WAIORA NORTHLAND WATER

Waitangi Catchment Management Plan

Waitangi catchment group
2 June 2017

Northland REGIONAL COUNCIL

Contents

Introduction

The purpose of this Waitangi Catchment Management Plan is to identify solutions to issues/problems that are impacting on values in the Waitangi catchment. The Waitangi Catchment Management Plan has been developed by a collaborative group supported by Northland Regional Council and made up of members representing a range of parties with an interest in freshwater in the Waitangi catchment (including dairy farming, beef farming, horticulture, irrigation company, forestry, tangata whenua, tourism, geo-thermal power, quarrying, Department of Conservation, Landcare groups, Fish & Game, and general public interests). The catchment plan sets out the issues identified by the group, their objectives for water quality and quantity in the Waitangi catchment and a range of methods to achieve the outcomes sought.

A draft version of the catchment plan was subject to a round of public consultation between August and September 2016 and has been revised on the basis of the feedback received. The Catchment Group greatly appreciates the feedback received which has been considered in finalising the catchment plan.

The catchment plan should be read with the Proposed Regional Plan, which sets out the region-wide objectives, policies and rules for fresh and coastal water management (among other things), while the catchment plan provides a catchment-specific approach using both regulatory (rules) and non-regulatory methods. Catchment specific rules approved by council as a result of this process will be added to the catchment specific section of the Proposed Regional Plan (expected to be notified in September 2017). The non-regulatory recommendations in the plan will be subject to an implementation plan (expected to be be finalised mid-late 2017).

The objectives, methods and actions are recommendations only unless included in statutory documents by local authorities or other agencies with regulatory powers.

Catchment overview

The Waitangi catchment is located to the west of the Bay of Islands (See Figure 1) and drains into the Waitangi River. The catchment has five sub-catchments – Upper Waitangi; Lower Waitangi; Manaia Stream; Puketotara, and Waiaruhe. Naturally formed lakes include Lake Owhareiti and smaller geothermal lakes at Ngāwhā. The catchment also has significant river wetlands (swamps, marshes).

The Waitangi River drains via the Waitangi Estuary to the Bay of Islands on Northland's east coast. The Waitangi Estuary and adjacent land has significant historical value to New Zealand. Land to the south of the estuary has been developed to cater for the populations of Haruru and Paihia. The estuary itself has significant value for shellfish gathering and recreational activities for the local community and visitors. The estuary and other estuaries draining into the Bay of Islands have experienced increased rates of sediment deposition on shellfish beds which can alter shellfish species present, food gathering opportunities and recreational use.

The catchment has an area of approximately 302km^2 (30,200 hectares) and consists of private and public land. Most of the land and waterbody beds in the Waitangi catchment are in private ownership. However, there are areas of public land (Department of Conservation reserves, paper roads, marginal strips and esplanade reserves) along the Waitangi River and around Lake Owhareiti, which provide opportunities for recreational activities in waterbodies – see Figure 3. Popular freshwater swimming sites are located on the Waitangi River at Haruru Falls and at Waikuku Road, Waimate North. The sites above the Haruru Falls (Wakelins at the Lily Pond, and below Puketona Junction) meet the criteria[1] to be monitored by the regional council as part of the Northland Swimming Water Quality Monitoring Programme. The reserves along the Waitangi River margins are publicly accessible but public use is currently low. This may be attributable to gaps in riparian reserves; the fragmented ownership of the reserves by different public authorities; or the lack of public awareness.

Land use/cover is predominantly pastoral farming (68%), indigenous forest (20%) and exotic forests (8%) – see Figure 1. Most terrestrial wetlands (for example, gumlands, heathlands) have been drained and converted to pastoral use. Pastoral grazing occurs predominantly on lowland topography and is undertaken for commercial and cultural ('lifestyle') purposes. There are 26 dairy farms in the catchment. Most dairy farms have some form of land-based disposal of effluent but 17 of 26 have consent to discharge treated farm dairy effluent to waterways – see Figure 4. Three of the dairy farms in the catchment rely solely on discharge of treated effluent to water.

Catchment topography is 73% lowland (under 15 degree slope) and 27% hill-country (over 15^o slope) – see . Hill-country is more prone to hill-slope erosion

[1] http://www.nrc.govt.nz/Living-in-Northland/At-the-beach/Swimming-water-quality/

with rates dependent on topography, overlying land use/cover, and underlying geology and soils. Forests occur predominantly on hill-country topography.

Aquifers contribute to groundwater recharge of stream base-flows. River/stream base-flows are at their lowest in summer, peak in winter, with median flows in autumn and spring. Stormflows occur frequently and play an important role in providing flow variation and controlling populations of aquatic species by removing and resetting plant, periphyton, invertebrates and exotic fish populations. There are six in-stream dams in the catchment which capture and store seasonal base-flows and stormflows for summer extraction.

The catchment has a mixture of hard-bottom and soft-bottom river reaches. Soft-bottomed river reaches occur over soft-substrate geology and in lowland reaches where flow velocities decrease and sediment deposits. Recent alluvium soils occur under a significant length of lowland stream. Hard-bottomed stream reaches predominantly occur over hard substrate geology. Hard-bottomed reaches support periphyton, where there is sufficient light, and are generally dominated by invertebrate communities made up of mayflies, stoneflies and caddisflies.[2] Soft-substrate streams support species more tolerant of natural nutrient enrichment and sedimentation including water cress, where there is sufficient light, and invertebrate communities dominated by snails, worms and chromatids. Koura (freshwater crayfish), valued for food and conservation value is also present. The occurrence of fish species in the catchment is limited due to the climate and the Haruru Falls – a natural migratory barrier. Regular fish surveys have found expected native species including tuna/longfin-eel (food-gathering and conservation value); tuna/shortfin-eel (food-gathering value); Crans Bully; and Banded Kokopu (food-gathering value). Past surveys have also found Toitoi-Common Bully (food-gathering value) and Northland Mudfish (conservation value). Exotic fish species found include Gambusia (pest-fish); Rudd (pest-fish); and trout (sports-fish value). Waterfowl (game fowl and food-gathering) are predominantly mallard ducks and pukeko.

[2] Page 17, Ministry for the Environment. A User guide for the Macroinvertebrate Community Index.

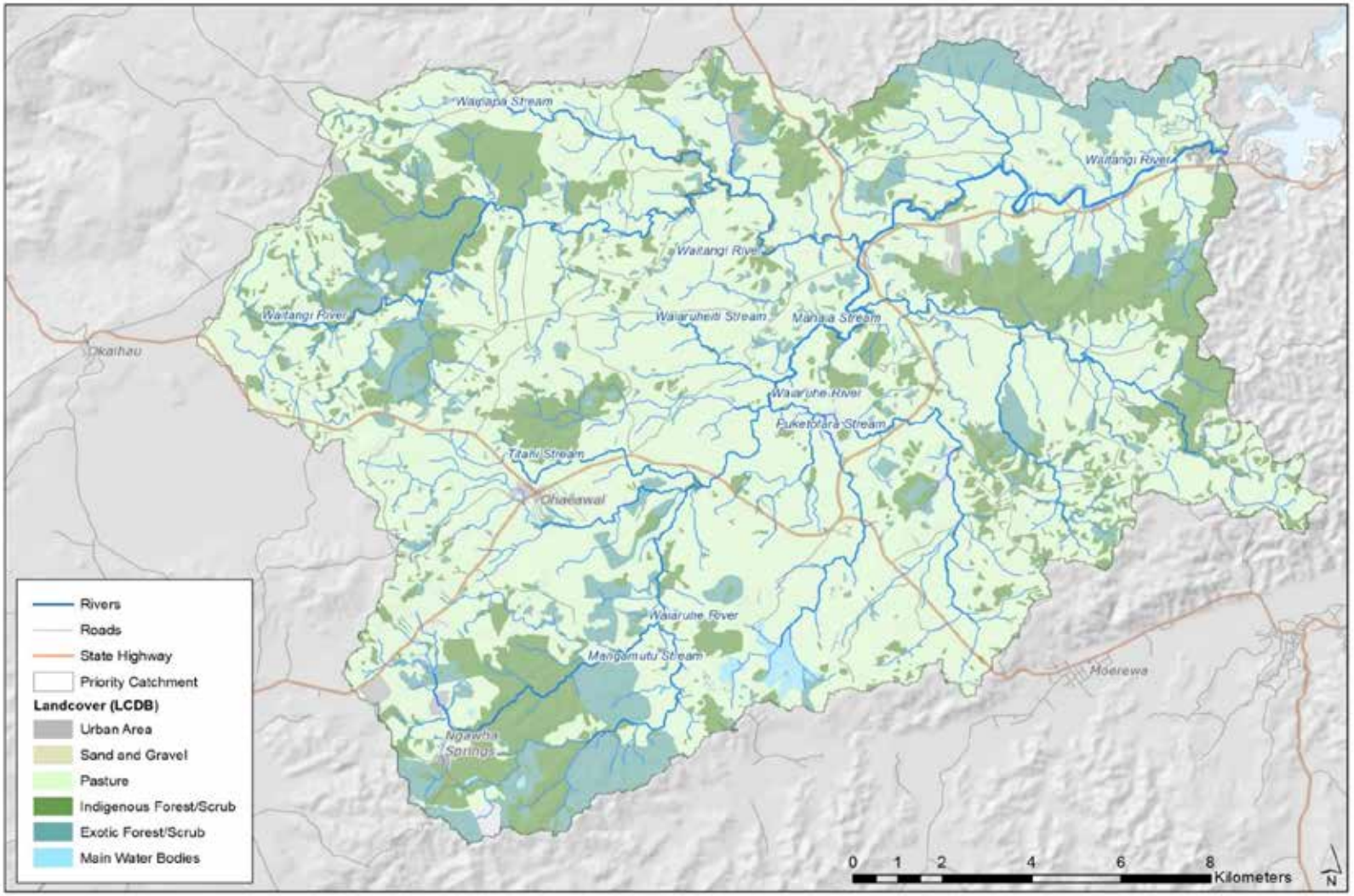

Figure 1: Waitangi catchment and land cover.

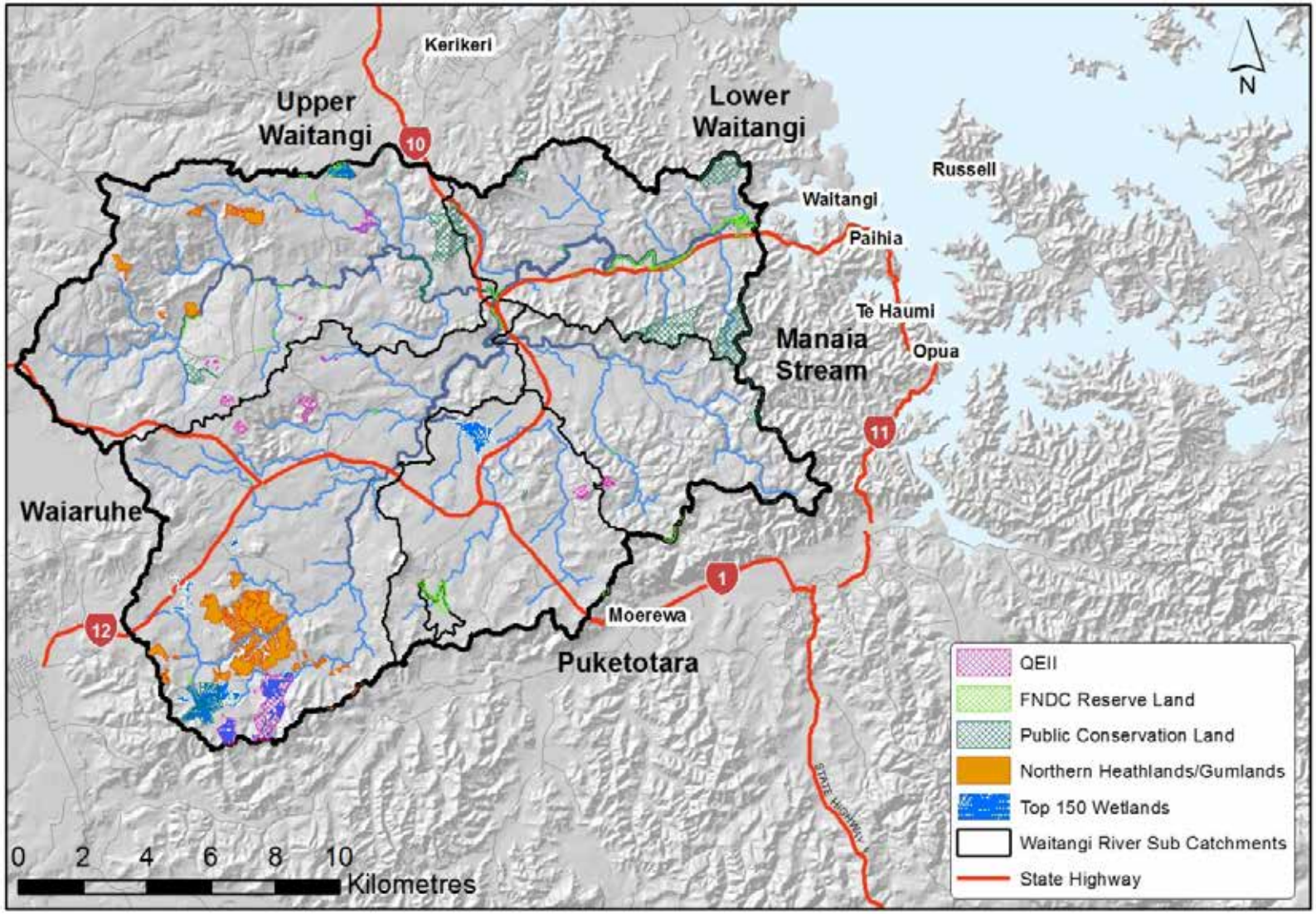

Figure 1: wetlands in Waitangi catchment.

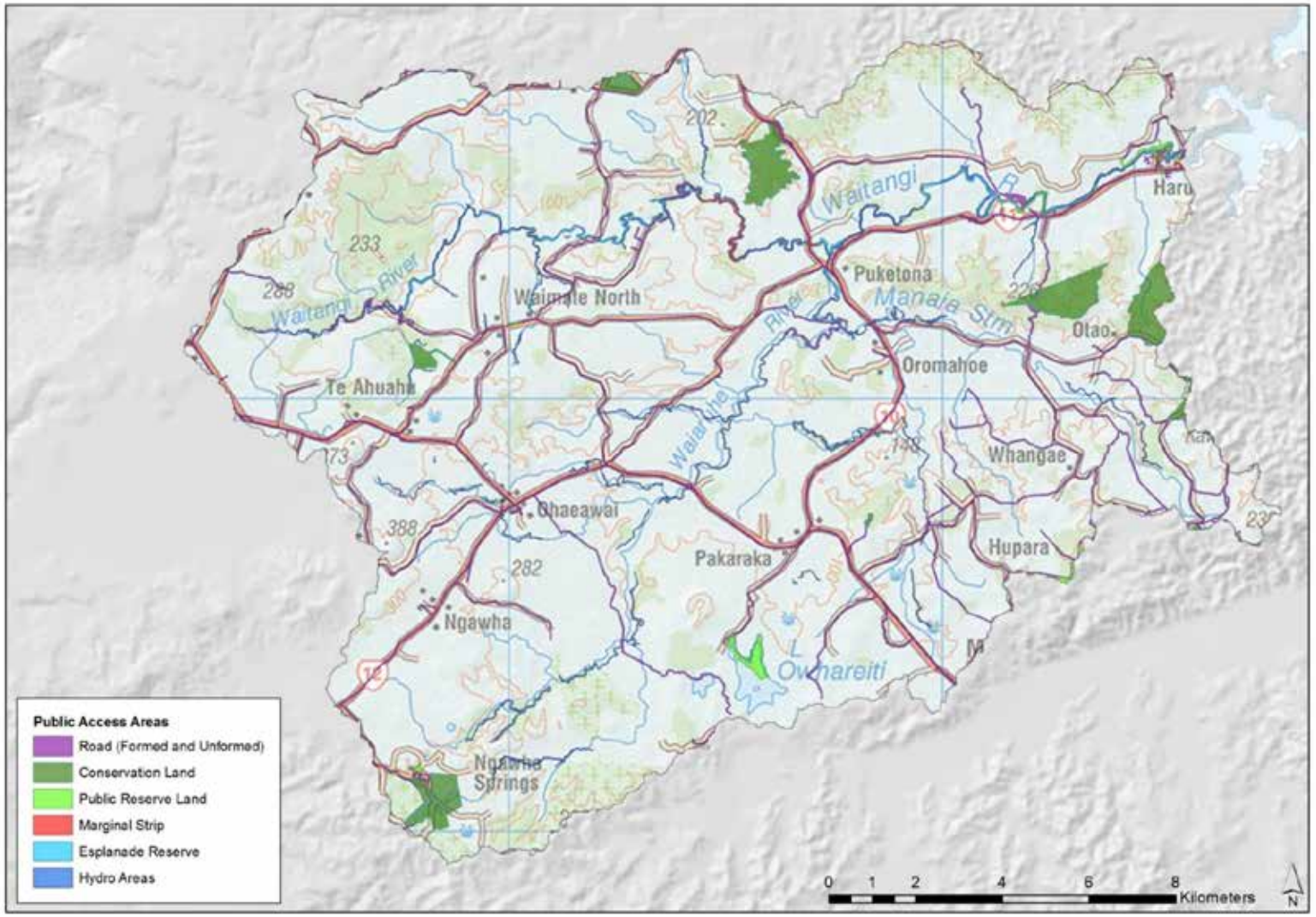

Figure 3: public reserves: conservation land, public reserve land, crown land, marginal strips, roads, and esplanade reserves.

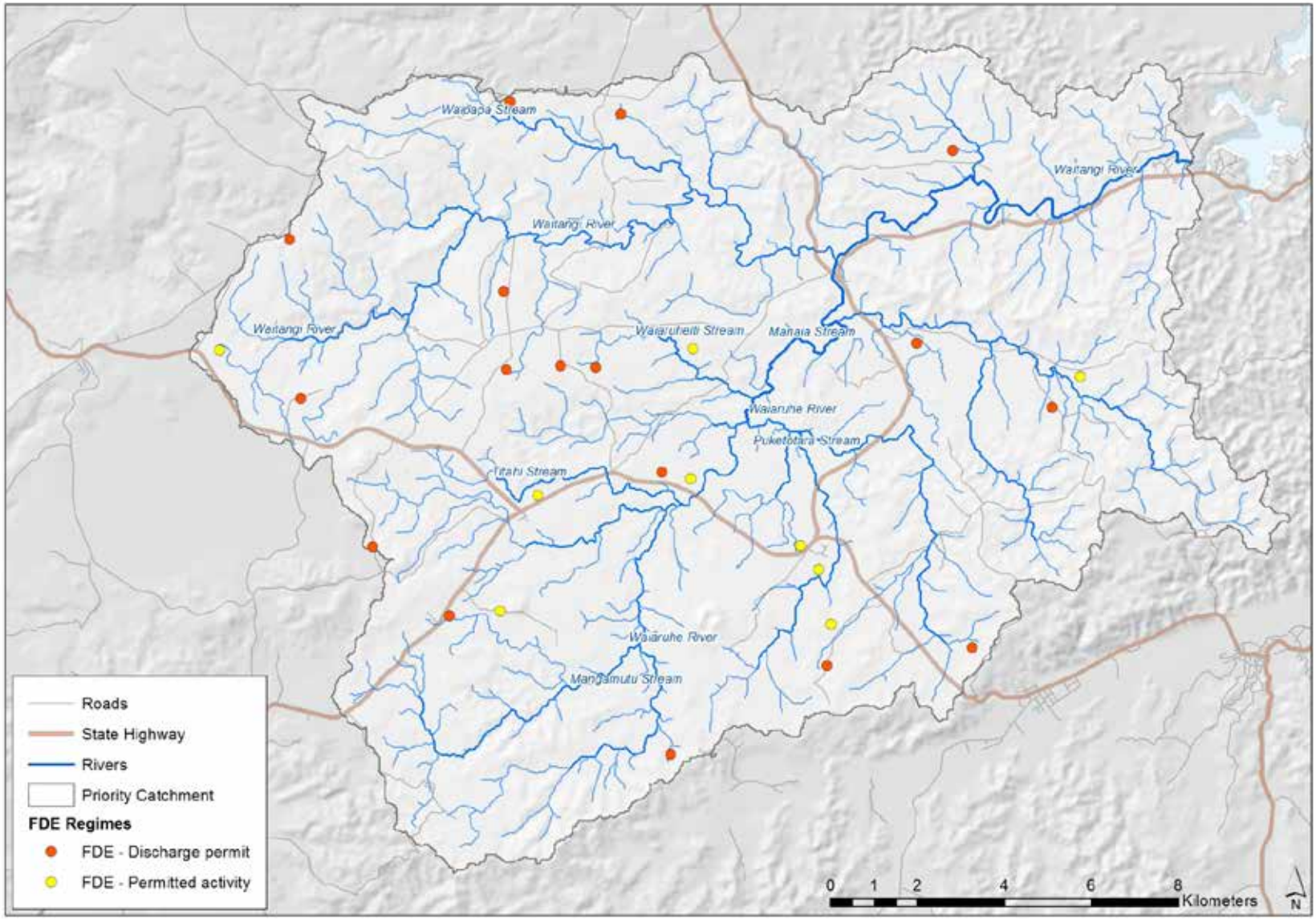

Figure 4: locations of dairy shed discharges – land only discharges (non-consented) and discharges to rivers (consented).

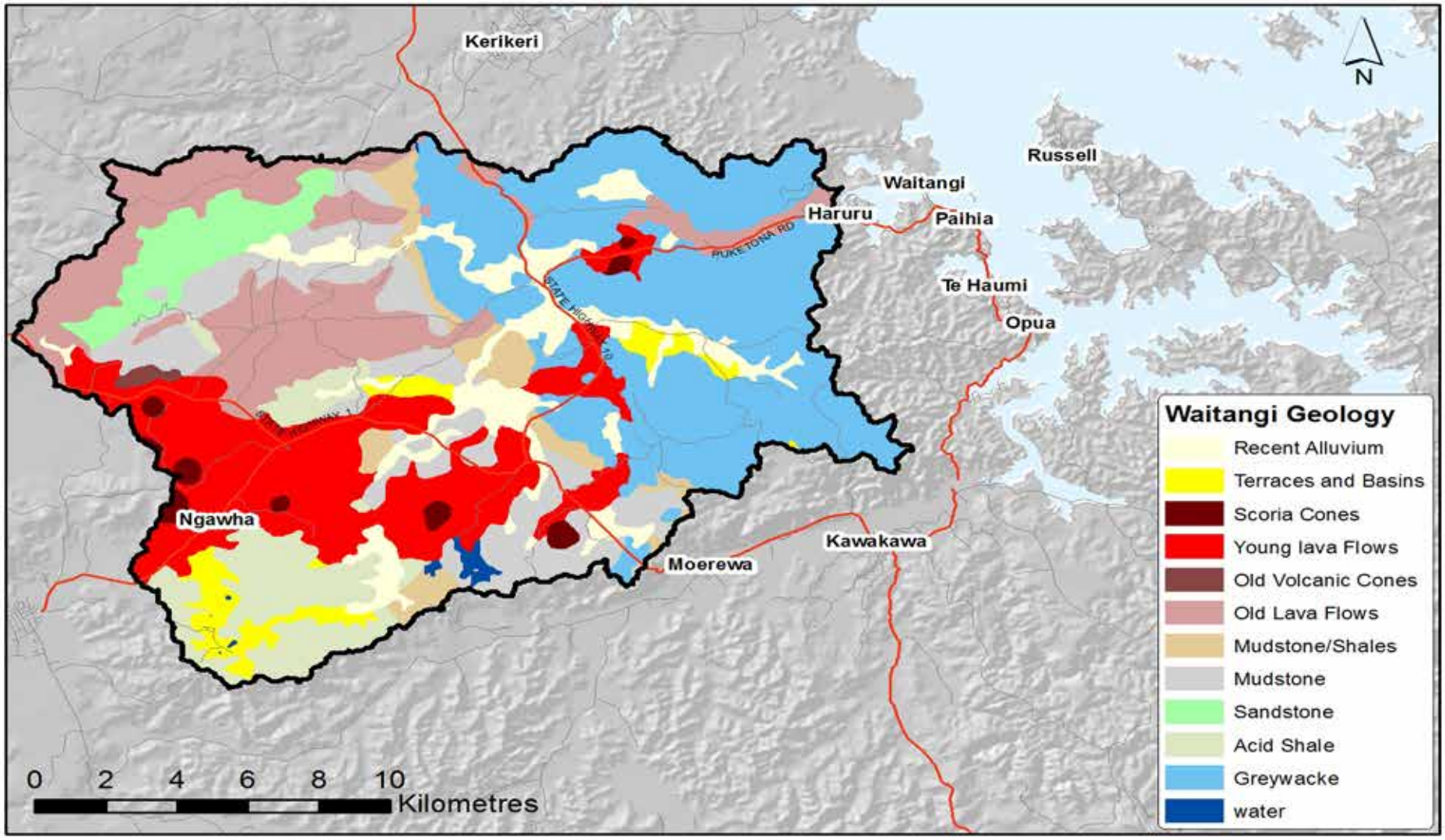

Figure 5: geology in the catchment.

Water quality monitoring

Rivers: water quality is monitored by Northland Regional Council at a number of rivers in the Waitangi catchment (See Figure 6). A number of water quality indicators are monitored to understand the condition of the water for ecological health and human health. Council also monitors stream macroinvertebrates (MCI) and stream habitat as indicators of water quality and stream health. The results of this monitoring are shown in Table 1.

Table 1 sets out a number of different measures – those identified under the heading of the "National objectives framework (NOF)" are compulsory[3]. In its current form the NOF does not address all the water quality issues of concern in Northland. For this reason, we have also included a number of other guidelines/indicators to give a more complete picture of water quality. While the NOF and guidelines such as the ANZECC are quite different and are not directly comparable it is useful to provide results for both to give an overall indication of water quality throughout the catchment.

[3] Required by the National Policy Statement for Freshwater Management 2014

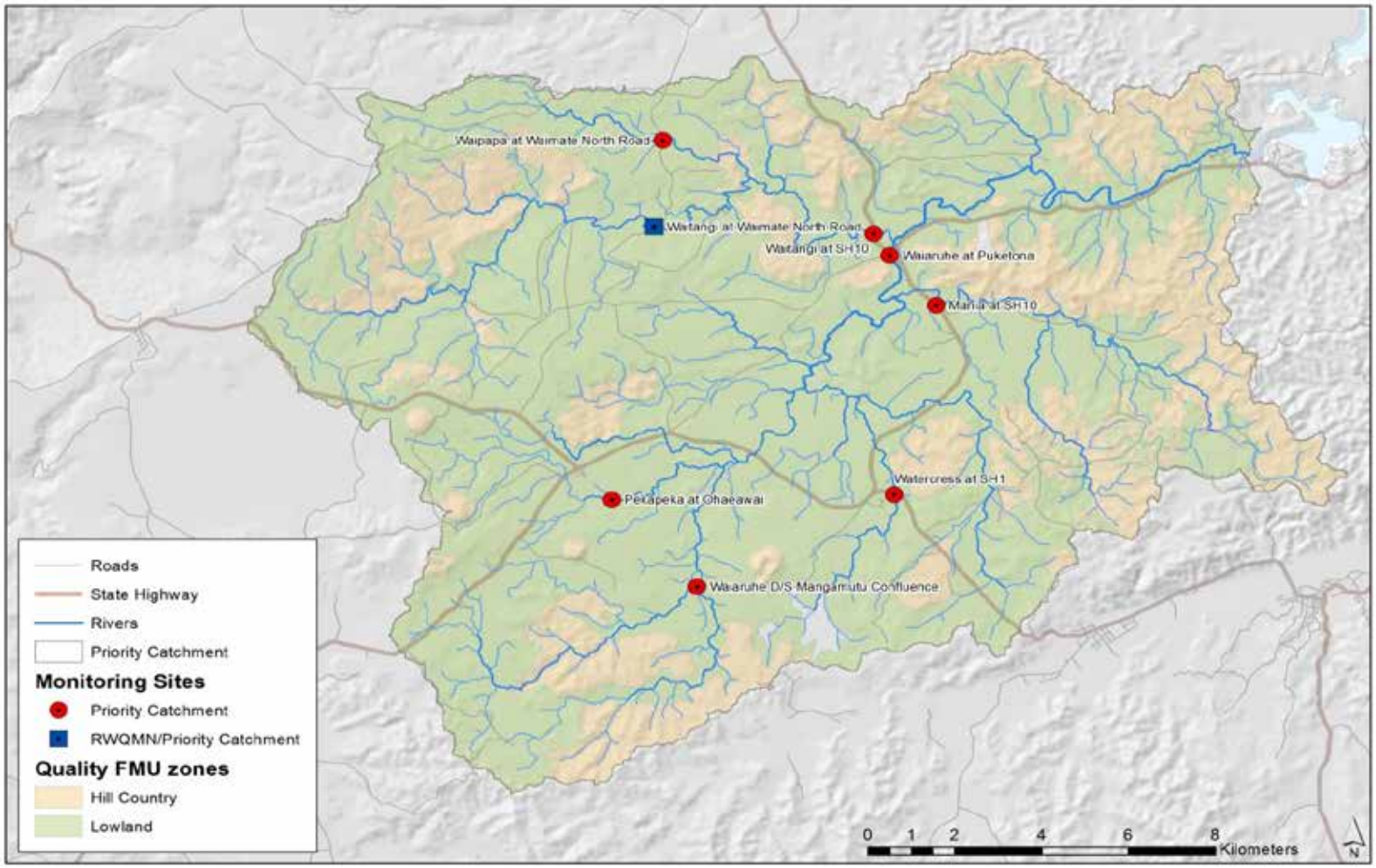

Figure 6: Waitangi catchment hill-country and lowland areas.

Table 1A: Waitangi catchment river water quality monitoring sites and results July 2014-June 2016 (2014 National Objectives Framework)

SITE NAME	2014-2015			2015-2016			2014-2017
	Nitrate nitrogen toxicity (mg/L)	**Ammoniacal nitrogen toxicity** (mg/L)	**Escherichia coli** (*E.coli* /100mL)	**Nitrate nitrogen toxicity**	**Ammoniacal nitrogen toxicity**	**Escherichia coli** (*E.coli* /100mL)	**Periphyton** Exceeds no more than 8% samples
	95th percentile A<1.5; B> <3.5 C>3.5 <9.8 D>9.8	Annual max A<0.05; B>0.05<0.4 C>0.4<2.2; D>2.2	Annual median A<260; B>260 <540 C>540 <1000 D>1000	95th percentile A<1.5; B> <3.5 C>3.5 <9.8 D>9.8	Annual max A<0.05; B>0.05<0.4 C>0.4<2.2; D>2.2	Annual median A<260; B>260 <540 C>540 <1000 D>1000	A<50 B>50 <120 C<120 <200 D>200
Waipapa at Forest Ranger site	A	A	A	A	A	A	A
Waiaruhe D/S Mangamutu cnfl	A	B	B	A	B	B	B
Pekepeka at Ōhaeawai	A	B	A	A	B	A	B
Watercress at SH1	A	B	B	A	B	B	C
Manaia at SH10	A	A	B	A	A	A	no data
Waiaruhe at Puketona	A	A	B	A	A	A	B
Waipapa at Waimate North Rd	A	B	B	A	B	A	A
Waitangi at Waimate North Rd	A	A	B	A	A	A	A
Waitangi at SH10	A	B	B	A	B	A	A
Waitangi at Wakelins	A	A	A	A	A	A	no data

A	Similar to reference conditions
B	Slightly impacted
C	Moderately impacted (lower/upper limit national bottom line)

National bottom line	
D	Degraded/unacceptable (must be managed to C or better)

Table 1B Waitangi Catchment river water quality monitoring data July 2014-June 2016 (ANZECC 2000 trigger values).

SITE NAME	Nitrate, nitrite, nitrogen	Ammoniacal nitrogen	Dissolved reactive phosphorus	Turbidity	Dissolved oxygen (% saturation)	*E.coli*	Macro-invertebrates	Stream habitat
	Annual median <0.444 mg/L	Annual median <0.021 mg/L	Annual median <0.01 mg/L	Annual median <5.6NTU	Annual median ≥80 % sat	Annual median >550/100ml	MCI score Average 2015-2016	% rating compared with reference site
Waipapa at Forest Ranger (REFERENCE)	below	below	below	below	above	below	134	100
Waiaruhe D/S Mangamutu confluence	below	above	below	below	above	below	126	77
Pekepeka at Ōhaeawai	below	below	below	below	above	below	112	82
Watercress at SH1	above	below	above	below	above	below	103	54
Manaia at SH10	below	below	above	below	below	below	53	38
Waiaruhe at Puketona	below	below	above	below	above	below	122	78
Waipapa at Waimate North Road	below	below	above	below	above	below	102	93
Waitangi at Waimate North Road	below	below	below	below	above	below	128	59
Waitangi at SH10	below	below	below	below	above	below	119	52
Waitangi at Wakelins	below	below	above	below	above	below	62	42

The water quality results in Table 1A and B above suggest that water quality is generally good although there are localised areas where periphyton (slime / nuisance algal growth) results are elevated. Periphyton tends to occur on hard bottom streams (not soft sediments). Its growth can be an indicator of elevated nutrient concentrations but is also influenced by light / temperature and frequency of 'flushing'. Water quality (as measured by E.coli) is suitable for secondary contact with all but one site in the A state (annual median <260 E.coli/100mL). Manaia and Wakelins sites also show some signs of ecological impacts with lower MCI and habitat scores. DRP is also elevated at two sites (Watercress and Manaia). It is worth noting that results for dissolved reactive phosphorus (DRP) are elevated in many places in Northland due to naturally high phosphorous levels.

Lakes

Lake Owhareiti is the largest lake in the Waitangi Catchment. It is located in the headwaters of the Puketōtara sub-catchment and is surrounded mostly by pasture. The lake was formed by a volcanic flow dam and is 95.9 ha in area with a maximum depth of 16m. The lake has one surface inflow (to the south east) but no outflows.

The Northland Lakes Ecological Status 2013 report ranks Lake Owhareiti 177th (low) in Northland. Its low ranking is due to severe impacts from the pest plant *Egeria densa* and poor water quality due to nutrient enrichment. Owhareiti is currently a mesotrophic lake type indicating a significant improvement in water quality since 2007, when it was eutrophic– see

Table 2.

Table 2: Lake Owhareiti water quality monitoring sites.

Lake Owhareiti						
			NOF Objective Framework Attributes			
Lake type	Trophic level	Clarity (m)	Chlorophyll-α (mg/m^3)	TP (mg/m3)	TN (mg/m3)	Date
Eutrophic	4.97	1.74	122	9	650	May-06
Eutrophic	4.972	2.3	52.4	34	455	Aug-07
Mesotrophic	3.504	5.1	4	7	400	Jun-11

Recreational swimming waters

The regional council monitors the *E.coli* or *enterococci* concentrations at popular coastal and freshwater swimming sites where public use and the risk of public illness is greatest. Two sites are monitored in the Waitangi catchment – Watea above Haruru Falls and Paihia outside the mouth of the Waitangi estuary. Faecal source tracking, undertaken at Paihia at Waitangi beach in 2013 and 2014, identified both wildfowl and ruminant sources of *enterococci* in samples. However, the proportion of enterococci from each of these sources cannot be accurately determined. Sampling results are passed on to Environmental Health Officers (at the Far

North District Council), who are responsible for issuing warnings and advice to the general public. It is important to note that even sites that are predominantly a low-risk can be high-risk from time to time and that swimming should be avoided after heavy rainfall for 48 hours. Sampling results are summarised in Table 3. These indicate that there is generally a low risk of illness when swimming at these sites, except during and/or after heavy rain.

Table 3: swimming water monitoring results for Waitangi River at Wakelins and Paihia Beach at Waitangi Bridge.

Site name	Risk
Waitangi River at Wakelins	Low-risk for swimming 78% of the time in the last two years.
Paihia at Waitangi Bridge	Low risk for swimming 92% of the time in the last 10 years.

The regional council monitors the enterococci concentrations at popular coastal shellfish sites where public use and the risk of public illness, due to consumption of shellfish, is greatest. Sampling results are passed on to Health Protection Officers (at the Northland District Health Board) and Environmental Health Officers (at the Far North District Council) who are responsible for issuing warnings and advice to the general public. Northland District Health Board has issued general advice not to collect shellfish after heavy rainfall where the seawater looks muddy or cloudy (that is, after stormflows) or where there are nearby human or animal pollution sources. Sampling

results are summarised in Table 4 which indicates there is low risk 83% of the time – risk is typically associated with rainfall events. Check test results before going swimming - see: **https://www.lawa.org.nz/explore-data/northland-region/swimming/**

Table 4: recreational shellfish water monitoring results for Paihia Beach at Waitangi Bridge.

Site name	Risk
Paihia at Waitangi Bridge	Low-risk for shellfish gathering 83% of the time in 2015.

Sediment modelling

Recent SEDNET[4] sediment modelling has estimated sources of sediment per annum in Waitangi – total sediment volume from the whole catchment is estimated at 36,076 tonnes per year from 301km^2 (120 tonnes/km^2/year or 1.2 tonnes/hectare/year). Much of this sediment load is delivered during high rainfall events which is difficult to remedy however, some erosion types on land can be addressed.

The SEDNET model estimates the proportion of sediment sources as:

- 38% from pasture;
- 24% from woody vegetation; and
- 38% from streambank erosion.

It is estimated that 13,441 tonnes of sediment comes annually from 204km^2 of pasture. The most cost-effective options to reduce pastoral hill-slope erosion losses are those that target properties with critical source areas. The Waitangi Catchment Group recommends that land with a predicted yield of more than 250 tonnes / km2 / year be required to develop Erosion Control Plans (See Figure 7).

Identified critical source areas include:

- Gully pastoral erosion: 2750 tonnes per year comes from 0.94km^2 (2920 tonnes/km^2/year).
- Earthflow pastoral erosion: 1904 tonnes per year comes from 4.15km^2 (458 tonnes/km^2/year).
- Landslide pastoral erosion: 4844 tonnes per year comes from 20.2km^2 (239.4 tonnes/km^2/year).
- Surficial (overland) pastoral erosion: 3943 tonnes per year comes from 201.6km^2 (19.55 tonnes/km^2/year).
- Stream bank erosion has been estimated to be between 38% - 46% of the entire catchment load, derived mainly from the lower reaches of the upper Waitangi, Waiaruhe and the main Waitangi River from Puketona junction to Haruru Falls.
- A large natural earthflow within the catchment (Upper Waitangi), as identified through field survey and sediment source tracking, appears to be delivering a substantial amount of fine sediments into the river system. Further investigation of earthflow and potential mitigations are required.

[4] SEDNET is a model used to identify types of erosion processes and their relative yield to total sediment load

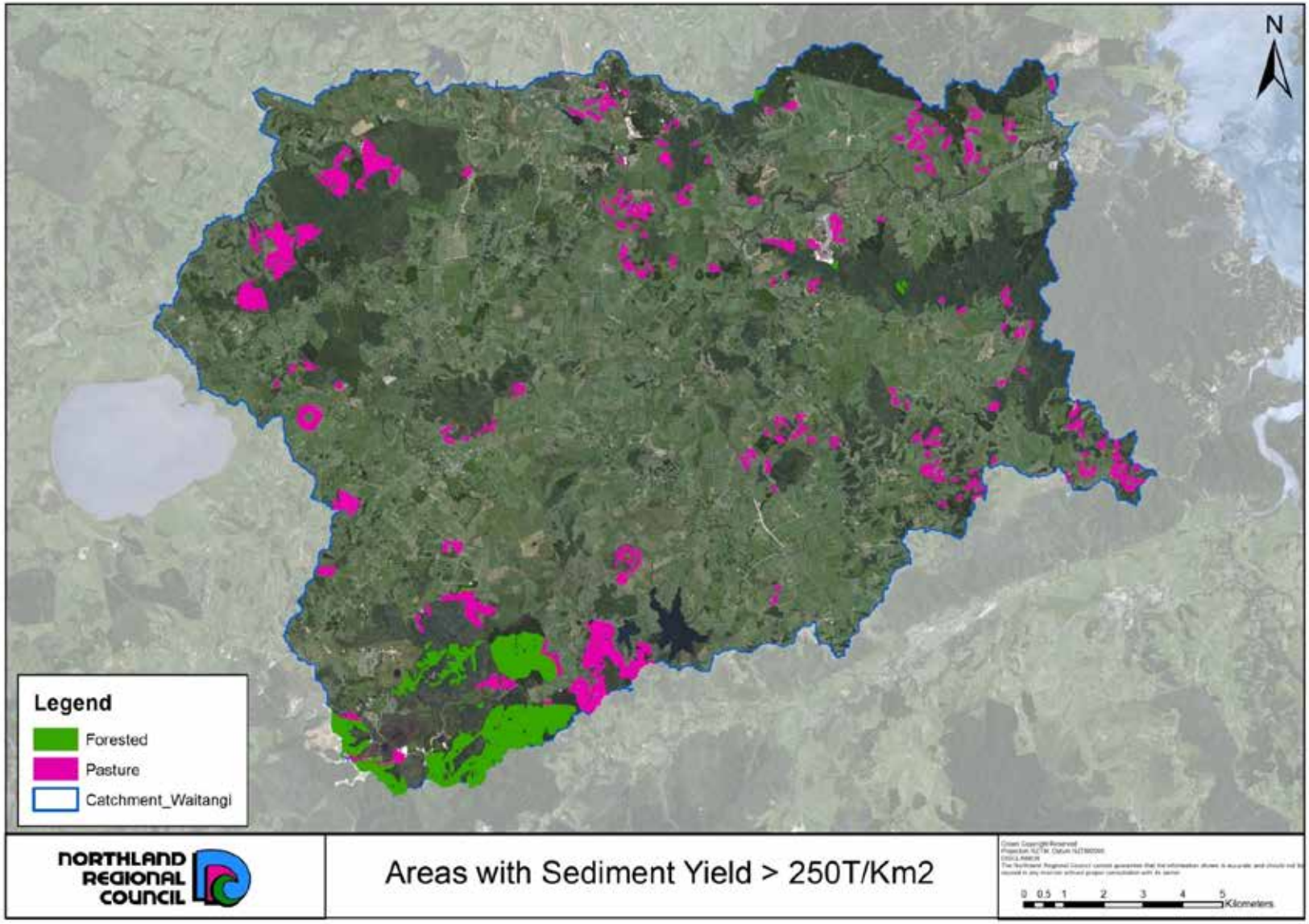

Figure 7: High sediment yielding land.

Figure 9: large earthflow on Whangai Stream.

Water quantity modelling

There are 22 water take consents within the Waitangi catchment (Figure 88); six of these are associated with dams and 15 are from streams. The largest takes are associated with the Ngāwhā Geothermal Power Station, the Kerikeri Irrigation Company and the Far North District. There is one consent to take groundwater in the catchment for horticultural use.

The total estimated run of stream allocation during low summer base-flows (7-day Mean Annual Low Flow), when demand is highest, is approximately 331L/s – including estimated water taken for stock drinking and dairy shed use of 25.9L/s. The total run-of-stream allocation over summer is 31% of the Mean Annual Low Flow of the river (1019L/s) and is considered moderate. This indicates that extraction of water for human use has the potential to alter natural flows to a moderate-high extent. Figure 4 shows the location and scale of consented surface water takes in the catchment – it also indicates that some river reaches have high total allocation. It should be noted that most consented surface water takes include a 'cease to pump' condition when rivers reach minimum flows.

The Northland Regional Council has grouped rivers in the region into four different Freshwater Management Units (FMU) for managing river water quantity based on their uses, values and sensitivity to extraction[5]. Each FMU is subject to different limits on the taking of water – how much water should remain in rivers (minimum flow) and the total amount that can be extracted (allocation limit). These limits will be included in the new Regional Plan and serve to protect aquatic habitat values, other recreational or cultural values, and reliability of supply for water users. The limits are expressed as a percentage of the river's mean annual low flow (MALF). Under the regional approach, the Waitangi catchment would be within the 'small rivers' FMU, which provides a moderate level of habitat protection for aquatic species. The small river limits provide for a lower minimum flow and higher allocation given the less sensitive habitat value. In the Waitangi catchment the presence of the Haruru Falls is a significant natural barrier which limits fish diversity. Limits for the small rivers FMU are: minimum flow of 80% MALF and allocation limit of 40% MALF.

[5] Note: Once notified regional plan content is subject to the Schedule 1 RMA process and may therefore be subject to change.

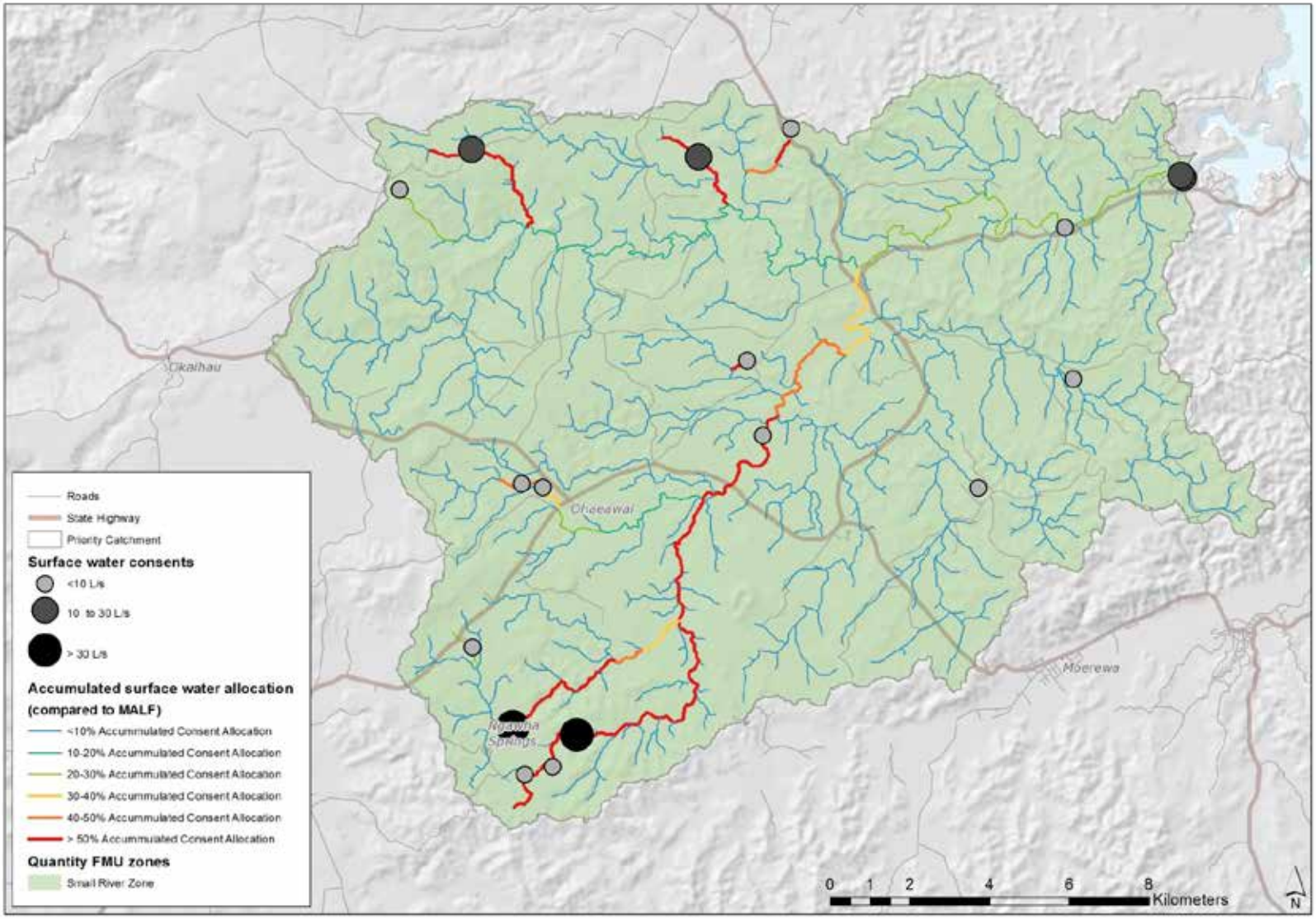

Figure 8: consented water takes.

Issues identified

The Waitangi Catchment Group has identified the following issues in the catchment and how they impact on uses and values. This informs the setting of objectives and the selection of methods to address the issues in the following sections.

Issues identified by the catchment group	**Impacts on Ecosystem health**	**Impacts on Natural form and character**	**Impacts on Cultural values**	**Impacts on Recreational values**	**Impacts on Socio-economic values**
Livestock access to waterbodies.	*Damage to in-stream and riparian vegetation.* *Damage to streambed habitat.* *Nutrient toxicity (reduced habitat quality for aquatic species).*	*Damage to in-stream and riparian vegetation.* *Stream bank erosion.* *Increased sediment.*	*Impact on mauri of water.* *Restriction on traditional uses of water.*	*Increased health risk from contact with water (E.coli/pathogens).*	*Stock losses.*
Effluent discharges.	*Nutrient toxicity (reduced habitat quality for aquatic species).*		*Impact on mauri of water.*	*Increased health risk from contact with water (E.coli/pathogens).*	*Mahinga kai unsafe to gather.*
Erosion *Hill-slope erosion from pasture.* *Stream bank erosion.*	*Impacts on native aquatic plant growth and fish habitat due to reduced water clarity.* *Sediment deposition in estuaries.*	*Reduced water clarity.* *Sediment deposition in estuaries.*	*Smothering of shellfish beds.*	*Reduced water clarity.* *Sediment deposition in estuaries.*	*Loss of productivity.* *Damage to land/infrastructure (for example, fences).*

Issues identified by the catchment group	**Impacts on Ecosystem health**	**Impacts on Natural form and character**	**Impacts on Cultural values**	**Impacts on Recreational values**	**Impacts on Socio-economic values**
Exotic species (for example, trout, alligator weed).	*Predation of native fish.* *Competition for space/smothering.*	*Impact on native species populations.*	*Predation of eels (for example, trout).* *Smothering/reduced habitat for traditional foods (for example, alligator weed).*	*Reduced access to recreational sites (due to prolific weed growth).*	*Damage to infrastructure (for example, fences/water intakes) from weed debris.*
Nutrient enrichment in Lake Owhareiti.	*Frequent algal blooms.* *Reduced water clarity and impact on native plant growth.* *Reduced habitat quality for native species.*	*Reduced habitat for native species.*			
Extraction of water from rivers.	*Risk to fish habitat due to reduced flows.* *Reduced flow variation (flushing flows).*	*Reduced flow variation (flushing flows).*	*Reduced habitat for aquatic mahinga kai species.*		*Reliability of water supply for users of water.*
Impact on mahinga kai species (for example, commercial harvest, habitat modification).	*Reduced populations/distribution of native species.*		*Reduced availability of mahinga kai.* *Reduced capacity for manaakitanga.*		

Issues identified by the catchment group	Impacts on Ecosystem health	Impacts on Natural form and character	Impacts on Cultural values	Impacts on Recreational values	Impacts on Socio-economic values
Limited public awareness of cultural values and lack of consultation on sites of significance to tangata whenua.			*Impacts on the mauri of waterbodies.* *Damage to sensitive sites.*		
Elevated flood peaks.	*Damage to riparian planting.*	*Bank erosion, damage to floodplains and increased sedimentation rates in coastal waters.*			

Catchment objectives (the outcomes sought)

Table 5 identifies uses and values identified by the Waitangi Catchment Group (these are grouped into five broad categories). It also identifies the issues that affect these uses/values and objectives (high level and specific) to address the issues identified. Measures are also identified so progress / changes can be monitored over time. In some cases, the objectives must allow for the time it takes for change to occur (particularly in relation to water quality). The Waitangi catchment group has also recommended that resource consent decision-makers be required to consider the uses/values, issues and objectives identified in the catchment plans where relevant. If approved by council, it is likely this will be in the form of a general policy in the new regional plan that would apply to all catchment plans.

Table 5: catchment objectives.

Uses and values	Issues that impact uses and values[6]	High level objectives	Catchment specific objectives
Ecosystem health · Fish and invertebrate habitat and abundance. · Water clarity. · Native riparian vegetation. · Healthy wetlands. · Native birdlife/wildlife.	· Livestock access to waterbodies. · Sediment from hill slope and stream bank erosion. · Extraction of water from rivers (during low flows). · Exotic/pest species (for example, trout, aquatic weeds). · Effluent discharges to rivers. · Lack of riparian vegetation. · Water temperature.	**Improve fresh and coastal habitats for native aquatic species.** Measures: stream habitat MCI, and sediment deposition rate, turbidity.	· By 2035[7], reduce the current amount of sediment in fresh and coastal waters from high yielding areas that have the potential to improve (e.g. hill-slope in pasture and stream banks). · Ensure the management of water quantity and water takes from rivers provides for flow variation and protection for habitats of native fish species. · Restore riparian vegetation where this will mitigate streambank erosion, improve habitat and reduce effects of nutrients and elevated temperature of aquatic habitats. · The area of significant indigenous wetlands is maintained or improved to protect their habitat values and ability to trap sediment and supplement river flows in dry periods. · Halt the decline of native fish species diversity and abundance.
Recreation · Able to swim and recreate safely. · Water sports. · Education.	· Livestock access to waterbodies. · Effluent discharges to water. · Lack of public access to riparian margins.	**Improve water quality for recreational activity.**	· By 2035[8], E.coli levels are reduced so that there is very low risk from activities in freshwater with occasional immersion/ingestion such as wading/boating: (annual median of <260 *E.coli* per 100mL) at monitored sites except 48 hours after heavy rain[9]. · Reduce the incidence of water quality non-compliance for recreational shellfish gathering at monitoring sites (Waitangi Bridge).

[6] Refer to Appendix 2 for more detail.
[7] It takes time for water quality improvement to occur - this timeframe allows for stock exclusion rules and erosion control plans to have an effect on sediment loads.
[8] It takes time for improvements in water quality to occur - this timeframe allows for new stock exclusion and dairy effluent rules to have an effect and reduce *E.coli* concentrations.
[9] "Heavy rain" is defined by MetService as rainfall greater than 50mm in 6 hours or 100mm in 24 hours: http://www.metservice.com/warnings/weather-warning-criteria#chart.

Uses and values	Issues that impact uses and values[6]	High level objectives	Catchment specific objectives
· Recreational fishing/boating/ canoeing/ yachting/duck shooting.		**Improve public access along riparian margin of Waitangi River.** Measure: *E.coli*, water clarity.	· Improve water clarity in rivers and reduce sediment deposition in estuaries in popular recreation areas and Waitangi estuary. · Improve recreational access and amenity along the margins of the Waitangi River between Haruru Falls and Waimate North.
Cultural values · Medicinal/healing waters. · Te Mana o Te Wai. · Tangata whenua Sites of significance in water. · Mahinga kai: shellfish (freshwater and marine), waterfowl, eels, watercress. · Kei te ora te mauri (the mauri of the place is intact). · Wai tapū. · Spiritual/ ceremonial uses.	· Livestock access to waterbodies. · Effluent discharges. · Exotic/pest species (for example, trout, aquatic weeds). · Commercial harvest of native fish/eels. · Lack of public awareness of cultural values/sites of significance. · Damage/disturbance to sites of significance.	**Improve cultural 'health' and awareness.** **Improve the ability to gather and safely consume mahinga kai.** **Measures** Number and area of wetlands. Stream habitat health rating. Macroinvertebrate index.	· Enhance the sustainability of populations and habitat of important aquatic mahinga kai and medicinal species. · Water quality for shellfish consumption at Waitangi bridge improves within 10 years. · Mahinga kai from freshwater is safe to eat when taken at least 48 hours after heavy rain. · Protect the integrity of wetlands, particularly those that are culturally significant (for example, as a source of traditional materials or as sensitive sites). · Enhance the value of Lake Owhareiti as a mahinga kai source.

Uses and values	Issues that impact uses and values[6]	High level objectives	Catchment specific objectives
Socio-economic · Effluent disposal. · Shingle extraction. · Navigable waterways. · Tourism. · Industry (stock drinking, irrigation etc.). · Hydro-electric power generation. · Domestic/town water supply. · Firefighting.	· Availability and reliability of freshwater supplies (in rivers). · Hill-slope erosion on pasture. · Stream bank erosion (and associated damage to assets, for example, fences).	**Enhance the productive capacity of land.** **Measures** Level of allocation / water availability. Security of supply. Scale/extent of streambank erosion & associated damage.	· Ensure minimum flows and allocation limits provide capacity for economic growth and reasonable reliability of supply for the use of water over the next 10 years. · Minimise the loss of productive soils through erosion. · Improve soil quality/capacity for nutrient retention and to minimise runoff. · Minimise damage to land and/or infrastructure from flood debris and streambank erosion. · Enable the extraction of gravel/shingle from rivers as a resource and to limit stream bank/river bed erosion. · Promote and facilitate water harvest during high flows and associated storage. · Promote and facilitate commercial use of rivers and their margins where this does not compromise other objectives.
Natural character · Natural beauty/ aesthetics (for example, Lilypond and Watea). · Water clarity and quality that we can be proud of. · Natural processes/ patterns. · Waterway as shared Taonga by community.	· Sediment from hill slope and stream bank erosion. · Exotic/pest species (for example, trout, gambusia and aquatic weeds). · Lack of riparian vegetation.	**Maintain the natural character of waterbodies in the Waitangi catchment.** **Measure** Visual clarity. Extent of riparian vegetation. Changes in pest species populations.	· Reduce the amount of sediment in fresh and coastal waters from high yield areas, particularly from pasture erosion and from stream bank erosion. · Encourage the retention and enhancement of riparian vegetation and wetlands. · No further expansion of the range of pest fish and plants in Waitangi catchment. · Minimise the impact of pest plants and fish on important aquatic habitats. · Restrict the introduction of exotic/game fish species. · Provide for natural ‘flushing flows’ in setting water quantity limits (minimum flows and allocation limits). · Limit channelisation and change to natural waterway form.

Implementation methods

The following section outlines the draft implementation methods identified by the Waitangi Catchment group to achieve the draft objectives. Table 6 sets out the regulatory measures (i.e. rules) and non-regulatory measures (voluntary methods / actions) identified by the group – once finalised, the regulatory measures can be included in the new Regional Plan and apply specifically to the Waitangi Catchment in addition to the other region-wide rules in the new Regional Plan. Implementation of non-regulatory measures can be set-out in an Implementation Plan after considering community feedback.

Table 6: implementation methods.

<table>
<tr><th>Issues and current management approach</th><th>Waitangi catchment plan approach</th></tr>
<tr><td>

Livestock access to water bodies

There are currently no rules in operative regional plans requiring stock to be excluded from rivers and lakes. While dairy farmers have largely excluded livestock from streams wider than 1m and deeper than 30cm through industry good practice and supplier contracts, only about 40%[10] of rivers in the lowland area of the Waitangi catchment are fenced.

Stock exclusion can reduce sediment and E.coli – a range of estimates is provided below.

<table>
<tr><th>Description</th><th>E. coli (% reduction annual average)</th><th>Sediment (% reduction annual average)</th><th>Source</th></tr>
<tr><td rowspan="2">Fence out beef/dairy cattle</td><td>60</td><td>80</td><td>Jon Dymond and Richard Muirhead</td></tr>
<tr><td>30</td><td>40</td><td>Monaghan and Quinn (2010)</td></tr>
</table>

</td><td>

Regulatory:

As per Proposed Regional Plan

Non regulatory:

- Encourage livestock exclusion from hill country waterbodies.
- Develop good practice guidelines for managing riparian vegetation issues that may arise following stock exclusion in the Waitangi catchment to:
  i. reduce the incidence of flood damage
  ii. maintain the free flow of water
  iii. minimise use of sprays
  iv. minimise management costs for land owners.

</td></tr>
</table>

[10] This is an estimate only - much of the lowland areas in the Waitangi catchment support beef cattle that are not subject to the same industry agreements/arrangements as applied to the dairy sector.

Issues and current management approach				Waitangi catchment plan approach
	20–35	30–90	McKergow et al. (2007)	

[1] Pers. comms., 2015
[2] Monaghan, R., and Quinn, J. (2010), Appendix 9: Farms, in: National Institute of Water and Atmospheric Research (NIWA), *Waikato River Independent Scoping Study*, NIWA, Hamilton.
[3] McKergow, L.A., Tanner, C.C., Monaghan, R.M., and Anderson, G. (2007), *Stocktake of diffuse pollution attenuation tools for New Zealand pastoral farming systems*, NIWA Client Report HAM2007-16, Hamilton.

Effluent discharges/nutrients

Regional rules currently provide for dairy effluent discharges to land as a permitted activity (subject to conditions). Where farms cannot meet the permitted rules, resource consents are required for discharge of treated effluent to water subject to conditions. Of the 24 dairy farms in the catchment, 15 have resource consent to discharge to water **–** 12 apply effluent to land and are only consented to discharge to water when conditions are too wet, and three rely solely on discharge to water. Nine operate under the permitted activity criteria (no resource consent).

Regional rules also apply controls on on-site effluent disposal and wastewater treatment systems. The Far North District Council currently monitors on-site effluent disposal systems under the control of an 'on-site wastewater disposal systems bylaw' – this requires an inspection every five years.

Regulatory:

Not applicable – rely on Proposed Regional Plan rules.

Non regulatory:

- Encourage exclusion of stock from streams in hill country areas.
- Encourage good management practices:
    a. use of dung beetles in the catchment to improve soil health and water percolation, and reduce nutrient and pathogen levels in run-off water;
    b. reticulated water and shade away from waterways; and
    c. improved effluent management.
- Industry to encourage Good Management Practices such as land-based effluent application, storage, pasture management, fertiliser application, managing riparian areas to minimise weeds and damage to banks, and desired riparian planting.
- Sample bathing water quality when water is likely to be appropriate for bathing (that is, 48 hours after heavy rain).

Issues and current management approach	Waitangi catchment plan approach
	· Investigate cause of high nutrients in hotspots. · Encourage shading (to reduce periphyton growth) through advice to land owners about riparian planting and the benefits of lower water temperatures.
Hill slope erosion from pasture The current approach to managing hill slope erosion is: · Working with land owners to address erosion on a voluntary basis through Erosion Control Plans and Farm Water Quality Improvement Plans, with some financial assistance provided (for example, for poplars).	**Regulatory:** Require Erosion Control Plans from 1 January 2025 for pastoral land use on high sediment yielding land to target active gully, earthflow and landslide erosion. See Figure 8 for map. Controlled activity – Pastoral land use on *High sediment yielding land* after 1 January 2025 is a controlled activity if an erosion control plan has not been developed for the land. Matters of control: 1. the effectiveness of measures to control or mitigate sediment from areas of gully, landslide and earthflow erosion, and 2. the location, timing and prioritisation of measures to control or mitigate sediment from areas of gully, landslide and earthflow erosion. 3. information and monitoring requirements *See Figure 8 for map of High Sediment Yielding Land* *Meaning of words:* *"**Pastoral land use** means: effective grazing area and includes all contiguous land areas in herbaceous species including isolated trees. It excludes those forested areas*

Issues and current management approach	Waitangi catchment plan approach
	which achieve 100% canopy closure or other woody vegetation which prevents pastoral growth. ***"Erosion Control Plan** means: a plan developed by a suitably qualified professional which specifically identifies areas of gully, landslide, and earthflow erosion and measures to mitigate sediment yield from these areas. The Erosion Control Plan must be approved by Northland Regional Council".* ***"High sediment yielding land"**– land in the Waitangi catchment with estimated sediment yield of 250 tonnes/km^2 per year or more.* **Non regulatory:** Not applicable.
Stream bank erosion The current approach to managing stream bank erosion is primarily reactive in that regional rules: · Enable removal of obstructions from rivers (for example, debris and gravel) to maintain the free flow of water. · Limit the removal of riparian vegetation (this is for a number of reasons that also relate to water quality and aquatic ecosystems). However, there are currently no regional rules restricting stock access to rivers and lakes.	**Regulatory:** As per Proposed Regional Plan. **Non regulatory:** · Encourage reduction in peak flows in headwaters (flow harvesting and storage, short term detention, creation of wetlands and afforestation of steeper slopes). · Encourage riparian setbacks when fencing waterways (through education and regional council land management advice). · Identify and address areas of severe stream bank erosion (survey the entire lower catchment for stream bank erosion to assess current state, and align mitigations to site specific problems).

Issues and current management approach	Waitangi catchment plan approach
	· Investigate options to address stream bank erosion in high velocity, high volume locations such as Haruru and Puketona. · Identify and potentially consent sites for access to gravel in rivers, in liaison with river liaison committee. · Encourage native inter-planting with approved species of willows (where native trees may not offer the best protection), and ongoing management and maintenance. · Encourage the enhancement of existing wetlands and investigate the potential for wetland creation.
Impacts on mahinga kai species The commercial harvest (and total allowable catch) of fresh and marine fish species is managed by the Ministry for Primary Industries under the Fisheries Act 1996 and by Department of Conservation for whitebait. Currently commercial harvest of eels is occurring in the catchment and is of concern to tangata whenua. There are current regional rules that provide protection for aquatic species including: · Restrictions on the removal of riparian vegetation. · Restrictions on discharges of contaminants to water. · Controls on structures in/disturbance to coastal and freshwater bodies. · Minimum flows for rivers and controls on the extraction of water. **Lake Owhareiti** Subject to a management plan under the Lake Owhareiti Trust.	**Regulatory:** Apply the Small Rivers FMU water quantity limits and rules to the Waitangi catchment (Minimum flow 80% MALF and allocation limit 40% MALF). **Non-regulatory:** · Regional council to facilitate identification of important native fish spawning sites in the catchment in order to focus habitat enhancement/riparian restoration efforts. · Build capacity for productive use of land within minimum flow and allocation limits, in recognition that a considerable amount of Māori land in the catchment is currently undeveloped. · Monitor the actual effects of the 80/40 regime to native aquatic species. · Seek restrictions on the release of exotic predatory fish species (for example, trout) from Fish & Game/Department of Conservation.

Issues and current management approach	Waitangi catchment plan approach
	· Continue catchment survey to identify structures and other impediments to fish passage up and down rivers. · Recommend to MPI that the commercial harvest of wild populations of short and longfin eel in rivers in the catchment and receiving environment to Waitangi Bridge, cease due to low populations. · Monitor the subsequent effect of no commercial eel harvest on wild populations. · Construct eel passage under Haruru Falls road. · Maintain and support existing Lake Owhareiti management plan.
Recreation/public access There is an established public land network along a high percentage of the riparian margin of the Waitangi River – however it is incomplete and does not provide for public access along the full extent of the Waitangi River between Haruru Falls and Waimate North. Public access is managed primarily by district councils (typically by taking reserves on subdivision). The Crown also retains riparian margins in some cases on sale of land. These public riparian lands can be managed for a range of purposes, but currently this does not extend to public recreation use/access in all areas.	**Regulatory** Not applicable. **Non-regulatory:** · Recommend that Far North District Council identify current gaps in the public access network between Haruru Falls and Waimate North as an esplanade priority area. · Promote development of access ways along existing public riparian land adjoining the Waitangi River through a shared cost arrangement between land owners, public and council, to enhance recreation and tourism values.

Issues and current management approach	Waitangi catchment plan approach
Water extraction/flows in rivers Regional rules currently apply a minimum flow (the lowest level rivers can be reduced as a result of extraction of water – typically around 80% of Mean Annual Low Flow), but do not provide a 'hard' limit on the total volume that can be extracted (an allocation limit). Allocation limits protect both aquatic habitat (providing for flushing) and reliability of supply for water users. Currently the total volume of water extracted from rivers (by resource consent or permitted activity rules) in the Waitangi catchment is moderate at around 31% of Mean Annual Low Flow.	**Regulatory:** Not applicable. **Non-regulatory:** · Encourage storage and water attenuation during high flows. · Accept Small Rivers FMU and limits and build water supply resilience, for example: o more wetlands to hold and slowly release water; o maximise efficiency of water use; o don't block trading or transfer of consents; o get water to most economic use; and o Iwi/hapū development considered. · Encourage reafforestation with plants with economic potential such as manuka.
Ecology – enhancing native biodiversity There are current regional rules that provide protection for aquatic species including: · Restrictions on the removal of riparian vegetation. · Restrictions on discharges of contaminants to water. · Controls on structures in/disturbance to coastal and freshwater bodies. · Minimum flows for rivers and controls on the extraction of water. **Exotic/pest species (for example, trout, aquatic weeds):** Pest species can be addressed through regional pest management plans. The regional council can also support community efforts to address pest plants through community pest control areas. There is no current community pest control area established in Waitangi.	**Regulatory:** Confirm the Small Rivers FMU water quantity limits and rules to the entire Waitangi catchment (Minimum flow 80% MALF and allocation limit 40% MALF). **Non-regulatory:** · Verify fish passage barriers. · Investigate opportunities for tuna (eel) passage at Haruru Falls. · Identify and protect spawning habitat for native species. · Seek restrictions on the release of exotic fish species (E.g. trout) by Fish & Game / Department of Conservation.

Issues and current management approach	Waitangi catchment plan approach
The release/transfer of exotic fish species (for example, trout) is authorised by the Department of Conservation and typically implemented by Fish & Game. Trout have been released in Waitangi Rivers in the past.	· Recommend that trout be treated as a pest species in the Waitangi catchment. · Carry out public awareness and surveillance of pest species. · Encourage appropriate riparian planting for fenced-off rivers. · Seek collaboration from public authority owners to carry out riparian planting on public land between Haruru Falls and Puketona Junction or Waimate North. · Identify and enhance Mudfish habitat sites. · Encourage wetland creation. · Ongoing improvement in MCI measures from current state.
Cultural values Limited public awareness of cultural values and sites of significance to tangata whenua There are few sources of information advising the public of cultural values or appropriate conduct in general and at culturally sensitive sites in particular. There are no sites of significance to tangata whenua currently identified in Regional Plans (an acknowledged gap).	**Regulatory:** Not applicable. **Non-regulatory:** · Support tangata whenua to develop silent file alert layers of their sites of significance with local government.

Conclusion

The regulatory measures identified by the Waitangi Catchment Group will be recommended to council for inclusion in the Proposed Regional Plan. If adopted by Council as part of the Proposed Regional Plan, they will then be subject to the same submissions, hearings and appeal processes[11].

A draft of the Waitangi Catchment Plan was subject to public consultation during August to September 2016. The Waitangi Catchment Group greatly appreciates the time, effort and thought provided in the feedback received. This feedback has been considered during subsequent revision of the Waitangi Catchment Plan in early 2017.

Non-regulatory measures will rely on operational initiatives by the Waitangi Catchment Group members and affiliates and / or other parties or agencies. Funding for these measures will also depend on council annual / long term plan processes and / or other agency funding. Implementation of non-regulatory measures will be set out in a prioritised implementation plan.

[11] In accordance with Schedule 1 of the Resource Management Act 1991

Glossary

Ammonia	A highly soluble nitrogen compound, chemical formula NH_3, characteristically found in manure, sewage and anaerobic conditions.
ANZECC (Australian New Zealand Environment Conservation Council) 2000 Guidelines	The ANZECC (2000) guidelines outline trigger values for water quality aspects that put stress on river and stream health. This specifies a level below which there is a low risk that adverse biological effects will occur. The trigger values are not designed to be used as threshold values at which an environmental problem is inferred it they are exceeded. Rather they are designed to be used in conjunction with professional judgement to provide an assessment of the state of a water body.
Chlorophyll-a	A green pigment found in plants that is used to absorb sunlight during photosynthesis. Chlorophyll-a concentrations are an indicator of phytoplankton abundance and biomass in water.
Contact recreation	Primary contact recreation refers to swimming and bathing; secondary contact recreation refers to activities such as boating, fishing and wading.
Dissolved oxygen	A measure of the quantity of oxygen in the water column. Oxygen is required by freshwater and marine organisms, with some species being more sensitive to low oxygen levels than others.
Dissolved reactive phosphorus (DRP)	The fraction of phosphorus that consists largely of inorganic orthophosphate (PO_4) form of phosphorus that can be directly taken up by algae. The amount of dissolved reactive phosphorus therefore indicates the amount of phosphorus that is immediately available for algal growth.
Escherichia coli (E. coli)	A common form of faecal bacteria that live in the guts of mammals and birds. Although usually harmless themselves, high levels of E. coli indicate that other pathogens – invisible microbes such as bacteria, viruses, and so on that cause disease – are present.
FDE (Farm Dairy Effluent)	FDE systems are divided into consented or non-consented (permitted) types. Non-consented systems are visually inspected and graded depending on compliance with the criteria for “permitted activities” in the Regional Water and Soil Plan. All Northland dairy farms are inspected at least once per season. Follow-up inspections are also made to all farms found to have significantly non-compliant discharges.
FMU (Freshwater Management Unit)	A water body, multiple water bodies or any part of a water body determined by the council as the appropriate spatial scale.
Heavy rainfall event	50mm within six hours or greater than 100mm rain in 24 hours.
Kaitiakitanga	Guardianship, protection or preservation. Environmental management based on the traditional Māori world-view.
L/s (litres per second)	A unit of measure of river volume flow rate, that is, the number of litres of water which passes that point per second.

Mahinga kai	Food and other resources, and the areas they are sourced from.
Mahinga mātaitai	Customary seafood gathering site, shellfish bed.
Mana	Prestige, authority, control, power, influence
Manaakitanga	Hospitality, kindness.
Mana whenua	Those who have customary authority.
Mātauranga	Knowledge, body of knowledge.
Mauri	The essential life force of all things; spiritual essence.
MALF (Mean Annual Low Flow)	A 7-day MALF is commonly used for setting minimum flow and allocation limits because it is a measure of water availability during dry periods. MALF also standardises minimum flow and allocation by the size of the river.
MCI (Macroinvertebrate Community Index)	An index where macroinvertebrates are used for monitoring and reporting on stream health in New Zealand. The MCI assigns a score to each species or taxon (from one to 10), based on its tolerance or sensitivity to organic pollution, then calculates the average score of all taxa present at a site.
MPN (Most Probable Number)	Method used to enumerate the number of bacteria in a sample.
Nitrate	A highly soluble compound of nitrogen and oxygen with the chemical formula NO_3.
NOF (National Objective Framework)	Established in the National Policy Statement for Freshwater Management 2014, providing a number of grades as well as "national bottom lines" – thresholds of water quality attributes that good management should prevent our waterways from reaching in a consistent way across the country.
NTU (Nephelometric Turbidity Units)	A measure of turbidity in water being the propensity of particles to scatter a light beam.
Periphyton	Slime and algae community growing on river and stream beds. As the primary producer in stream ecosystems, it is an important indicator of ecosystem health.
Taonga tuku iho	Treasure(s) handed down.
Turbidity	Measure of water clarity, the cloudiness or haziness of water. A measure of the degree to which light is scattered in water by particles, such as sediment and algae.
Wāhi tapu	Places and things that are sacred.