

Title: Nutrient management in the Ruamāhanga catchment

Purpose: To provide information on nutrient management in the Ruamāhanga catchment

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Nutrient management in the Ruamāhanga catchment

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1. Background

This report has been prepared for the Ruamāhanga Whaitua Committee (the Committee) to assist them in identifying nutrient management issues to be addressed by the Whaitua Implementation Programme.

The report briefly details the problems associated with nutrient discharges and current water quality in the whaitua, then outlines the current regulatory and non-regulatory approaches to managing nutrients in the whaitua. The information provides the basis for the Committee to consider the nutrient issues that need to be addressed by management approaches in the Whaitua Implementation Programme.

The terms of reference for the Committee direct the management of nutrients as a key task, and specifically include developing:

- water quality limits, including nutrient load and contaminant limits for freshwater and coastal waters if appropriate
- programmes or activities that will support or contribute to the achievement of the established objectives and targets for water quality and quantity outcomes, including such tools as environmental accords and post-settlement arrangements.

2. What's the problem?

Nitrogen and phosphorus are two nutrient pollutants of particular interest in the Ruamāhanga whaitua. They are essential nutrients, but when excess nitrogen and phosphorus end up in fresh water and coastal water, they can cause problems. Too much nitrogen can be toxic to fish and some other aquatic life. It can also affect humans and animals that drink fresh water.

Nutrients contribute to the growth of algae (periphyton in rivers and phytoplankton in lakes) and aquatic plants. Excessive algae and weeds can degrade swimming and fishing spots, reduce the quality of habitat for macroinvertebrate and fish species, and deplete oxygen in the water, sometimes to the point of suffocating aquatic life. Cyanobacteria blooms which can occur in rivers and lakes can be toxic to humans and other animals.

Reports by the Parliamentary Commissioner for the Environment (e.g. PCE, 2013) describe the fundamental distinction between nitrogen and phosphorus that effects how they get into fresh water. Nitrogen – in the forms in which it generally gets into water – is very soluble. This means it flows relatively easily across land, and leaches down through soil into groundwater, ultimately making its way into rivers, lakes, estuaries and groundwater. Because of this solubility, the Parliamentary Commissioner for the Environment describes nitrogen as the “elusive” one.

In contrast, phosphorus tends to stick to soil. As soil is washed into water, it not only builds up as layers of sediment, but takes phosphorus with it. Some phosphorus becomes dissolved in water and can be taken up by aquatic plants, but most phosphorus in waterways is trapped in, and therefore accumulates in, sediment. This phosphorus can be released again under the right conditions and thus be available for plant growth. For this reason the Parliamentary Commissioner for the Environment describes phosphorus as the “sticky” one.

3. Sources of nitrogen and phosphorus

Compounding the problem of incomplete management is that nutrients in rivers, lakes and groundwater in the Ruamāhanga catchment come from two sources that are managed quite differently: point source discharges and diffuse source discharges.

Significant point source discharges of nitrogen and phosphorus into rivers and lakes in the Ruamāhanga occur from community wastewater treatment systems at Masterton, Carterton, Greytown, Featherston and Martinborough. At Carterton, discharges are made to land during summer months and at Masterton some discharges also go to land. Wastewater discharges contain dissolved phosphorus as well as other nutrients.

Planning is underway for community wastewater discharges in the Ruamāhanga catchment to progressively be moved to land rather than continuing these discharges directly to water. At the present time, while direct discharges of wastewater are monitored and nutrient loads going into rivers can be roughly estimated, no numeric loads are included in the conditions of resource consents.

Diffuse or non-point source discharges of nitrogen and phosphorus in the Ruamāhanga whaitua come largely from agricultural runoff and leachate. There will also be some contribution from urban stormwater that is likely to be relatively small and potentially from leaky or poorly performing parts of wastewater networks. Because of the 'stickiness' between phosphorus and sediment, a large proportion of non-point source phosphorus is delivered to water through erosion and overland flow. These diffuse discharges are not currently monitored or measured by Wellington Regional Council (WRC), so the ability to estimate contaminant loads is difficult at present.

4. Nutrient impacts in the Ruamāhanga whaitua

The Committee has already received reports that compare water quality in the Ruamāhanga catchment with NPS-FM attributes (Greenfield and Perrie 2015) and regional measures (Bunny et al. 2014 (a, b and c)). These reports indicate that at some monitoring sites water quality does not meet NPS-FM bottom line attributes or attributes that are currently used regionally. Of particular importance is that the NPS-FM attributes are required to be achieved through the freshwater objectives of the proposed Plan and any limits or targets that are established in it.

The attribute states in the National Objectives Framework in Appendix 2 of the NPS-FM provide several nutrient related attributes for aquatic ecosystem health in rivers (periphyton biomass, nitrate-N toxicity and ammoniacal N toxicity). Initial examination suggests sites unlikely to meet the NPS-FM bottom line for periphyton are the Kopuaranga River, Taueru River, Parkvale Stream and the Huangarua River (Greenfield and Perrie, 2015). Comparing the ecosystem health attribute for nitrate toxicity indicates that it is exceeded in the Parkvale Stream.

Data from Lake Wairarapa and Lake Onoke are assessed against NPS-FM bottom line attributes. The lake attributes do not apply to Lake Onoke because it is in the coastal marine area and is classified as an Intermittently Closed and Open Lake/Lagoon. The Ministry for the Environment has advised they are likely to be included in future iterations of the NPS-FM. Of these attributes, the amount of phosphorus in Lake Wairarapa exceeds the bottom line attribute state in the NPS-FM.

The Collaborative Modelling Project will generate information to support the Committee in making their recommendations for land and water management in the Ruamāhanga whaitua. The project will produce a range of modelling outputs including groundwater and surface water contaminant flow. Some of the modelling outputs are expected in late February. The modelling outputs will be presented to the Committee as soon as they become available.

5. Regulating nutrient management

The Regional Freshwater Plan (RFP), made operative in 1999, includes policies for the management of water bodies according to contaminant guidelines. These guidelines address contaminant discharges broadly. There is no specific direction for nutrient contaminants discharged to land or fresh water in the RFP.

The RFP is being replaced by the Proposed Natural Resources Plan (the proposed Plan) which was publicly notified in July 2015. The proposed Plan has region-wide objectives, policies and rules for the management of water quality. The process for preparing the new plan has two stages. The two stages are publicly notifying region-wide provisions in the proposed Plan followed by including within it catchment-specific provisions recommended by whaitua committees. WRC's programme for implementation of the NPS-FM (WRC 2014) establishes that whaitua committees will be responsible for recommending water quality limits that will be included in the regional plan. However, the proposed Plan does provide some direction and this is discussed below.

5.1 Objectives

The proposed Plan includes a number of objectives relating generally to water quality and contaminant discharges (objectives O23 to O30). Objectives identify environmental states the proposed Plan is trying to achieve and gives management directions.

Objective O25 is an objective that includes specific reference to water quality connected to the effects of nutrient discharges. Improvement is required when standards identified in the objective for aquatic plants (macrophytes), algae (periphyton), or nutrients (nitrates in the case of groundwater) are not being met. In the case of periphyton in rivers and streams, specific numeric standards are identified. In the case of aquatic plants and nutrients the standards are descriptive rather than numeric.

Objective O46 on discharges provides a clear direction that discharges to land should be managed to reduce the runoff or leaching of contaminants reaching water. See appendix one for the full wording of O25 and O46.

5.2 Policies

Policies in the proposed Plan identify matters that are relevant when resource consent applications are considered and generally what the Council considers appropriate in the management of natural resources.

The proposed Plan includes a number of policies relating generally to water quality and contaminant discharges to water (P62 to P105). A number of these policies more specifically relate to nutrient discharges - P65, P68, P81, P83, P84, P85, P96 and P101 (see Appendix 1).

Some important policies in the proposed Plan to note in regards to nutrient management include:

- P65 states that the effects of nutrient discharges from agricultural activities should be minimised
- P68 identifies types of discharges directly to water which are not appropriate and therefore should be avoided (these include untreated wastewater, untreated animal effluent and untreated organic waste or leachate from stored organic material)
- P81 and P83 give directions on the management of point source discharges of wastewater to water, including that new discharges are to be avoided and for existing discharges of nitrogen and phosphorus are to be progressively improved and the quantity of discharges progressively reduced
- P84 and P85 which state that on-site domestic wastewater are to be designed, operated and managed according to the relevant New Zealand Standards
- P96 states rural land use activities shall be managed using good management practice
- P101 states that the impacts of sediment and nutrients on water should be managed in accordance with good management principles, including in regards to riparian margins, livestock exclusion and the management of pest plants and animals.

5.3 Rules

Discharge and land use rules in the proposed Plan identified below have the potential to result in nitrogen and phosphorus entering rivers, lakes and groundwater (in small quantities in some cases). Activities that are not permitted or prohibited by rules in the proposed Plan require resource consent. Table 1 sets out the rules most relevant to nutrient discharges.

Table 1: Regulation of activities relevant to nutrient management (generate or transport nutrients) in the proposed Plan

*Unless the activity does not meet the conditions of the relevant rule, in which case it requires consent

† But may be consented if less than minor effects or is supported by policies in the proposed Plan

Does not require consent*	Requires consent	Inappropriate [†]
<p>Minor discharges to water and land (R42 and R69)</p> <p>Discharges from existing drainage schemes (R59) or water races (R58) to water</p> <p>Discharges from pit latrines (R71), composting toilets (R72), greywater (R73) or onsite wastewater (R74 and R75) to land</p> <p>Application of Aa biosolids (R77), fertiliser (R82) or compost (R85) to land</p> <p>Application and storage of silage and compost (R90)</p>	<p>Discharges of collected animal effluent (e.g. effluent ponds) (R83 or R84)</p> <p>Discharges that do not meet permitted activity conditions (R67 or R93)</p> <p>Cultivation and break-feeding that does not meet permitted activity conditions for these activities (R151)</p>	<p>Discharges of untreated wastewater</p> <p>Discharges of collected animal effluent directly to water</p>

There are some land uses rules in the proposed Plan that regulate activities associated with phosphorus getting into rivers and lakes. Because phosphorus is “sticky” and usually associated with sediment discharges, the relevant land use rules are discussed in the report on sediment management going to the 9 February 2016 meeting of the Committee.

5.4 Summary of proposed Plan regulations

Objectives in the proposed Plan are directed at reducing run-off or leaching and improving discharges over time where water quality is known to be poor. Policies seek the progressive reduction of community wastewater discharges and minimisation of the adverse effects of nutrient discharges from agricultural activities.

The Plan regulates point source and diffuse source discharges unevenly. Point source discharges from community wastewater systems require resource consent and conditions are able to be put on these discharges to control them. Diffuse source discharges are generally permitted activities and the approach to managing them in the proposed Plan relies on landowners carrying out good practice.

The objectives, policies and rules in the proposed Plan are region-wide and WRC’s intention expressed through its programme for implementing the NPS-FM (WRC 2014) is that they will be complemented and improved by catchment-specific provisions recommended by each whaitua committee. This means the Ruamāhanga Whaitua Committee needs to identify freshwater objectives, values, attributes and limits for nutrients relevant to the Ruamāhanga catchment and sub-catchments.

6. Non-regulatory nutrient management practices

6.1 Proposed Plan

The proposed Plan includes non-regulatory methods that enable and promote continuation of current farm planning initiatives. In particular, Method M12 encourages good management practice on-farm, recognising the relationships between Council, landowners and rural industries. This method specifically directs assistance in farm planning to catchments known to have nutrient management issues, including naming the Mangatarere, Taratahi/Parkvale and Lake Wairarapa catchments as priorities. Method M12 also commits the Council to assist in fencing and riparian management works. Method M28 states that the Council will continue to develop material to support good management practice, including in collaboration with industry and other relevant groups.

Method M10 recognises that where water quality, including from nutrient contamination, does not meet the objectives of the proposed Plan, further investigation is required to understand the causes of these issues and identify potential management solutions. In the Ruamāhanga, those water bodies identified are the Parkvale Stream and associated Taratahi groundwater zone (for elevated nitrate and periphyton), the Te Ore Ore, Tauherenikau and Martinborough groundwater zones for elevated nitrate levels, and the Waipoua and Ruamāhanga Rivers for elevated cyanobacteria events.

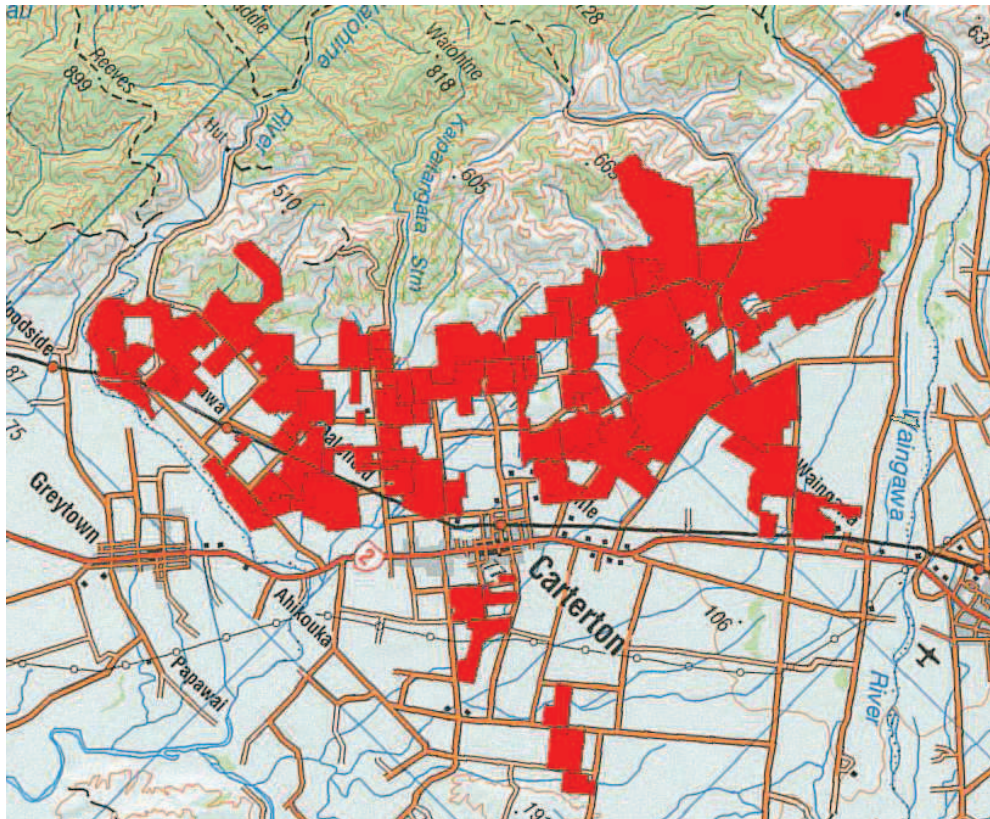
6.2 Farm planning background and context

Farm planning as a tool to achieve sustainable land use practices has a long history in the Wairarapa, with the first plan being prepared in the 1950s. The target of these plans was initially focused on hill country properties in the eastern Wairarapa to address soil erosion issues. Hill country farm plans do not cover nutrient management. These plans have provided a very successful mechanism to assist landowners bring about sustainable land use change whilst developing and maintaining a healthy relationship between WRC and the landowner.

In 2011, the WRC Land Management department undertook a pilot project working with intensive land users in the Mangatarere Catchment, west of Carterton. The initiative for this pilot came from a detailed report generated by the Environmental Science team at WRC in July 2010. This report identified degraded water quality within the catchment with the main contaminants being E.coli, nitrogen and phosphorus. This pilot project initially worked with four dairy farmers within the catchment and revolved around the development of a comprehensive Land Environment Plan (since renamed Farm Environment Plan – FEP) and an annual farm winter works programme based to a large extent on the model used in the eastern hill country.

Since the programme's inception thirty one FEP, have been produced in the Ruamāhanga whaitua. The main success of the programme thus far has been the high level of landowner engagement and their motivation to interact with the regional council in a non-regulatory manner. The relationships developed are positive and have led to an awareness being built around good land management practices whilst helping landowners learn about their farms natural resources. Landowners are well aware of change on the horizon in regards to nutrient management and are looking for support and guidance.

Figure 1. Coverage of Farm Environment Plans in the Mangatarere (shown in red)



As part of WRC's 2015/16 Long Term Plan (LTP), the Land Management Department will have funding to expand the programme to other parts of the Ruamāhanga Valley, outside of the Mangatarere catchment. A particular focus will be to capitalise on the relationships developed with South Wairarapa farmers as part of the Wairarapa Moana Fresh-Start for Freshwater Project, which finished in October 2015. This project has been co-funded by the Ministry for the Environment.

The current strategy developed for the expansion of the FEP programme in the Ruamāhanga includes three goals detailed in Appendix 2.

7. Next steps

Following this report the Committee can consider issues relating to discharges of nutrients in the Ruamāhanga Catchment. A list of issues discussed by the Committee will be brought back to a subsequent meeting and management options will be developed.

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Appendix 1: Plan objectives and policies directly related to nutrient discharges

Objectives

Objective O25



To safeguard **aquatic ecosystem health** and **mahinga kai** in fresh water bodies and coastal marine area:

- (a) water quality, flows, water levels and aquatic and coastal habitats are managed to maintain **aquatic ecosystem health** and **mahinga kai**, and
- (b) **restoration** of **aquatic ecosystem health** and **mahinga kai** is encouraged, and
- (c) where an objective in Tables 3.4, 3.5, 3.6, 3.7 or 3.8 is not met, a fresh water body or coastal marine area is improved over time to meet that objective.

Objective O46



Discharges to Land are managed to reduce the runoff or leaching of contaminants to land

Policies

Policy P65: Minimising effects of nutrient discharges



The effects of nutrient discharges from agricultural activities that may enter water shall be minimised through the use of:

- (a) **good management practices**, and
- (b) information gathering, monitoring, assessment and reporting, and
- (c) integrated catchment management within the Wellington Regional Council and with the involvement of **mana whenua**, territorial authorities, water users, farmers, households, industry, environmental groups and technical experts, and
- (d) regulatory and non-regulatory methods, and
- (e) plan changes or variations resulting from catchment-specific recommendations from the **whaitua** committee process.

Policy P68: Inappropriate discharges to water



Discharges to fresh and coastal water of:

- (a) untreated **wastewater**, except as a result of extreme weather-related overflows or **wastewater** system failures or from recreational boating activities, and
- (b) **animal effluent** from an **animal effluent** storage facility or from an area where animals are confined, and
- (c) untreated industrial or trade waste, and
- (d) untreated organic waste or leachate from storage of organic material

shall be avoided.

Policy P81: Minimising and improving wastewater discharges



The adverse effects of **existing discharges** of **wastewater** to fresh water and coastal water shall be minimised, and:

- (a) in the case of **existing discharges** to fresh water from **wastewater** treatment plants, the quality of discharges shall be progressively improved and the quantity of discharges shall be progressively reduced, and
- (b) in the case of **existing discharges** to fresh water or coastal water from **wastewater networks** during or following rainfall events, the frequency and/or volume of discharges shall be progressively reduced.

Policy P83: Avoiding new wastewater discharges to fresh water

New discharges of **wastewater** to fresh water are avoided.

Policy P84: On-site domestic wastewater management



More than minor adverse effects on fresh water, including groundwater and coastal water from discharges from **on-site domestic wastewater treatment and discharge systems** shall be avoided. **On-site domestic wastewater treatment and discharge systems** shall be designed, operated and maintained in accordance with the *New Zealand Standard AS/NZS 1547:2012 – On-site domestic wastewater management*.

Policy P85: Biosolids and treated wastewater to land



The adverse effects on fresh water, including groundwater and coastal water and on soil from the application of **biosolids** or treated **wastewater** to land shall be minimised. The application of **biosolids** shall be managed in accordance with *Guidelines for the safe application of biosolids to land in New Zealand, 2003*.

Policy P96: Managing land use

Rural land use activities shall be managed using **good management practice**.

Note

A limit, target and/or allocation framework will be established through the **whaitua** committee process and incorporated into the Plan through a future plan change or variation.

Policy P101: Management of riparian margins



In order to maintain or restore **aquatic ecosystem health** and natural character, and reduce the amount of sediments and nutrients entering **surface water bodies**, good management of riparian margins shall be encouraged including:

- (a) the exclusion of **livestock**, and
- (b) the planting of appropriate riparian vegetation, and
- (c) the management of pest plants and animals.

Appendix 2: Goals of the Farm Environment Plan Programme

Goal 1: The effective engagement of farmers into the FEP programme through the identifying of priority sub-catchments and the motivated farmers within those sub-catchments.

- Identify the priority sub-catchments based on land-use, soil types, water quality data and the critical source areas (CSAs) on farms within those priority sub-catchment areas.
- Identify the motivated farmers within these priority sub-catchment areas
- Direct marketing of the programme to these identified farmers highlighting the advisory service provided through these plans and the access to a contestable pool of funding for suitable on-farm projects.
- Recruit farmers as customers for change thus growing the pool of motivated farmers

Goal 2: Build farmer awareness of their farm and farming practices through collaborative processes. Build their understanding of how it interacts with their catchment as a whole; particularly in regards to water quality

- Prepare FEPs for the identified farmers targeting the specific issues identified for those priority sub-catchments.
- Work with farmers to develop an understanding of nutrient loss pathways on their property and to assess risks to water quality
- Identify CSA's at the farm level
- Develop specific projects that would mitigate nutrient loss from farms from CSAs identified. These actions will feedback into the catchment and sub-catchment outcomes identified
- Work with farmers to identify, define and advocate for good management practices (GMPs) on these farms. Use specific farm examples as demonstration sites.
- Provide technology transfer services that focus on GMPs, through field days, fact sheets and one-on one interaction with farmers.

Goal 3: Enabling of landowners to change behaviour to good farming practice through the processes of engagement and awareness.

- Foster the understanding that the farmer is the expert in regards to their farm and farming system.
- Develop appreciation of how their farm interacts in the catchment
- Encourage farmers to make changes and celebrate their successes

- Empower farmers to be champion's for change within their communities and professional networks
- Monitor progress of farmers through the programme.

The FEP programme is being designed to take a collaborative and flexible approach to finding mutually beneficial solutions to water quality issues. It is recognised that every farm is different and that 'one size fits all' solutions can be problematic. Further to this it is recognised that it is crucial that those implementing good practice need to be part of a process that identifies, defines and plans for its implementation.

To date the FEP programme has enjoyed good support from stakeholder groups and industry including CRIs, Federated Farmers, Fonterra, DairyNZ and Ravensdown through the life of the project. An alignment with industry and stakeholder groups such as Fonterra and Dairy NZ would allow a common message to be communicated to farmers. This would reduce farmer fatigue from being bombarded with conflicting messages from different parties. GW would also take the opportunity to identify and become involved in relevant collaborative projects with industry groups.