011, revised in 2014 and there is currently a proposal for a 2017 version. Each iteration has tightened the national direction around freshwater quality, but the key message is that the overall quality of freshwater should be maintained or improved.

GWRC's Regional Policy Statement (RPS) identifies regionally significant issues around the sustainable management of the region's natural and physical resources. The quality of water in rivers, streams, lakes, wetlands and groundwater is considered an issue of significance in the RPS (chapter 3.4). Both regional and district plans are required to give effect to the RPS.

The proposed Natural Resources Plan (pNRP) was developed in accordance with the Resource Management Act 1991 (the Act). It set out the objectives, policies and methods (including rules) for the use of the region's natural and physical resources. The pNRP (once operative) will replace the five existing Regional Plans.

Of particular interest to the Ruamāhanga catchment is the proposed introduction of national stock exclusion rules. These will be national rules requiring the exclusion of stock (cattle, pigs and deer) from waterways. In some cases (e.g. dairy cattle in lowland areas) stock will be excluded from all waterways, including drains and wetlands.

## **5. Environmental Outcome – resilient community**

### **5.1 What does this mean?**

This is about ensuring our communities are healthy, safe, prosperous and prepared. The key things we do in this regard are:

- Ensuring security of water supply for drinking and other needs, including irrigation
- Protection of homes and land against flooding and other natural hazards
- Preparing landowners to cope with the impacts of climate change
- Work with local councils to ensure air quality improves and meets national standards and guidelines.

### **5.2 Ensuring security of water supply for drinking and other needs, including irrigation**

What the science is saying...

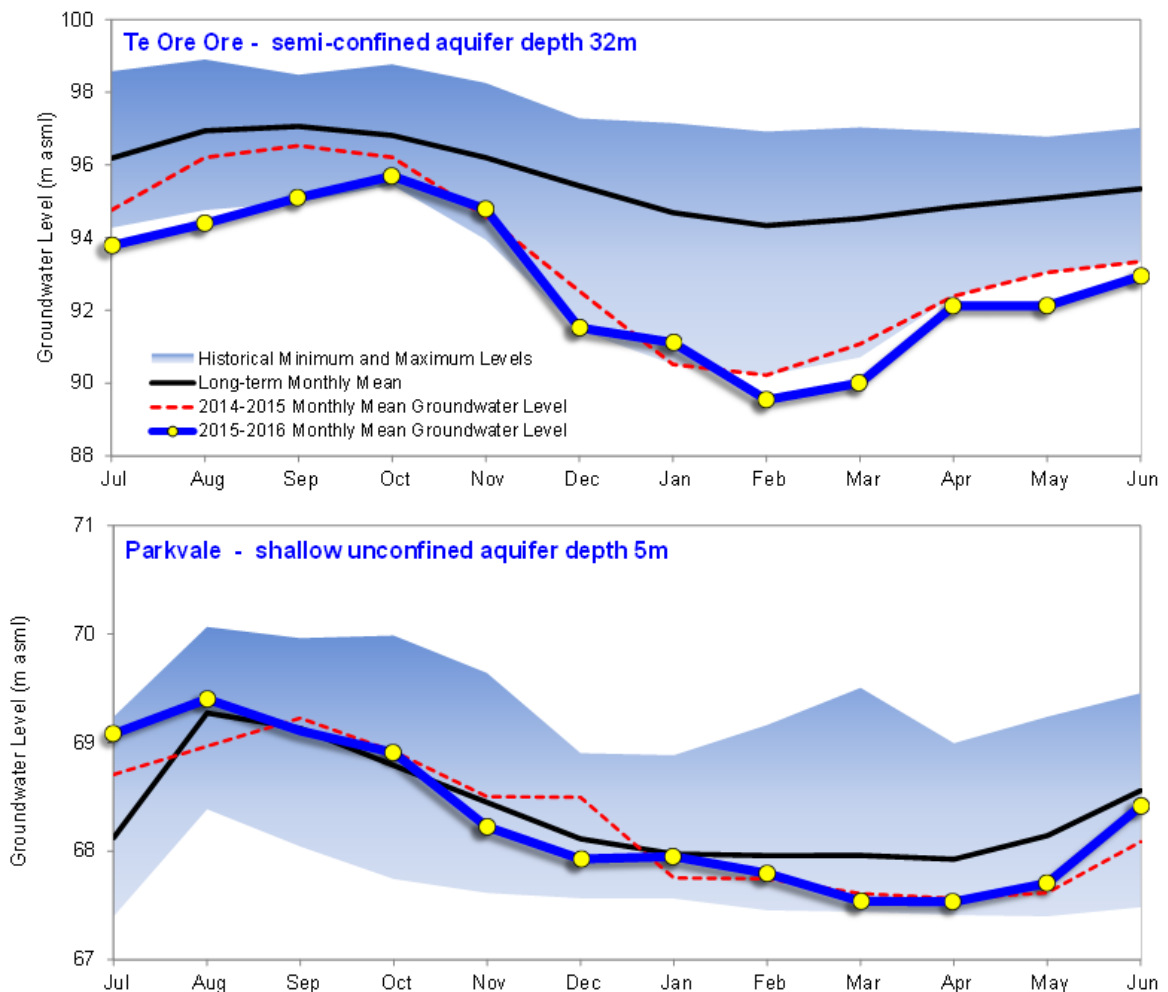
Monitoring results from the 2015/16 year show that rainfall was below average across most of the area, with the period February-April 2016 being particularly dry. Unsurprisingly, river levels were also below average for much of the year, with record lows reached in the Ruamāhanga River during March.

A number of rivers and streams breached low flow thresholds resulting in restrictions on water takes. The number of days with restrictions was particularly high for the Waingawa River and Mangatarere Stream – 84 and 107 days respectively.

Interestingly, groundwater bodies do not necessarily follow the same pattern. The graph below shows that levels in the shallow unconfined Parkvale Aquifer have remained around average for the past two years, despite it being quite a dry period.

In contrast, levels in the deeper semi-confined Te Ore Ore Aquifer have been extremely low over the past two years. Looking further back, the levels in this aquifer were average-below average in 2013/14 (which was a wet year), and exceedingly low again in 2012/13 (another dry year).

The difference is at least in part because shallow unconfined aquifers (like Parkvale) are readily recharged by rain and surface water bodies, whereas more confined aquifers (like Te Ore Ore) take longer to recharge and are more likely to be reflective of long term trends in rainfall and water levels.



### What are we doing about it?

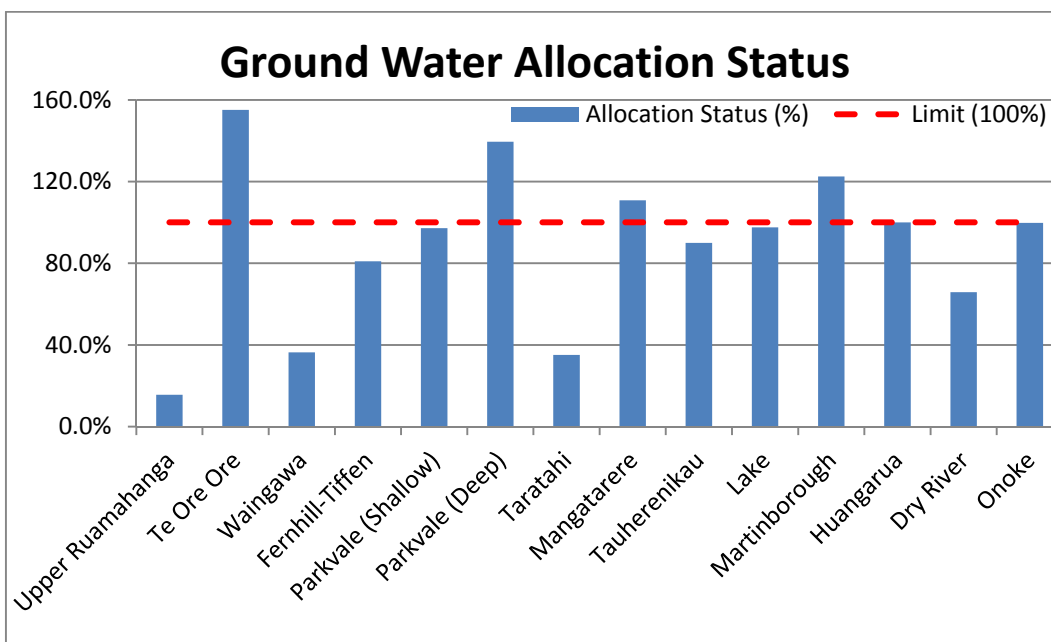
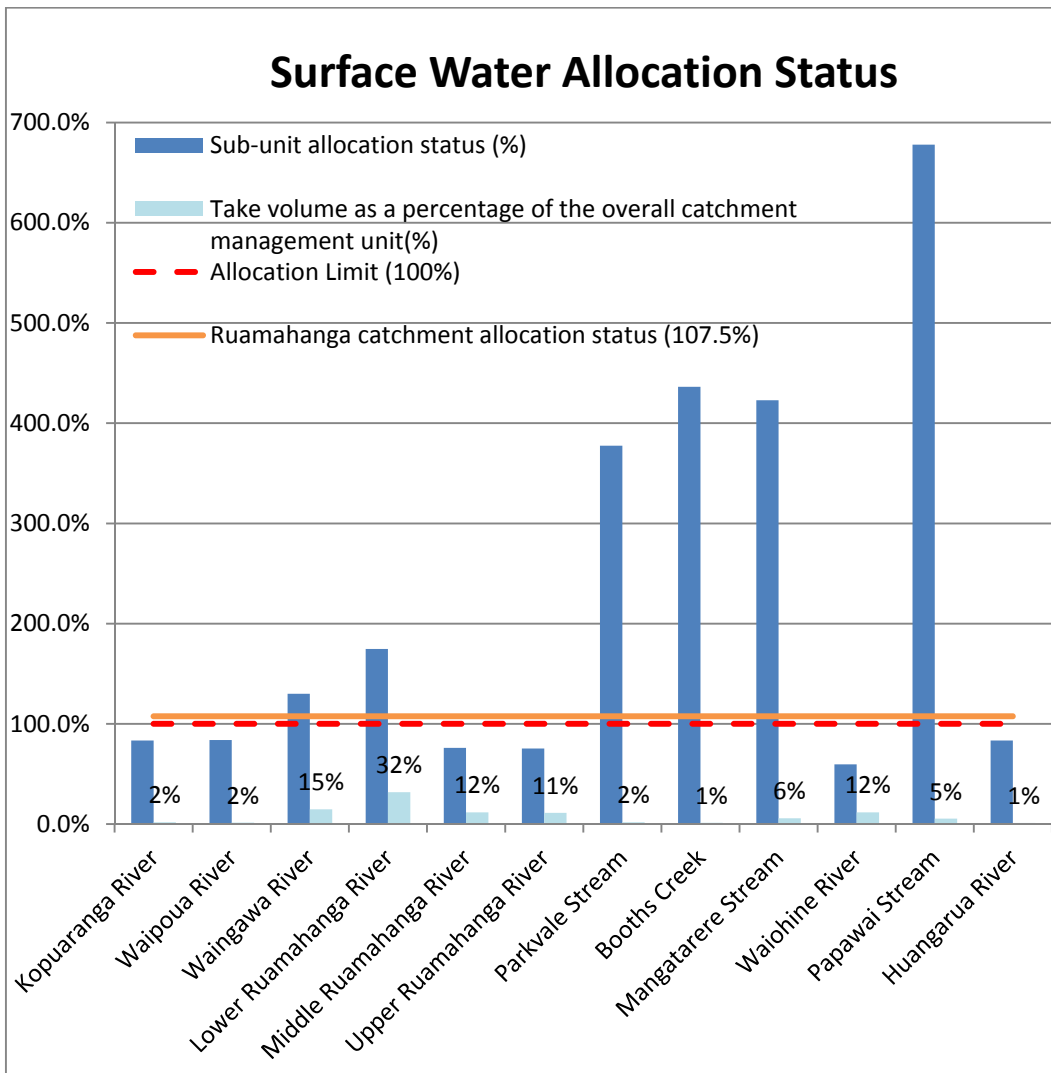
The amount of water allocated through resource consents across the region increased significantly between 1990 and 2010, but has largely remained stable since then. In the Ruamāhanga, irrigation is the dominant use.

Most of the region's major rivers are now fully allocated, meaning that at normal to low flows there is just enough water to meet all consented water takes while still maintaining the environmental health of these waterways.

The amount of groundwater that can be safely allocated is actually likely to reduce in the future. This is because we now know much more about the linkages between groundwater and surface water, and how groundwater abstraction affects nearby river and stream levels.

The figures below shows the current allocation status of rivers and aquifers in the Ruamāhanga as set out in the provisions of the pNRP. The pNRP splits surface water allocation into overall catchment management units which are in turn split into sub-units. The overall catchment management unit in this case is the Ruamāhanga River and all its tributaries, and is currently 107% allocated. Several of the sub-units are also markedly over-allocated.

Water take limits for surface water consist of a minimum flow (a river flow at which users cease taking water) as well as an allocation amount (the amount of water that can be taken when the river flow is above the minimum flow). The main environmental protection mechanism is the minimum flow. The Ruamāhanga Whaitua Committee is currently reviewing these limits.



The pNRP deals with over-allocation in a number of ways, including:

- *Prohibited activity for ‘new’ water* – under the pNRP, if adopted as currently written, any consent for a ‘new’ water take in a fully allocated catchment will be a prohibited activity. This does not apply to renewals of existing consents or where it is demonstrated as being essential for the health needs of people or stock drinking water.
- *Efficiency* – All renewals and new consents will be required to demonstrate that the amount applied for is reasonable and will be used efficiently. In addition consent holders are increasingly using advanced technology such as soil moisture technology to ensure they are only irrigating when it is actually required.
- *Water metering* – All allocated takes over 5L/s are required to meter their actual water usage. Water meter records will help determine the actual needs of the consent holders and more closely align allocated takes with actual usage.
- *Attrition* - Allocation will be clawed back over time as consents are surrendered or renewed for lesser amounts (due to water meter records or efficiency tests showing less water is needed).

However, we know that current water users do not have enough water during dry periods. A major GWRC project, Water Wairarapa, is investigating water storage and distribution options that can harvest water when there is a surplus, and distribute it to where it’s needed during water shortages.

More complex water management scenarios can also be considered with appropriate water storage and distribution infrastructure in place, allowing a more efficient use and allocation regime.

Large scale infrastructure projects take anywhere from 10 years and more to complete. Water Wairarapa is only half way through this timeframe and has many years of more investigations to be sure of scheme viability across all parameters including financial, environmental, social and cultural.

### 5.3 Protection of homes and land against flooding and other natural hazards

What the science is saying...

We monitor a number of rivers and streams for flood warning purposes. The table below shows the number of times flood warning alarms were activated over the previous three years.

Site	2013/14	2014/15	2015/16
Ruamāhanga River – Mt Bruce	11	11	0
Ruamāhanga River – Wardells station	14	4	0
Ruamāhanga River – Waihenga Bridge	14	6	4

Waipoua River	11	4	1
Waingawa River	1	1	0
Waiohine River	9	5	1
Mangatarere Stream	2	0	1
Taueru River	4	0	1
Huangularua River	1	0	0
<b>Totals</b>	<b>67</b>	<b>31</b>	<b>8</b>
<b>Comment</b>	Wetter than normal year	Largely below average rainfall	Largely below average rainfall
<b>Any significant flood events?</b>	12 July 2013, Taueru River (8-yr return period), no recorded flood damage	No	No

Initial results from 2016/17 have shown an increase in flood activity, however there has been no significant flood damage as a result.

A recent study undertaken by NIWA on regional climate change projections shows that although the Wairarapa is going to become drier overall (up to 10% less rainfall per year by 2090), extreme rainfall events are likely to become more extreme and more common. This essentially means that storms are going to bigger and more frequent, with less rain in between. This pattern is only going to increase the risk from flooding.

**What are we doing about it?**

When flood warning levels are breached we have protocols for informing potentially affected land/home owners so they can take precautions such as moving stock or evacuating in dire circumstances.

Two floodplain management plans (FMP) are currently in development for the Ruamāhanga catchment – the Waiohine FMP and the Te Kāuru Upper Ruamāhanga FMP. FMPs involve years of investigating the most comprehensive and long-term approach for managing flood and erosion risks to both rural and urban land. A FMP for the lower Ruamāhanga is planned for development following completion of the current projects.

We also facilitate nine river management schemes within the upper Ruamāhanga and a large lower valley scheme that is governed by the Lower Ruamāhanga Valley Floodplain Management Advisory Committee. The schemes are run by community-based committees and guide maintenance



activities that help achieve bank-edge protection and reduce the incidence of flooding.

The primary goal for the major gravel-bed rivers is to establish stable channel alignment through the adoption of a design channel fairway with vegetative buffers on either side of the river. The methods used generally involve bio-engineering practices (which is the term used to describe the use of vegetative systems and structures) and rely heavily on vegetative buffers to reduce river bank erosion and absorb/redirect the energy of flowing water.

#### **5.4 Preparing landowners to cope with the impacts of climate change**

What the science is saying...

Climate change is undoubtedly the biggest environmental challenge we face and will affect everyone in the region.

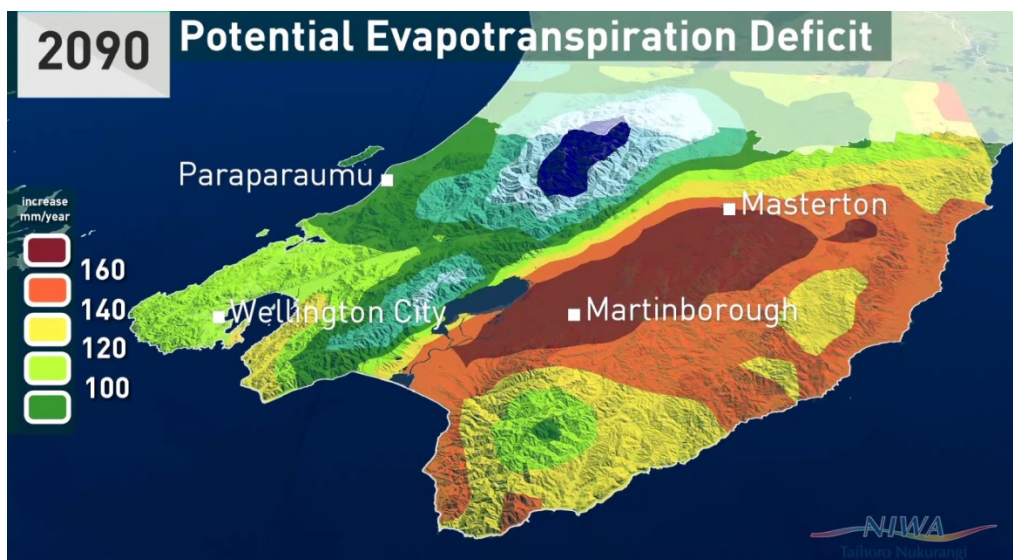
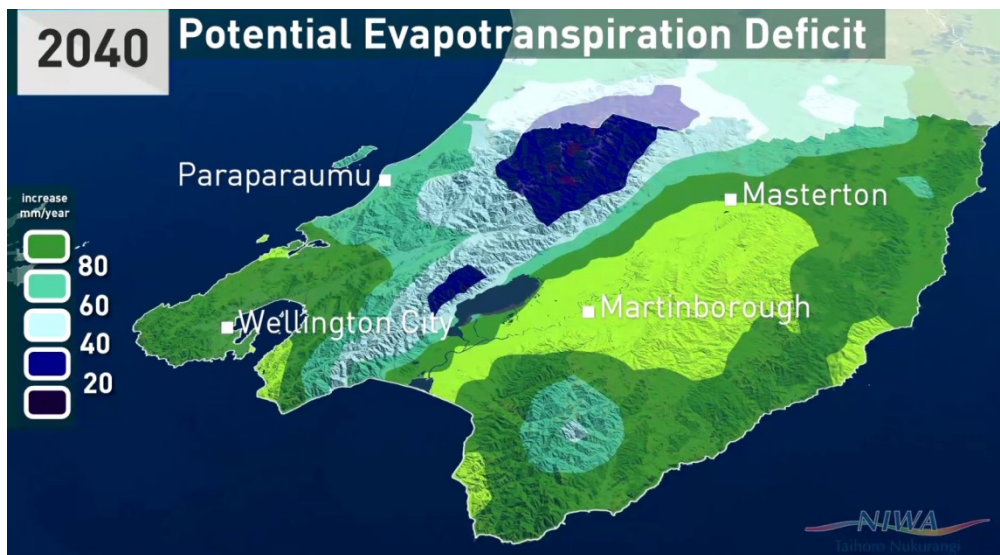
Being an inland valley, the Ruamāhanga won't be hugely affected by sea level rise. However during flood events the capacity for the river to drain out to sea will be reduced. There will also be a major impact on farming in the lower valley with a number of farms already relying on pump drainage schemes to survive. Increased sea levels will probably mean farming will have to cease in certain areas.

The biggest effects will be from changes in temperatures and rainfall. By 2090, the Wairarapa could be up to 3 degrees warmer. The number of extreme hot days (days with temperature exceeding 25 degrees) are also likely to increase significantly. This has the potential to impact on human health, power consumption and the health of livestock.

By 2090, the Wairarapa is projected to receive up to 10 percent less rainfall per year. However, extreme rainfall events are projected to become more extreme and more common. This essentially means that storms are going to be bigger and more frequent, with less rain in between. This adds to the risk of flooding, landslides and impacts from severe winds.

Potentially the biggest threat to the Ruamāhanga is that drought is highly likely to become more common and more severe. One way to measure the severity of drought is called the Potential Evapotranspiration Deficit (PED). It's quite complicated but essentially it can be thought of as the amount of rainfall needed in order to keep pasture growth at optimum levels. The higher the PED, the more drought-affected the area is going to be.

By 2040 the PED could increase by up to 120mm/yr, and by 2090 it could increase by up to 180mm/yr. This means that by the end of the century, what is presently considered as severe drought will be the norm. Drought of this severity will impact significantly on primary industry in terms of pasture and crop growth, and flow-on effects for water supply.



These projections are based on the most extreme climate change scenario, which is based on continued high emissions of greenhouse gases. And while some of the effects of climate change are now inevitable due to past and current greenhouse gas emissions, it's not too late to make a difference and avoid the extremes as predicted above. The speed and magnitude of impacts in the longer term will be determined by how quickly the global community can reduce greenhouse gas emissions.

What are we doing about it?

A problem of this scale inevitably requires a response at both the national and regional level. One of our responses, as local government, was to develop a Climate Change Strategy which aligns and coordinates climate change actions across GWRC's responsibilities and operations.

Alongside the work we are doing to reduce our own emissions and influence emissions reductions across the region, we are also focussing on better understanding the **implications** of climate change impacts (like extreme rainfall events mixed with prolonged droughts).

We recently commissioned a report from NIWA that describes the climatic changes which may occur across the region over the rest of this century. The report (which will be available in July 2017) discusses the predicted changes and outlines potential implications. The resolution at which the information is presented (ie, climate change mapping) sets this report apart from any others that have preceded it.

The information from the report will be used alongside other climate change-related studies that have been done as part of the Collaborative Modelling Project for the Ruamāhanga Whaitua Committee, to inform GWRCs adaptation planning. It will also enable the community to better understand what climate change could mean for them.

Climate change projections are already being incorporated into flood protection operations, and are being progressively integrated into all aspects of our work including transport, biodiversity, biosecurity and land management activities, as well as analysis of irrigation scheme options by Water Wairarapa.

Consideration of climate change is now a core component of decision making at GWRC and we are adopting an adaptive planning approach across our operations.

## 5.5 Work with local councils to ensure air quality improves and meets national standards and guidelines

What the science is saying...

Most of the time air quality in the Ruamāhanga is good. In this area, home heating places the greatest pressure on air quality, and does at times affect air quality in the townships during winter.

Wairarapa towns have the highest proportion of households (approx. 70 percent) in the region using wood or coal for home heating, and smoke from home fires contains high levels of fine particles (PM<sub>2.5</sub>).

Winters in the Ruamāhanga are also less windy than elsewhere in the region and the valley can experience temperature inversions where the colder air is trapped beneath a layer of warmer air which restricts the dispersion of wood smoke.

The table below shows key monitoring results from 2016.

<b>PM<sub>10</sub> target</b>	<b>No. of days target was exceeded</b>	<b>PM<sub>2.5</sub> target</b>	<b>No. of days target was exceeded</b>
<i>National Environmental Standard:</i> Allows one day	Masterton West <b>1 day</b>	<i>World Health Organisation guideline:</i> Allows three	Masterton West <b>19 days</b>
	Masterton East <b>10 days</b>		Masterton East <b>35 days</b>

per year above 50 µg/m <sup>3</sup>	Carterton <b>2 days</b>	days per year above 25 µg/m <sup>3</sup>	Carterton <b>17 days</b>
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The good news is since monitoring started 14 years ago, winter air quality in Masterton has slowly improved. One of the reasons for the gradual improvement may be the phasing in of cleaner-burning wood burners required by the National Environmental Standard (NES) for Air Quality.

However more improvement is needed though to meet national standards and guidelines for levels of fine particles (PM<sub>10</sub> and PM<sub>2.5</sub>).

Levels of combustion gases (carbon monoxide and nitrogen dioxide) easily meet national standards and guidelines.

### What are we doing about it?

GWRC offers financial assistance (interest bearing targeted rate) to Masterton residents for upgrading their old home fires to a NES approved wood burner or heat pump. In 2016, 147 Masterton residents took advantage of the scheme.

Masterton District Council has also been actively involved in working towards improving air quality. A bylaw came into force in 2016 which bans outdoor fires in Masterton during the winter months.

Further, the pNRP seeks to improve winter air quality in the townships by working with district councils, stakeholders and local agencies to develop and implement action plans focussed on behaviour change (Method 5).

In practice this means people changing what they burn and the way they burn it so they are burning smoke-free most of the time. The non-regulatory behaviour change approach recognises the value to the community of being able to continue using wood for home heating, balanced against the need to improve air quality.

Behaviour change programmes need to be evidence-based and it is proposed to leverage learnings from the National Air Quality Behaviour Change Programme (co-funded by Ministry for the Environment). In 2015 Masterton District Council (MDC) participated in a pilot project using a sample of households observed to have smoky chimneys.

It found that smoke from home fires was not perceived to be an air pollution issue in Masterton – although industry was. To begin the process of change in Masterton work needs to be done on generating awareness and community conversations around the issue. A successful campaign needs to be positive, supportive and focussed on the benefits of smoke-free burning, ie, “it’s cheaper and warmer”.

MDC recently commissioned ChangeHub Consultancy to provide a local behaviour change programme outline, including resourcing and indicative costings. The three year programme would require a local coordinator and is estimated to cost \$120-750K (depending on the options selected). MDC have

indicated they may be able to provide coordination support but would require assistance with the costs associated with the programme. We are currently exploring funding options, including through the LTP process.

## 6. Environmental Outcome – Healthy and Productive Environment

### 6.1 What does this mean?

This is about ensuring our environment is healthy and meets the needs of current and future generations. The key things we do in this regard are:

- Monitor soil quality and work with landowners to ensure soil is managed productively, soil quality is maintained and erosion is reduced
- Protect terrestrial environments against pests and enhance native biodiversity
- Protect, manage and restore wetlands
- Protect freshwater bodies and coastal waters against pollution.

### 6.2 Monitor soil quality and work with landowners to ensure soil is managed productively, soil quality is maintained and erosion is reduced

What the science is saying...

Soil quality in the Ruamāhanga is generally quite good. The table below shows key soil quality results from the past four years of monitoring.

Year	Type of site sampled	No sites graded A (All 8 indicators meet target range)	No sites graded B (7 of 8 indicators meet target range)	No sites graded C (5 or 6 indicators meet target range)	No sites graded D (<5 of 8 indicators meet target range)	Indicators most failed
2015/16	Mostly Dairy (some Drystock)	3	3	7	0	Olsen P – 9 sites Total Nitrogen – 4 sites Macroporosity – 4 sites
2014/15	Drystock	4	9	1	0	Olsen P – 8 sites
2013/14	Cropping	2	6	2	2	Olsen P – 9 sites Macroporosity – 5 sites
2012/13	Dairy*	4	4	6	0	Olsen P – 9 sites Total Nitrogen – 4 sites Macroporosity – 5 sites

\*Note these are the same sites as were sampled in 2015/16.

The physical condition of soils in the Ruamāhanga are generally very good, however a number of dairy and cropping sites are showing signs of compaction (reduced macroporosity). Soil compaction happens when the spaces within the soil are reduced or compressed. It is undesirable because it can cause waterlogging, increased surface runoff, reduced pasture production and ultimately degrade the soil structure itself.

The chemical condition of soils is also generally good. Last year four sites exceeded the upper limit of the target range for total nitrogen, but not by much. The main issue is high levels of phosphorus (as measured by the indicator Olsen P) at a number of sites. Over the last three years 26 out of 41 (63%) sites had Olsen P levels which exceeded the upper level of the target range, and many were significantly higher.

Excess nitrogen leaches easily out of soil, whereas phosphorus tends to bind strongly to soil particles. This suggests that parts of the land are accumulating phosphorus, and over-fertilisation could be a contributing factor to this. It also means that any sediment from soil erosion is likely to be carrying phosphorus and contributing to nutrient enrichment of water.

What are we doing about it?

GWRC manage a Farm and Environment Plan (FEP) Programme, the vision of which is “Farmers use best practices to help solve farming and water quality problems in their catchment”. The programme has three goals.

1. Motivated farmers are engaged in the FEP programme, particularly in priority sub-catchments
2. Farmers are aware of how their farm and farming practices affect the wider catchment, particularly water quality
3. Landowners change their behaviour to good farming practices.

The current programme focusses on intensively farmed land, such as in the Mangatarere and the area around Lake Wairarapa. The programme provides financial incentives for on-ground works (such as fencing and riparian planting) to improve water quality and environmental outcomes. Other mitigations such as effluent management and strategic grazing of critical source areas to improve soil and water quality are also being promoted.

To help promote behaviour change and good farming practise, we have also held several farmer workshops and as a result produced two factsheets called *Soil compaction and pugging on dairy farms* and *Reducing the impacts of winter grazing*.

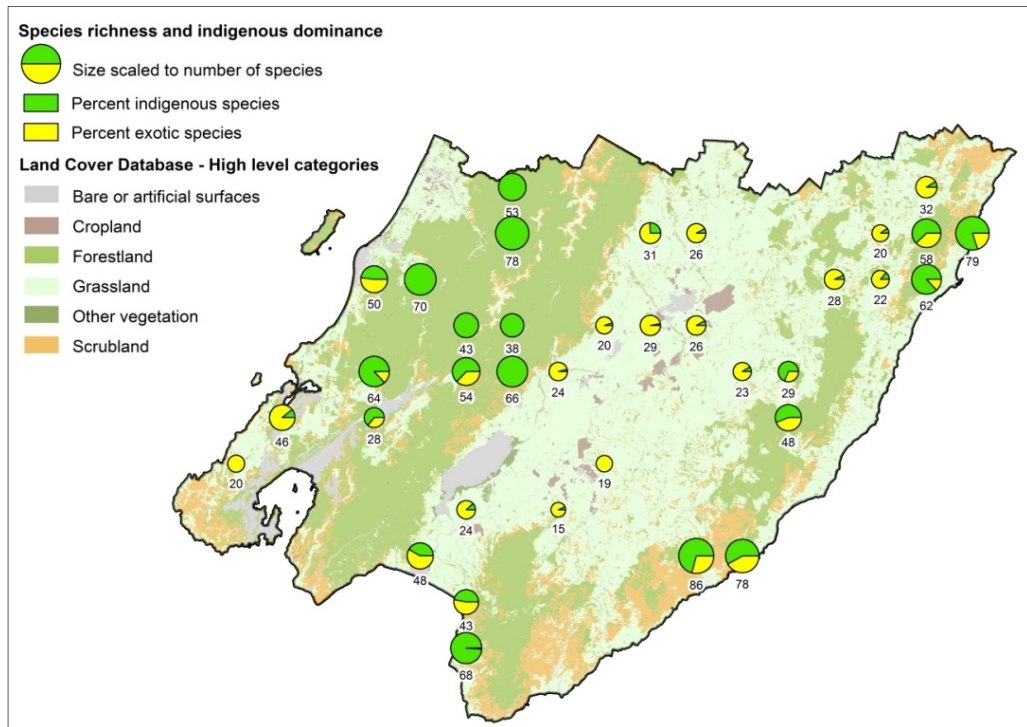
Another programme aimed at sustainably managing land and improving water quality is the Wellington Regional Erosion Control Initiative (WRECI). This programme is supported by the MPI Hill Country Erosion Fund and provides grants to landowners dealing with erosion prone land through; poplar and willow planting, conservation forestry or “retiring” land dominated by native scrub/forest.

The programme treats over 130ha of erosion prone land a year in the Ruamāhanga catchment. Research suggests that appropriately treated erodible land can reduce sediment loss by up to 70 percent.

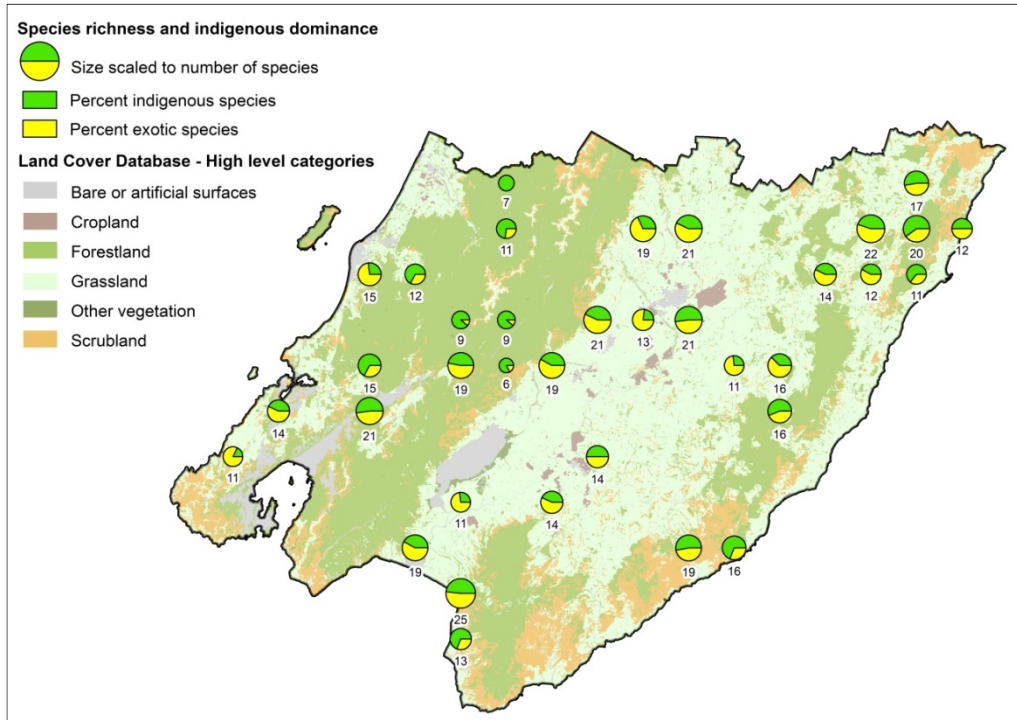
### 6.3 Protect terrestrial environments against pests and enhance native biodiversity

What the science is saying...

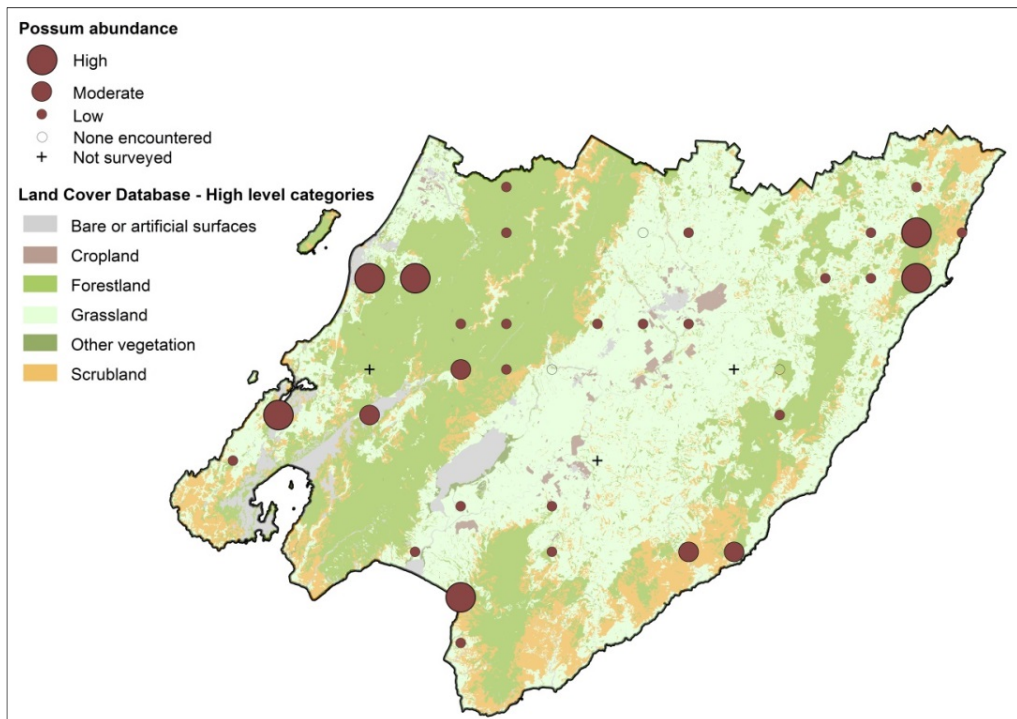
A national monitoring and reporting system for terrestrial biodiversity has been developed and implemented in the Wellington Region. The system involves gathering data on plant, bird and pest animal species from plots located on an 8km x 8km grid. Monitoring began in 2014/15, and the figures below show results from the first two years of monitoring.



**Plant species richness and indigenous dominance – Compared to the rest of the region, sites in the Ruamāhanga tend to have fewer species of plants and are dominated by exotic species.**



**Bird species richness and indigenous dominance – Most sites in the Ruamāhanga have a relatively high number of bird species, but the majority of them are exotic.**



**Possum densities in the Ruamāhanga are generally very low.**



## What are we doing about it?

Our biosecurity work is guided by the GWRC Pest Management Strategy 2002-2022 and involves the control of unwanted plants and animals for environmental, economic and social reasons.

Most of our biosecurity activities in the Ruamāhanga revolve around Key Native Ecosystems (KNEs) and the Regional Possum Predator Control Programme. This programme aims to maintain possums, which were previously controlled under the TBfree programme, at low levels.

Our KNE programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington Region. It does this by managing, reducing or removing threats to their ecological values. KNE sites are managed in accordance with three-year KNE plans prepared in collaboration with the landowners, tangata whenua and other partners.

The Ruamāhanga contains nine KNE sites covering a total of 2,023ha:

- Lake Pounui (960ha)
- Waihora (605ha)
- Sulphur Wells (75ha)
- Fensham (51ha)
- Tauherenikau bush remnants (50ha)
- Ruamahanga River Terraces (38ha)
- Strang's Bush (30ha)
- Omahu (25ha)
- Rewanui (188ha)

All of these are forest sites and contain numerous threatened plant and animal species. They include some of the best remaining examples of indigenous tōtara-tītoki forest in the region, of which only 2 percent of the original extent (most of it in a modified state) now remains. Other forest types include kahikatea-pukatea forest, of which only 1 percent of the original extent remains.

We are also supporting the work of the Queen Elizabeth II (QEII) National Trust to secure the long-term protection of natural features on private land. In the Ruamāhanga, nearly 150 sites covering around 3,300ha have been legally protected in perpetuity under a QEII open space covenant. GWRC provide up to \$50k a year to protect and enhance native biodiversity on QEII covenanted sites. Management activities include fencing to exclude stock from covenanted areas and establishing pest plant and animal control at new sites.

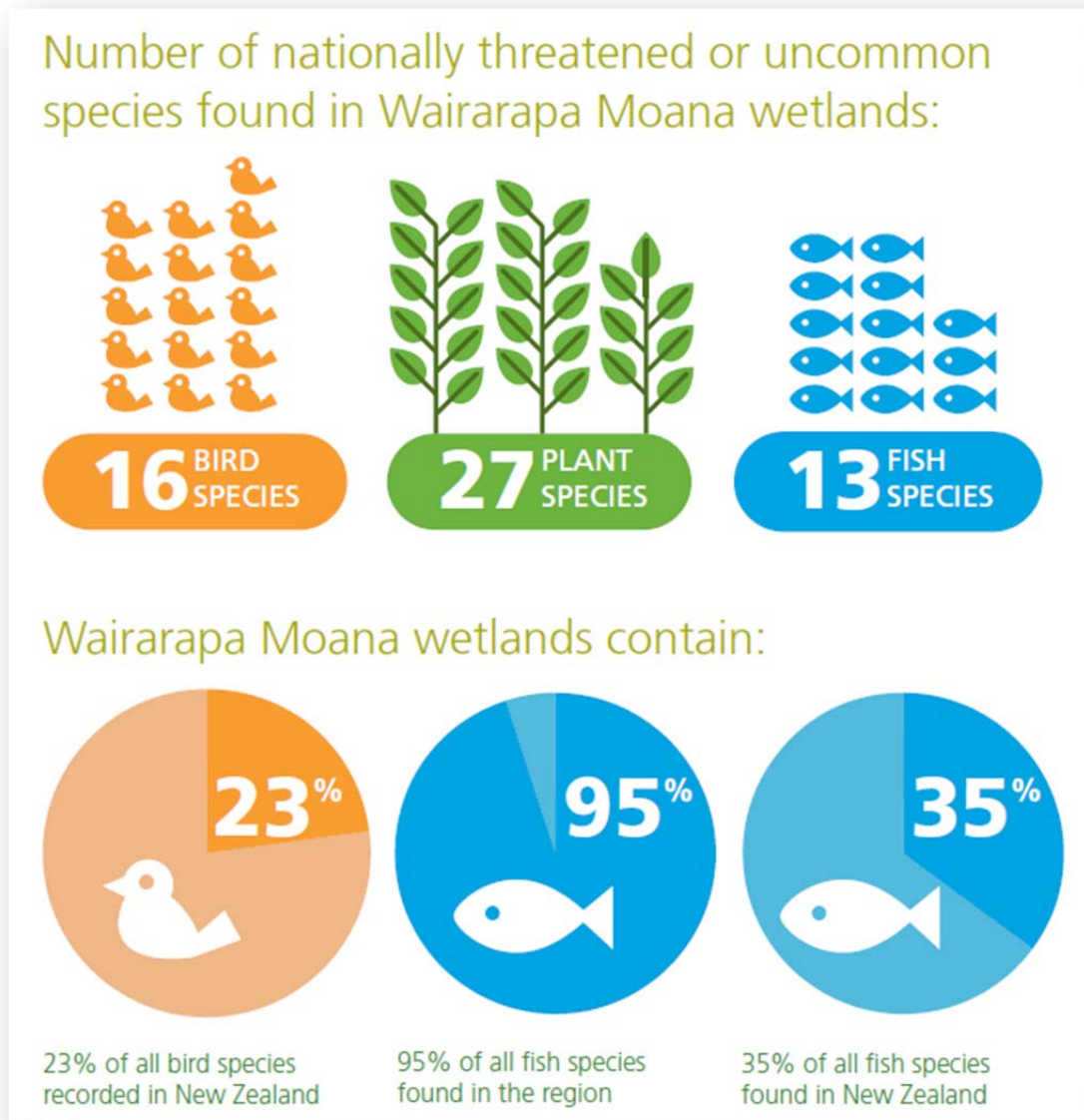
## **6.4 Protect, manage and restore wetlands**

What the science is saying...

Wairarapa Moana is an internationally important wetland and the largest lake and wetland complex in the lower North Island. Historically Wairarapa Moana was an unparalleled resource for tangata whenua. The tuna fishery provided food and a basis for trade that underpinned the wellbeing and cultural standing

of a widespread community. Although over a century of development (including the associated drainage and flood control schemes) has left the lake in a highly modified state, it still retains a number of high ecological values.

In 1991 minimum lake levels were set, partly because of the needs of wading birds that use the lake edge to feed and roost. Prior to this, DoC undertook surveys to assess the abundance of birds living there. In 2011 we restarted those surveys to determine whether there has been any changes in bird numbers since lake levels were set. Quite a few species have increased in number including the NZ dabchick, black shag and black-fronted dotterel. A smaller number of species have declined in number including the pied stilt and spur-winged plover.



Wairarapa Moana is also a regular feeding and resting place for international migratory birds. The kuaka (or bar-tailed godwit) undertakes a 12,000 km non-

stop flight from the Arctic to New Zealand in September every year – one of the longest non-stop flights carried out by any bird species anywhere in the world.

**What are we doing about it?**

Due to its regional, national and international importance Wairarapa Moana is in the final stages of achieving Ramsar status (the first site in New Zealand to do so in the last 10 years).

We also established the Wairarapa Moana Wetlands Project in 2010 to improve the health and restore the mauri of the lakes and surrounding wetlands. This project is a partnership between GWRC, the Department of Conservation (DoC), Ngāti Kahungunu ki Wairarapa, Rangitāne o Wairarapa, South Wairarapa District Council and Papawai and Kohunui marae.

DoC manages the delivery of ecological restoration activities and GWRC provides overall project coordination and financial support (75 percent of the annual \$264,000 operational budget). Ecological restoration activities include pest animal and plant control and restoration planting. GWRC also supports volunteer groups, school groups and the wider community in delivering restoration activities.

In the Ruamāhanga there are 53 significant wetlands and four outstanding wetlands. Five of these are actively managed as part of the KNE Programme. An additional five (Ti kouka Swamp, Tairoa wetland, Gretel Dick wetland, Taumata Lagoon wetland and Lake Nganoke wetlands) are part of our Wetland Programme.

The Wetland Programme involves providing advice on wetland restoration as well as incentives for landowners for restoration activities. Restoration activities which have been supported through the programme include pest animal and plant control, restoration planting and fencing. The programme aims to protect and restore even more wetlands in the Ruamāhanga by signing up new landowners.

## **6.5 Protect freshwater bodies and coastal waters against pollution**

**What the science is saying...**

As shown by the table below, freshwater quality in rivers in the Ruamāhanga is variable and a good example of how water quality is affected by land use. Sites rated as *Excellent* are typically in areas where the predominant land cover is indigenous forest, whereas sites rated *Poor* or *Fair* are all in areas where the predominant land cover is pasture.

There is a reasonable relationship between water quality and the insects and bugs that live in the riverbed (as measured by the MCI – Macroinvertebrate Community Index). Sites that have *Excellent* or *Good* water quality also tend to be classed as *Excellent* or *Good* on the MCI. Similarly, sites with *Poor* or *Fair* water quality also tend to be classed as *Poor* or *Fair* on the MCI.

Sites with elevated levels of algae are also all located in areas where the predominant land cover is pasture.

Site Name	Dominant Land Cover	Substrate Type	Water Quality Grade	MCI Quality Class	Periphyton WCC (maximum)
Ruamahanga River at McLays	Indigenous forest	Hard	Excellent	Excellent	0.5
Ruamahanga River at Te Ore Ore	Pasture	Hard	Excellent	Good	16
Ruamahanga River at Gladstone Bridge	Pasture	Hard	Excellent	Good	43
Ruamahanga River at Pukio	Pasture	Hard	Good	Good	32
Taueru River at Castlehill	Pasture	Soft	Fair	Good	Not measured
Taueru River at Gladstone	Pasture	Hard	Good	Fair	37
Kopuaranga River at Stuarts	Pasture	Hard	Fair	Fair	95
Whangaehu River upstream of confluence	Pasture	Soft	Fair	Poor	Not measured
Waipoua River at Colombo Road Bridge	Pasture	Hard	Good	Fair	43
Waingawa River at South Road	Indigenous forest	Hard	Excellent	Good	15
Parkvale tributary at Lowes Reserve	Pasture	Hard	Poor	Fair	0
Parkvale Stream at weir	Pasture	Hard	Fair	Poor	33
Waiohine River at Gorge	Indigenous forest	Hard	Excellent	Excellent	0
Waiohine River at Bicknells	Pasture	Hard	Good	Good	6
Beef Creek at headwaters	Indigenous forest	Hard	Excellent	Excellent	0
Mangatarere Stream at State Highway 2	Pasture	Hard	Fair	Good	84
Huangarua River at Ponatahi Bridge	Pasture	Hard	Excellent	Fair	93
Tauanui River at Whakatomotomo Road	Indigenous forest	Hard	Excellent	Excellent	20
Tauherenikau River at Websters	Pasture	Hard	Excellent	Good	3
Waiorongomai River at Forest Park	Indigenous forest	Hard	Excellent	Excellent	0.8

From a recreational water quality perspective, water quality is generally pretty good over the summer, except in poor weather conditions. Heavy rain flushes contaminants from urban and rural land into water and can affect water quality for up to two days afterwards.

Despite being relatively wet, water quality during the 2016/17 summer was still good most of the time. Only 7 samples out of 194 (4%) exceeded the guideline for safe swimming, and all of these were rainfall related.

The wetter conditions also meant that toxic algae growth was not as problematic as the previous year. Only two alert levels were recorded at the Waipoua River at Colombo Rd site early in the season, compared to the last season when toxic algae warnings remained in place from late December through to February 2016.

Water quality in lakes Wairarapa and Onoke haven't changed that much since monitoring began. Both lakes are facing issues associated with nutrient enrichment and poor water clarity. Excessive algae growth can also occur at times.

Variable	TL Value	TL Class
Total nitrogen (mg/L)	4.6	Eutrophic
Total phosphorus (mg/L)	5.5	Supertrophic
Secchi depth (m)	6.6	Hypertrophic
Chlorophyll <i>a</i> (mg/m <sup>3</sup> )	4.0	Eutrophic
<b>Overall TLI</b>	<b>5.1</b>	<b>Supertrophic</b>

**Lake Wairarapa is classed as *Supertrophic* meaning it has very high levels of nutrients.**

Variable	TL Value	TL Class
Total nitrogen (mg/L)	4.4	Eutrophic
Total phosphorus (mg/L)	4.7	Eutrophic
Secchi depth (m)	5.8	Supertrophic
Chlorophyll <i>a</i> (mg/m <sup>3</sup> )	3.2	Mesotrophic
<b>Overall TLI</b>	<b>4.5</b>	<b>Eutrophic</b>

**Lake Onoke is classed as *Eutrophic* meaning it has high levels of nutrients.**

Lake Pounui also shows signs of degradation and is classed as being in a *Moderate* ecological condition.

What are we doing about it?

One of the key things we do to protect our waterways against pollution is prohibit or restrict the direct discharge of animal effluent, wastewater and other types of pollutants into our rivers and streams.

All animal effluent discharges are monitored to ensure compliance with consent conditions. Resource consents require collected animal effluent to be discharged to land, ie, there are no resource consents that allow the direct discharge of effluent to water. The table below shows the latest compliance ratings for the Ruamāhanga.

<b>Complying</b>	No further action required.
<b>Minor non-compliance</b>	Condition(s) not met. No environmental effects. Some action required.
<b>Major non-compliance</b>	Condition(s) not met. Immediate action required.

	<b>Total</b>	<b>Complying</b>	<b>Minor non-compliance</b>	<b>Major non-compliance</b>
Dairy farms	150	125	21	4
Dairy farm and piggery	2	1	0	1
Piggery	2	2	0	0
Chicken farms	6	5	1	0
Truck washes	1	1	0	0
Other facilities	2	2	0	0
<b>Total</b>	<b>163</b>	<b>136</b>	<b>22</b>	<b>5</b>

In relation to dairy farms, the major non-compliances are mainly related to overflow issues and excessive irrigation. All cases of major non-compliance were at sites that were previously complying. The action taken was a mixture of formal action (including infringement fines) and education.

A key education focus has been ensuring farms have adequate storage facilities on site. Adequate storage is required to allow for deferred irrigation, ie, effluent is stored in ponds when soil is saturated and irrigated at times when the nutrients can be taken up by the root system of the pasture. If not managed well, effluent irrigation leads to ponding and runoff into adjacent surface water, or leaching into the groundwater.

One of the main point sources of contaminants to the Ruamāhanga River, either directly or indirectly through its tributaries, comes from the Wairarapa towns' wastewater treatment plants. All the towns are committed to removing the vast majority of discharges from water to land-based systems over the next twenty years, and Carterton and Masterton are already discharging treated wastewater to land during summer and low flows.

Many of our other activities including the work we do with landowners on managing land (refer section 8.2), protecting and restoring wetlands (refer section 8.3) and ensuring there is enough water in our waterways to maintain environmental health (refer section 7.2) all contribute to achieving this outcome as well.

## **7. Environmental Outcome – Iwi are our true partners**

### **7.1 What does this mean?**

This is about ensuring we have a true and trusted partnership with iwi at all levels including governance, decision-making and implementation. The key things we do in this regard are:

- Te Upoko Taiao
- Whaitua committees
- Cultural Health Monitoring

## 7.2 Te Upoko Taiao

Te Upoko Taiao - Natural Resources Plan Committee was established in 2009. The purpose of Te Upoko Taiao is to promote the sustainable management of the region's natural and physical resources by overseeing GWRC's regulatory responsibilities in relation to resource management, including the review and development of regional plans.

The formation of Te Upoko Taiao enabled all matters pertinent to the regional plan review process to be reviewed and discussed by Council and mana whenua together. The result is that the pNRP both integrates mana whenua perspective and also specifies mana whenua values in objectives, policies, methods and schedules throughout the document.

Te Upoko Taiao also established a set of guiding principles to underpin the overall management approach of the pNRP:

1. *Ki uta ki tai (connectedness)* – Managing natural and physical resources in a holistic manner, recognising they are interconnected and reliant upon one another.
2. *Wairuatanga (identity)* – Recognition and respect for mauri and the intrinsic values of natural and physical features, and including the connections between natural processes and human cultures.
3. *Kaitiakitanga (guardianship)* – Recognition that we all have a part to play as guardians to maintain and enhance our natural and physical resources for current and future generations.
4. *Tō mātou whakapono (judgement based on knowledge)* – Recognition that our actions will be considered and justified by using the best available information and good judgement.
5. *Mahitahi (partnership)* – Partnership between Greater Wellington (Wellington Regional Council), iwi (mana whenua) and the community, based on a commitment to active engagement, good faith and a commonality of purpose.

## 7.3 Whaitua committees

Whaitua committees work in partnership with mana whenua to develop catchment-specific recommendations for the management of land and fresh water resources. The work of the committees is guided by the five principles noted in section 9.2 above. More about the role of the whaitua committees and the work of the Ruamāhanga Whaitua Committee is outlined below in section 10.3.

## **7.4 Cultural health monitoring**

A current project, the Regional Kaitiaki Monitoring Framework, is underway to develop a framework for undertaking cultural health monitoring in partnership with mana whenua and give effect to local kaitiakitanga.

This works towards meeting our obligations to iwi under the NPS-FM and the pNRP. Mahinga kai and māori customary use are key shared objectives for several non-regulatory methods in the pNRP and we intend to use method 2 (kaitiaki monitoring and information strategy) to define mahinga kai and māori customary use and how that will be monitored within each rohē.

In the Ruamāhanga this means working with the Ruamāhanga Whaitua Committee to identify mana whenua values and needs. By taking the specific needs of Kahungunu and Rangitāne and developing cultural monitoring strategies we aim to encourage and support long-term cultural monitoring by kaitiaki. The framework will also address how cultural information can be reported.

## **8. Environmental Outcome – communities are engaged and participating**

### **8.1 What does this mean?**

This is about ensuring our communities know what we do, understand how they can contribute, and are positively engaged and participating. The key things we do in this regard are:

- Mahi Waiora
- Ruamāhanga Whaitua Committee
- Citizen Science
- Engagement and Education

### **8.2 Mahi Waiora**

Mahi Waiora is a new approach to how we work with landowners to improve water quality. It's about bringing together the Environment Management and Catchment Management groups so we can provide clear support and advice to landowners, helping them manage their land in a sustainable way.

Under the pNRP there will be changes to the rules around what landowners can do on their land, in particular the exclusion of stock from waterways and the protection of scheduled wetlands. To make sure they're ready and able to do the right thing, we need to deliver three things:

1. Training for everyone who interacts with landowners so they are empowered to represent GWRC as a whole, not just within the perspective of their role.
2. Developing further training, systems and tools to support staff to be able to improve how we work across our various functions, and see our work as part of the larger whole.
3. Work with industry groups and landowners to develop information about how the changes in the pNRP will affect them, why those



changes are important and what support we can offer them to be ready to meet the new requirements.



The six programmes which will help us deliver Methods 12 (sustainable land management practices) and 20 (wetlands) in the pNRP

### 8.3 Ruamāhanga Whaitua Committee

The whaitua process forms the basis of how we intend to implement the NPS-FM. The NPS-FM includes minimum standards for freshwater that Councils must seek to achieve, and requires overall water quality in a region to be maintained or improved. This is partly achieved via the setting of limits for each catchment.

Our process for setting catchment-based limits is through the pNRP and the whaitua committees. Whaitua committees are groups of local people responsible for developing a Whaitua Implementation Programme (WIP) in conjunction with their community. A WIP describe the ways in which the people from that catchment want to manage their water now and for future generations through a range of integrated tools, policies and strategies.

The Ruamāhanga Whaitua Committee was established in December 2013, and is working to produce their WIP by the end of 2017. The WIP will contain recommendations for provisions for the Ruamāhanga section of the pNRP, and for work programmes for the integrated management of land and water resources within the catchment.

Following extensive discussions across the community the committee has developed:

- A set of community values
- A list of key catchment issues
- A vision and outcomes they would like to see for the catchment:
  - Vision: Wairarapa – Where Water Glistens
  - Outcomes: The future is engaged communities proactive in the long term sustainability of the catchment as a whole. A place 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.

#### **8.4 Citizen Science**

Citizen science is growing worldwide as a way of collecting extra data and information, and increasing scientific knowledge. Supporting citizen science will allow us to expand environmental monitoring activities in the Wellington Region (using a limited amount of funding and resources) while engaging more closely with our communities.

A draft Citizen Science Implementation Framework has been developed and will be tested using two pilot citizen science projects. One of these is in the Ruamāhanga with a group of landowners and iwi interested in better understanding and improving water quality in the Kourarau Stream and associated wetlands.

Under the Wairarapa Moana Wetlands Project, the local community are contributing to a citizen science programme to monitor the kākahi population of Lake Wairarapa as an indicator of wetland health.

#### **8.5 Engagement and Education**

We undertake a huge number of engagement and education activities, but possibly one of our more prominent education campaigns has been *Is it safe to swim?*

This campaign seeks to enable people to make informed choices about when and where to swim, as well as educate them about one of the key factors affecting swimming water quality – rain. Swimming water quality in our rivers and at our beaches is actually pretty good over the summer, except in poor weather conditions. Heavy rain flushes contaminants from the land into water and we advise people not to swim for at least two days after rain, even if a site generally has good water quality.

Another emphasis of the *Is it safe to swim?* campaign is informing people (particularly dog owners) about toxic algae, including any toxic algae warnings and how to spot it.

A couple of years ago we developed an interactive water quality map <http://bit.ly/WaterQualityMap> and last summer we ramped up our communication efforts through more extensive use of social media. Every Friday over the summer period we put up a Facebook post advising people of any current water quality or toxic algae warnings, as well as the outlook for the weekend. This included a series of “Tank Talks” to better engage with dog owners (see example below).

**Greater Wellington Regional Council**  
February 3 · 🌐

My fellow canines,  
Isn't it nice to see the sun again!  
My human informant tells me that there are high levels of toxic algae in Henley Lake in Masterton. It's a great spot for a walk but if you take your human down there do not drink out of the lake. I repeat, **DO NOT DRINK OUT OF THE LAKE**. Oh, and watch the small humans, it's not safe for them either so make sure they don't go into the water.  
Woof, Tank.

For more information on toxic algae in Henley Lake check out <https://www.mstn.govt.nz/eve.../latest/images/algiedechigh.jpg> and <https://www.mstn.govt.nz/.../healthbro.../HenleyLakebrochure.pdf>



👍 Like    💬 Comment    ➦ Share

👍 You, Tina Love, Lian Potter and 19 others

14 shares

## 9. Environmental Outcome – Is freshwater quality being maintained or improved?

A draft report (due to be published in July) has analysed water quality trends for rivers and lakes in the Wellington Region. The analyses covered water quality as well as biological parameters (ie, algae growth and aquatic insects). A new assessment method, which assesses the direction of a trend, was used. If the direction of the trend could not confidently be inferred, the trend was considered to be ‘uncertain’.

Some of the key findings for river/stream sites in the Ruamāhanga:

1. Most of the water quality analyses resulted in uncertain trends.
  - a. The most notable trend was in **water clarity**. Approximately 60 percent of sites in the Ruamahanga showed an improving ten-year trend in water clarity. No sites showed a degrading trend.
  - b. There were a small number of sites that showed degrading **nitrogen** trends and a small number of sites that showed improving trends.
  - c. There were a small number of sites that showed improving trends in ***E.coli*** and **phosphorus**.
  - d. Most sites showed no consistency in trends across **multiple variables**, the exceptions being Enaki and Mangatarere streams which exhibited improving trends across a number of variables.
2. At most sites **periphyton (Chlorophyll *a*)** trends were classified as uncertain. However, there were a small number of sites that showed an improving trend. No sites showed a degrading trend.
3. At most sites the **MCI (Macroinvertebrate Community Index)** trends were classified as uncertain. However, there were a small number of sites that showed an improving trend. Only one site showed a degrading trend.

Some of the key findings for lakes Onoke and Wairarapa:

1. Water quality trends (five-year) for Lake Onoke were mostly classified as uncertain. The trend for **Secchi depth** is increasing suggesting water clarity is improving. Further, the trends for **TP (total phosphorus)** and the **TLI (Trophic Level Index)** are decreasing indicating the lake’s nutrient status is improving.
2. Water quality trends (five-year and ten-year) for Lake Wairarapa were mostly classified as uncertain. The trends for **TP (total phosphorus)**, **TKN (total Kjeldahl nitrogen)** and the **TLI (Trophic Level Index)** are decreasing indicating the lake’s nutrient status is improving.

What is apparent is that better water quality, and the associated healthy ecosystems that we want to achieve with it, will not happen overnight. Our water quality today is the result of over 100 years of mismanagement, and it will probably take a further 100 years to put it back to a healthy state.

It is only over the last 30 years or so that the thinking around the value of our freshwater resources has changed dramatically, and our actions are yet to fully catch up with our thinking. Restoring the health of our waterways needs to be

thought of not as some short-term engineered ‘corrective surgery’, but as a life-long journey back toward ‘healthy living’.

## **10. Moving forward**

To maintain and restore water quality in the Ruamāhanga catchment will require a collaborative effort between affected communities and government agencies mandated to bring change.

The process of creating behaviour change will be a long journey, one where mistakes will be made. Flexibility and adaptability will be essential for all parties. The key will be working together, using a mix of non-regulatory and regulatory methods. Industry participation and leadership will be essential.

## **11. Communication**

No communication is necessary.

## **12. Consideration of Climate Change**

The matters addressed in this report have been considered by officers in accordance with the process set out in the GWRC Climate Change Consideration Guide.

Climate change is further discussed in above in section 5.4 of this report.

## **13. The decision-making process and significance**

No decision is being sought in this report.

### **13.1 Engagement**

Engagement on this matter is not necessary.

## **14. Recommendations**

*That the Committee:*

- 1. Receives the report.*
- 2. Notes the content of the report.*

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