



PAPANUI

sub-catchment

January 2016

PAPANUI SUB-CATCHMENT

The Papanui sub-catchment is a priority area. Your support and action will help address water quality issues in your catchment and further down the Tukituki River.

If you have four or more hectares, rules in Plan Change 6 for Tukituki catchment apply to you. However doing the bare minimum to meet rule requirements will not be enough to improve the health of this catchment.

The Papanui sub-catchment is one of 17 in the Tukituki area, and covers 16,400 hectares. It contains about 130 farms, the majority running sheep and beef (80.5%), followed by cropping (10.2%), and some dairy production (4.5%). Papanui, along with five other sub-catchments, has unacceptably high nutrient levels. For this reason, Papanui will be a focus for HBRC in the next few years.

Even without this Plan Change, we need to improve how we use land to improve freshwater. We need to find a way to make a living from land sustainably, while improving the quality of our streams, rivers and wetlands for future generations.

BACKGROUND

Ōtane is the Papanui's largest settlement with Waipawa township just south and Pukehou to the north. There are local primary schools at Ōtane and Pukehou. Te Aute Māori Boys College and several schools outside the catchment boundary also associate with the Papanui community. Tangata whenua are represented by five marae at Mataweka, Tapairu, Pukehou, Kahuranaki and Te Whatuiāpiti.

The catchment landscape has been highly modified. Native forest remnants only exist in a few small pockets, mostly on the Raukawa Range. The vast lakes and wetlands have all but completely disappeared. The edges of these lakes and surrounding wetlands would have contained dense stands of raupō and harakeke (flax). Islands in the lake and the surrounding hill country would have been covered in lowland podocarp forest, dominated by tōtara, matai and kahikatea.

Māori have lived in the district since around 1250 following the arrival of Tara, the great explorer and the first known ancestor of the Ngāti Tara and Rangitāne tribes who first inhabited the Hawke's Bay region.

Since Tara's arrival, succeeding generations have valued the area for its abundance of mahinga kai (food resources). This included freshwater mussels, pipis and koura (crayfish), inanga (eel) as well as birds (including moa), and edible plants. In addition to food, the area offered other resources of flax, timber, and strategic and defensible pā sites.

The first European, William Williams arrived in the catchment in 1842 and it was his nephew, Samuel Williams, who changed the catchment's landscape and hydrology, overseeing the re-division of the Waipawa River and the draining of Lake Roto-ā-Tara, which formerly occupied more than 1500 hectares.

Native timber and flax harvesting were major industries here before the development of land for farming. Today the Papanui Catchment is well known for arable farming and crop production including grass seed, peas, maize and sweetcorn. Squash has been cropped on an impressive scale since the late 1980s, thriving in the low-lying peat areas.

Human activity has significantly altered the landscape in this catchment. Combined human activity can also significantly improve water quality in the future.

FAST FACTS: PAPANUI

Total area: 16,400 hectares

Average rainfall: 916mm/year. Range 800mm (Pukehou) to 1200mm Kaokaoroa Range

Soil types: Range from alluvial to peat and limestone formed soils, free draining to poorly drained.

Length of waterways: 111km 2nd-4th order streams (indicative)

Stock excluded waterways: 38%

Origin: Limestone springs in the Raukawa range and drainage channels on the flats

QEII covenants: 4 **DOC reserves:** 2

Contaminant issues: Phosphorus and bacteria

TUKITUKI PLAN CHANGE 6

is HBRC's first catchment-specific plan change, required by the National Policy Statement for Freshwater Management 2011.

The thing is..

this sub-catchment is the highest contributor of phosphorus to the Tukituki and is in the top 5% regionally for phosphorus concentrations.

CURRENT ISSUES

Simply stated, what comes from the land ends up in the water and affects water quality. Land managers hold the keys to improving water quality. Papanui stream adds high concentrations of phosphorus and bacteria to the Tukituki River.

SOME GOOD NEWS

Papanui is home to a number of native fish, with eels present across the catchment. More sensitive species such as koura (freshwater crayfish) and inanga are present in some patches. Some good work has already been done on local farms to look after water quality. Extending this work over a wider area would make a big difference and could extend the habitat to more sensitive species.



Phosphorus (P)

Phosphorus levels in the Papanui are the highest in the Tukituki catchment. Yields are double those of any other catchment and 10 times the target concentration level. Papanui is responsible for 23% of the total DRP (dissolved reactive phosphorus) load leaving the Tukituki, despite occupying only 6% of catchment land area. Reducing the loss of P from land to water is a key priority, as high nutrient levels fuel aquatic plant and algae growth both in the Papanui and further down the Tukituki.

Critical Source Areas

Most of the phosphorus losses (around 80%) come from a small part (20%) of the overall sub-catchment landscape. These areas generate significant phosphorus (P) loss and include land with high soil P levels, erosion, stock yards, tracks, races and intensively grazed areas. P losses can be reduced through improved management techniques. Anywhere with exposed soil is likely to be a 'critical source area'. Identifying critical source areas and ways to reduce P loss is a core component of your farm environmental management plan (FEMP).



Stock Access

A riparian assessment of the Tukituki catchment identified the Papanui as having poor riparian vegetation. The stream suffers from insufficient shading with 51% having no tree or shrub cover. 62% of stream edges are classed as moderately to highly disturbed by stock, with evidence of stream bank damage.

Stock exclusion will help to improve stream health. Widening buffer areas near streams and riparian planting will lead to further reductions in phosphorus and bacteria levels. Many small streams in the Tukituki get too hot in summer to support a range of in-stream life. Providing shade can reduce water temperature, decrease nuisance plant growth and increase the amount of oxygen in stream.

Riparian plantings and increased shading would initially have the greatest direct benefits to improve the life supporting capacity of Papanui stream.



Bacteria

E. coli in water is an indicator of bacteria from excrement. Papanui has very high bacteria levels. Samples taken at Middle Road had the highest peaks of any long-term monitoring site in the Tukituki catchment. All sites surveyed in the Papanui showed evidence of bacterial contamination. Concentrations increased to extreme levels during high flow. Faecal source-tracking work indicates periods of contamination typically from cattle, with some from water fowl, but not from human sources.

Stock exclusion, stream bank protection and improved winter grazing practices will all reduce bacterial contamination.



Sediment

The greatest threats to stream health are increased inputs of fine sediment and poor riparian management.

This sub-catchment has high levels of stream bed sedimentation, which fills in the nooks and crannies where fish and bugs (invertebrates) live.

Studies have shown that adding fine sediment to a small stream resulted in the loss of 90% of its fish, and removing riparian habitat resulted in 75% less inanga (whitebait).

Eel photo: Alton Perrie



Nitrogen (N)

Dissolved inorganic nitrogen levels are generally below the limits in the Tukituki plan. However, there are some sites that have recorded high levels of organic nitrogen, which may fuel algal growth further downstream. Minimising nitrogen losses should still be a consideration in this catchment.

Nitrogen is typically more difficult to address than phosphorus, because it can literally 'leak' through the landscape. In intensive grazing systems, urine patches are usually the major N source. Winter grazing can be a major source of nitrogen loss and should be carefully managed.

So what are the effects?

The combined effects of high in-stream nutrient concentrations, long low-flow periods in the summer months and high temperatures, lead to excessive growth of large water plants, algae and slime.

This puts huge stress on the bugs, fish and other animals living in the waterways.

The large number of aquatic plants and algae consume oxygen overnight.

This means there are long periods of time when almost no oxygen is available for bugs and fish.

WHAT ELSE IS BEING DONE?

Water Quality Monitoring

The HBRC science team conducted a targeted investigation taking water quality samples and gauging flows at 24 sites in the Papanui Stream and its tributaries. This has improved our understanding of water quality issues in the catchment.

Further land science investigation work will improve the understanding of sources of P loss in particular.

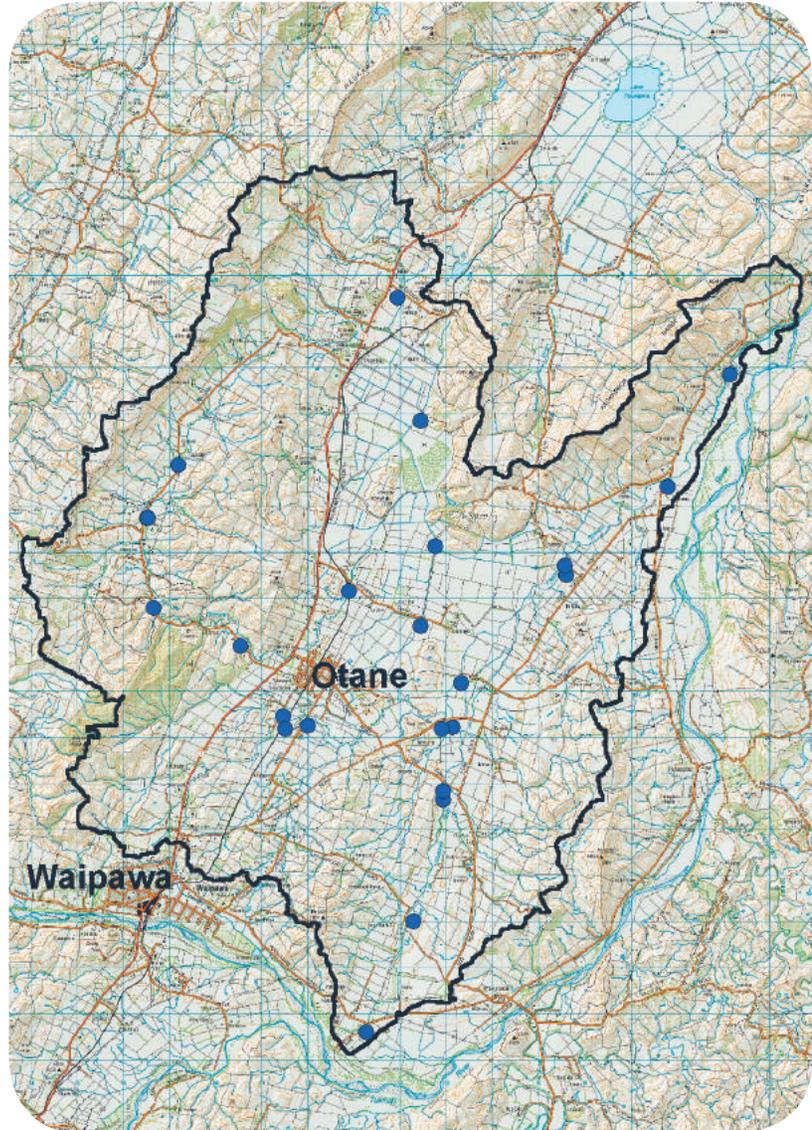
There is also a groundwater investigation underway that will help improve knowledge of groundwater characteristics such as age, nutrients and flow direction.

Water Quality Monitoring Sites

Carefully selected sites help HBRC scientists to compare nutrient levels to targets, and to the other Tukituki sub-catchments.

Implementing Plan Change 6

Stock exclusion requirements become mandatory in 2020 and are expected to make a significant impact to reduce in-stream phosphorus levels in the Tukituki River. Stream ecological valuation work done in the Papanui has also shown improvements to stream habitat where stock are excluded. Plan Change 6 will also require landowners or farm managers with four hectares or more to have a Farm Environmental Management Plan (FEMP) by 2018.



RECOGNITION

Papanui is the first priority catchment to begin focused work in the Tukituki. The Papanui Catchment focus group was formed in 2014. This group includes landowners and Taiwhenua representatives who worked together to develop the Papanui Catchment Management Strategy. The group's vision is to protect the economic sustainability of the catchment, while contributing to improved water quality locally and in the Tukituki River.

Making a start, planning and taking action early, and doing a manageable bit at a time, will reduce stress when these actions become requirements.

LET'S GET THE BALL ROLLING

HBRC started a riparian planting programme in 2014. Due to its success, it will be available again in 2016. There are a selection of native plants, with free advice for landowners undertaking riparian planting.

The eco-sourced plants are \$2 to \$3, PB3 good quality seedlings.

Contact Maddy Clark (below centre) on **06 833 8067** to get your order in.



Contact HBRC Land Management Advisors
on **0800 108 838** for help to clarify any of
the issues raised in this document or help
to design some practical solutions on farm.