

**WAIORA**  
**NORTHLAND**  
**WATER**

# Doubtless Bay Catchment Management Plan

August 2017

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## Introduction

The purpose of this Doubtless Bay Catchment Plan is to identify solutions to water quality and water quantity issues/problems in the Doubtless Bay catchment. The plan has been developed by a collaborative stakeholder group supported by Northland Regional Council and comprising members representing parties with an interest in freshwater in the catchment (such as residents, farming, forestry and tangata whenua).

The catchment plan sets out the issues identified by the group and its objectives for water quality and quantity in the Doubtless Bay catchment. It includes a range of methods to achieve the outcomes sought.

A draft Doubtless Bay Catchment Plan was developed and released for consultation with the wider public. Submissions were received on both the substance and format of the catchment plan. The Doubtless Bay Catchment Group is appreciative of the time taken by the public to make submissions, which have been taken into consideration in this revision of the catchment plan.

The catchment plan should be read with the Proposed Regional Plan as this 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. The regulatory methods (i.e. rules) in the catchment plan will be included in a section of the Proposed Regional Plan specific to Doubtless Bay.

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 Doubtless Bay catchment is located on the east coast of Northland, approximately 33km east of Kaitiāia and is 55,605 hectares in area (see Figure 1). It is made up of three primary sub-catchments formed around the larger rivers in the catchment – the Oruaiti, the Taipā/Ōruru and the Awapoko/Aurere. Land use in the catchment is predominantly a mix of agricultural use, plantation forestry and indigenous vegetation with a strip of urban development extending along SH10 and the coast from Hihi in the east, through Mangonui, Coopers Beach and Cable Bay to Taipā in the west.

Several dune lakes are located on the Karikari peninsula and have unique ecological values (such as Lake Waiporohita) and/or are valued for recreational use (such as Lake Rotopokaka – also known as Coca Cola lake). Cultural and ecological values are high across the catchment with fresh and coastal water also valued for recreational use and as a food source. Socio-economic values are also significant and, aside from urban areas, for the most part relate to primary production (such as farming and forestry) and tourism. For a more detailed description of the Doubtless Bay catchment please see: [www.nrc.govt.nz/waiora](http://www.nrc.govt.nz/waiora)

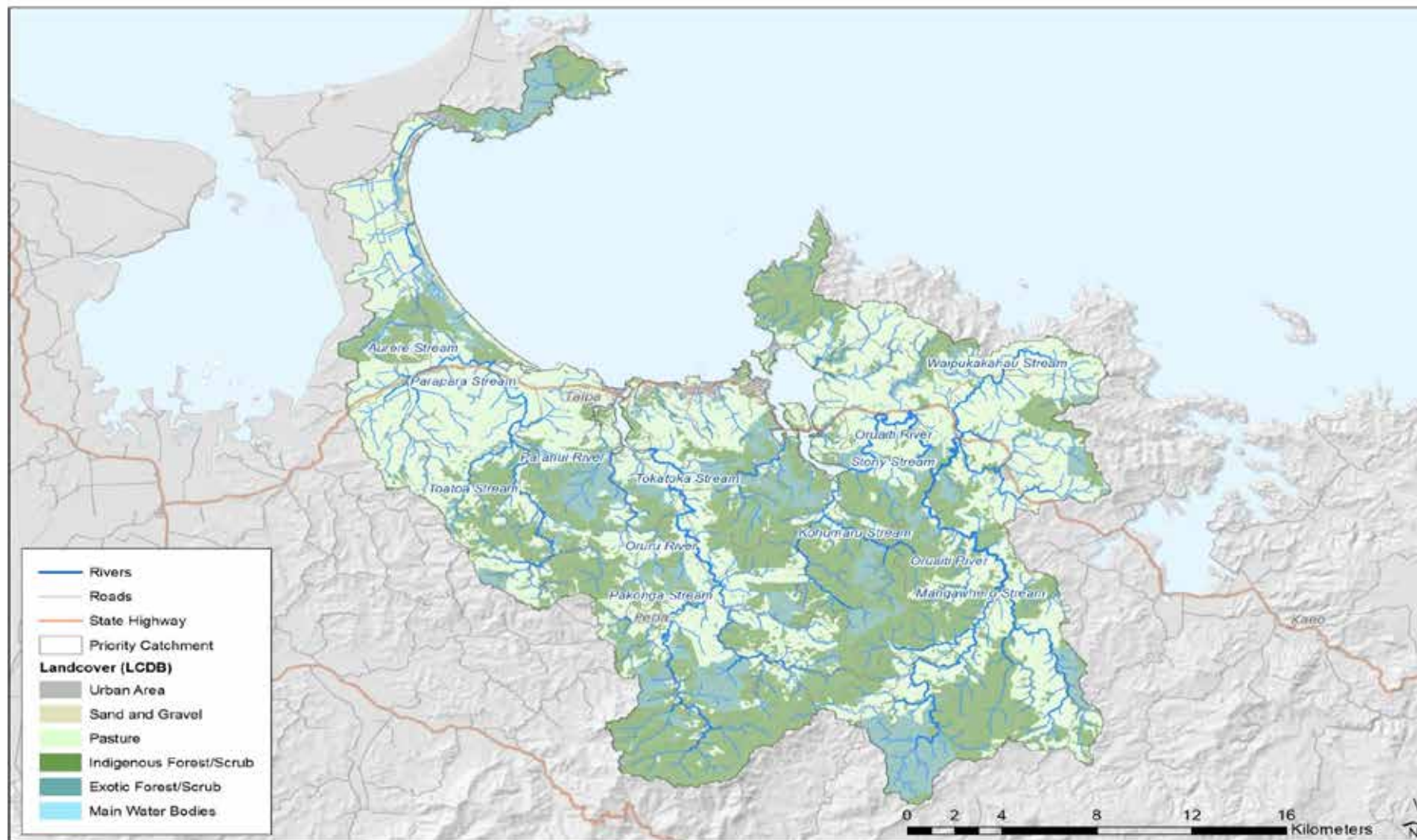


Figure 1: Doubtless Bay catchment showing main rivers and land cover.

## Water quality

### Rivers

Water quality is monitored by Northland Regional Council at a number of rivers in the Doubtless Bay catchment (see Figure 2). 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. In its current form the NOF does not address all the water quality issues of concern in Northland. For this reason we have 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<sup>1</sup> 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.

It is worth noting that results for dissolved reactive phosphorus (DRP) are elevated in many cases, which is likely due to catchment geology (naturally high phosphorous levels) and the fact that DRP and sediment tend to bond and ‘travel’ together. We also have limited data on

periphyton (nuisance algal growths in rivers) as three years’ data is required – also a number of the streams in the Doubtless Bay catchment don’t support periphyton growth as they are ‘soft bottom’ rivers and periphyton prefers rocky bottomed rivers.

For the purposes of managing stock access to freshwater bodies in the Regional Plan, the Northland Regional Council has divided Northland into two slope classes (Lowland - land below an average 15 degree slope, and Hill Country being land above 15 degree average slope – see Figure 2). Rules for stock exclusion differ for each slope class.

### Lakes

The Northland Regional Council monitors Lake Waiporohita, which is a small shallow dune lake in the northern part of the catchment. While Lake Waiporohita has very high ecological values, monitoring shows the lake is subject to high levels of nutrients and is in an enriched state, meaning it is at risk of algal blooms, which impact on ecosystem health (the habitat value for native plants and animals).

### Sediment modelling

Recent sediment modelling has provided an estimate of the sources of sediment in Doubtless Bay – total sediment volume from the whole catchment is estimated at 162,218 tonnes per year from 553km<sup>2</sup>. It

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<sup>1</sup> Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines)

is estimated that 15% of sediment comes from areas in woody vegetation, 62% from pasture and 23% from streambank erosion. Addressing erosion processes on pasture is the most effective approach to managing sediment run-off from land. Critical sources of sediment from pasture are gully, earthflow and landslide erosion processes which generate proportionately high percentages of the load from comparatively small areas of the catchment (critical source areas). The Doubtless Bay catchment group has recommended that areas that generate more than 500 tonnes/km<sup>2</sup> per annum be identified as High Sediment Yielding Land and should be targeted for sediment reduction measures (See Figure 3). It is important to note that these are modelled estimates, not measured.



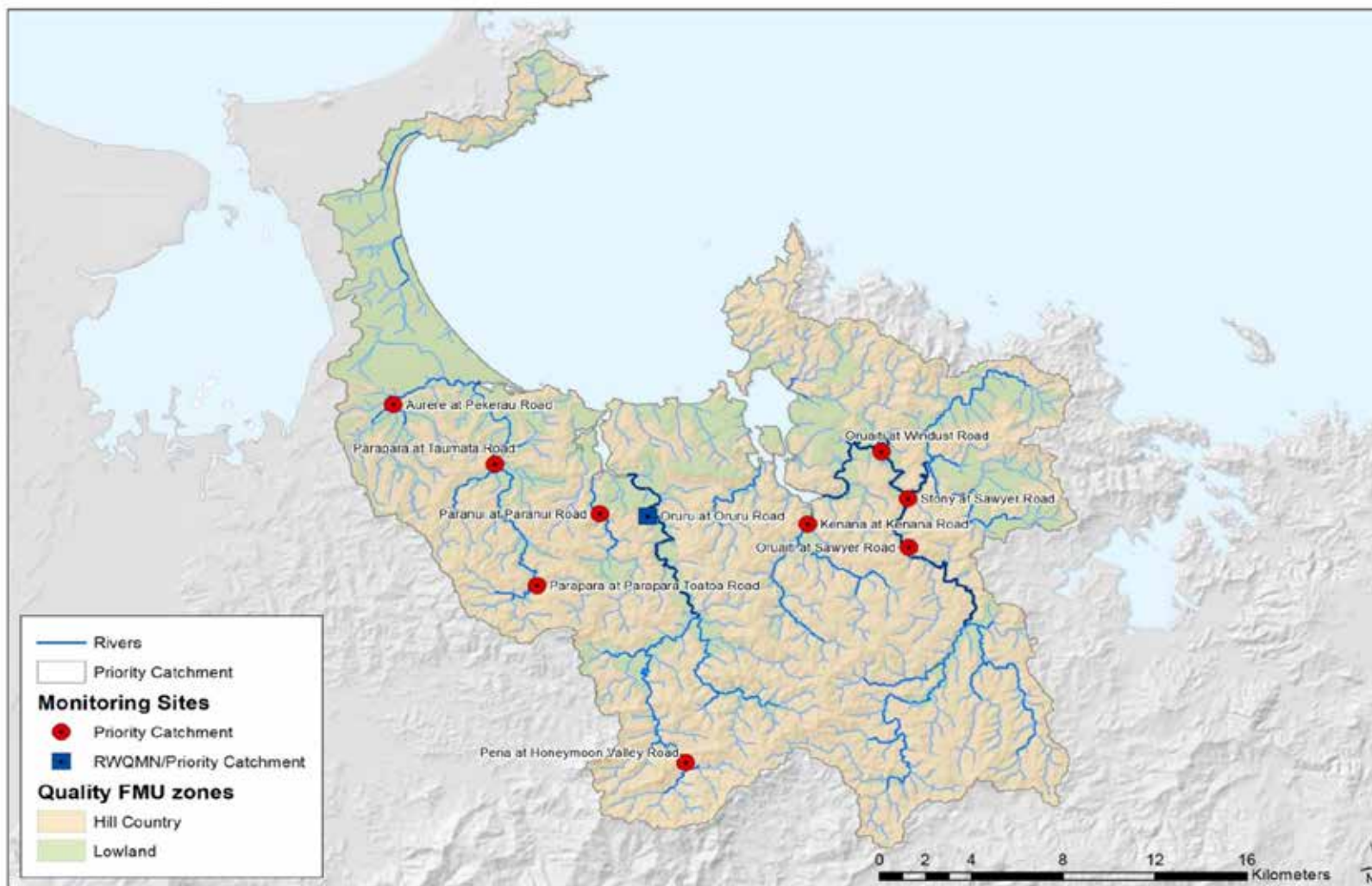


Figure 2: river water quality monitoring sites and lowland/hill country areas in Doubtless Bay catchment.

| Water quality monitoring site  | National Objective Framework (NOF) attributes                    |  |   |  | ANZECC guideline value               |                           | RMA 1991                        | Ecological indicators |                                       |
|--------------------------------|--|--|---|--|--------------------------------------|---------------------------|---------------------------------|-----------------------|---------------------------------------|
|                                | Nitrate nitrogen toxicity (mg/L)                                 | Ammoniacal nitrogen toxicity (mg/L)                            | Escherichia coli ( <i>E.coli</i> /100mL)                        | Periphyton Exceeds no more than 8% of samples (Chl a mg/m <sup>2</sup> ) | Dissolved reactive phosphorus (mg/L) | Turbidity (NTU)           | Dissolved oxygen (% saturation) | Macro-invertebrates   | Stream habitat                        |
|                                | 95th percentile<br>A ≤1.5<br>B >1.5 ≤3.5<br>C >3.5≤9.8<br>D >9.8 | Annual maximum<br>A ≤0.05<br>B>.05≤0.4<br>C >0.4≤2.2<br>D >2.2 | Annual median<br>A ≤260<br>B >260≤540<br>C >540≤1000<br>D >1000 | Chlorophyll a<br>A ≤50<br>B >50≤120<br>C >120≤200<br>D >200              | Annual median<br><0.01               | Annual median<br><5.6 NTU | Annual median<br>80 % sat       | MCI score             | % rating compared with reference site |
| Aurere at Pekerau Rd           | A  | C  | C   | ND   | Above                                | Above                     | Below                           | 73.6                  | 21                                    |
| Parapara at Parapara Toatoa Rd | A  | B  | B   | ND   | Below                                | Below                     | Below                           | 89                    | 43                                    |
| Parapara at Taumata Rd         | A  | B  | B   | ND   | Above                                | Above                     | Below                           | 87.45                 | 50                                    |
| Peria at Honeymoon Valley Rd   | A  | A  | A   | B  | Above                                | Below                     | Above                           | 132.86                | 91                                    |
| Oruru at Oruru Rd              | A  | B  | A   | ND   | Above                                | Below                     | Above                           | 79.23                 | 47                                    |
| Paranui at Paranui Rd          | A  | A  | A   | ND   | Below                                | Below                     | Below                           | 60                    | 59                                    |
| Kenana at Kenana Rd            | A  | B  | A   | ND   | Above                                | Below                     | Above                           | 114                   | 42                                    |
| Oruaiti at Sawyer Rd           | A  | A  | A   | C  | Above                                | Below                     | Above                           | 97                    | 67                                    |
| Stony at Sawyer Rd             | A  | B  | A   | B  | Below                                | Below                     | Above                           | 117                   | 78                                    |
| Oruaiti at Windust Rd          | A  | B  | A   | A  | Below                                | Below                     | Above                           | 107                   | 58                                    |

Table 1: river water quality monitoring results in Doubtless Bay catchment July 2014-July 2015.



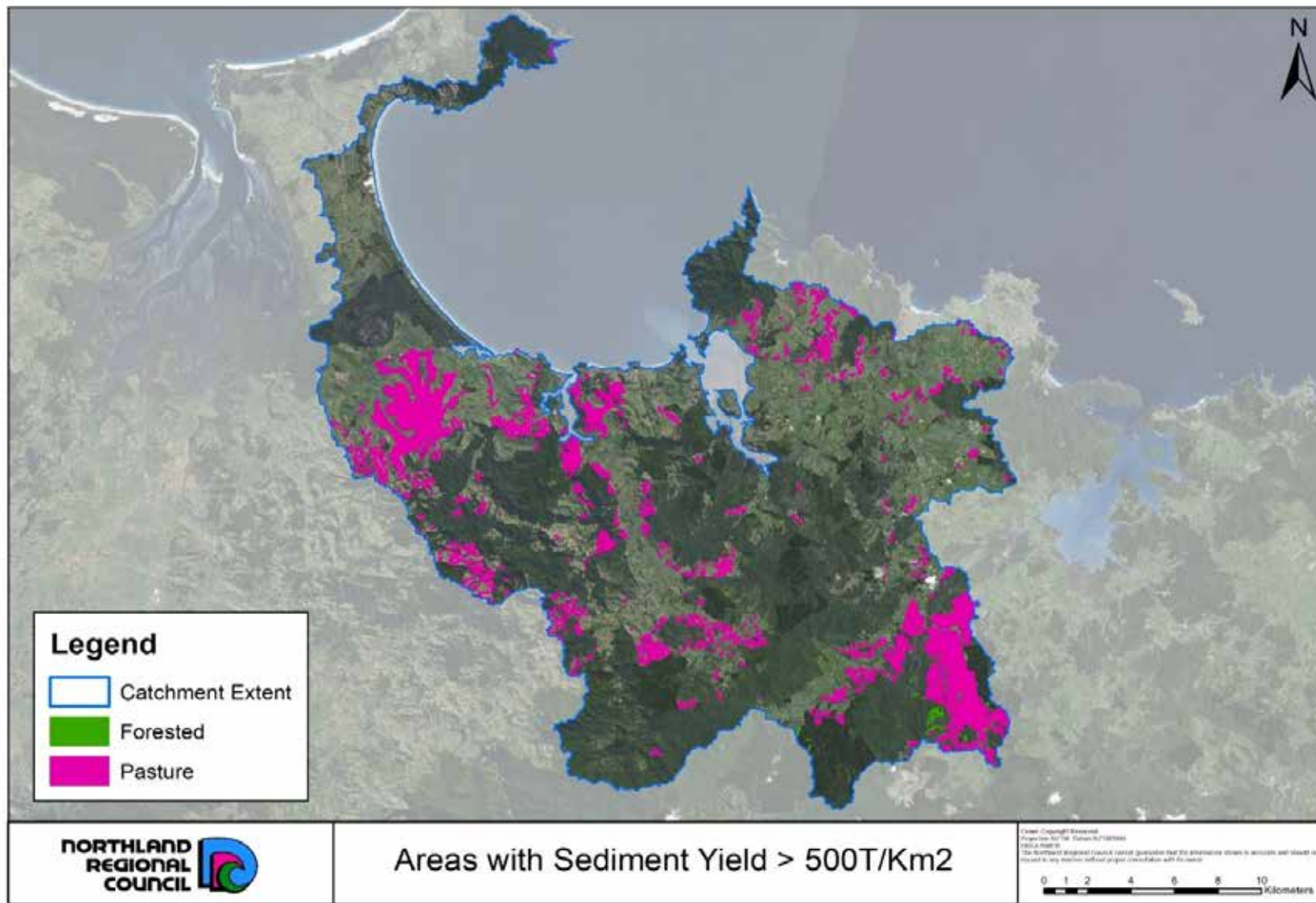


Figure 3: high sediment yielding land (land that is estimated to yield >500 tonnes/km<sup>2</sup>/yr)

### Coastal water quality

Council monitors coastal water quality for recreational bathing at three sites on the Doubtless Bay coast to assess the risk of contamination using the indicator bacteria Enterococci (Ent.). Results for 2014/15 and 2016/17 seasons are summarised below.

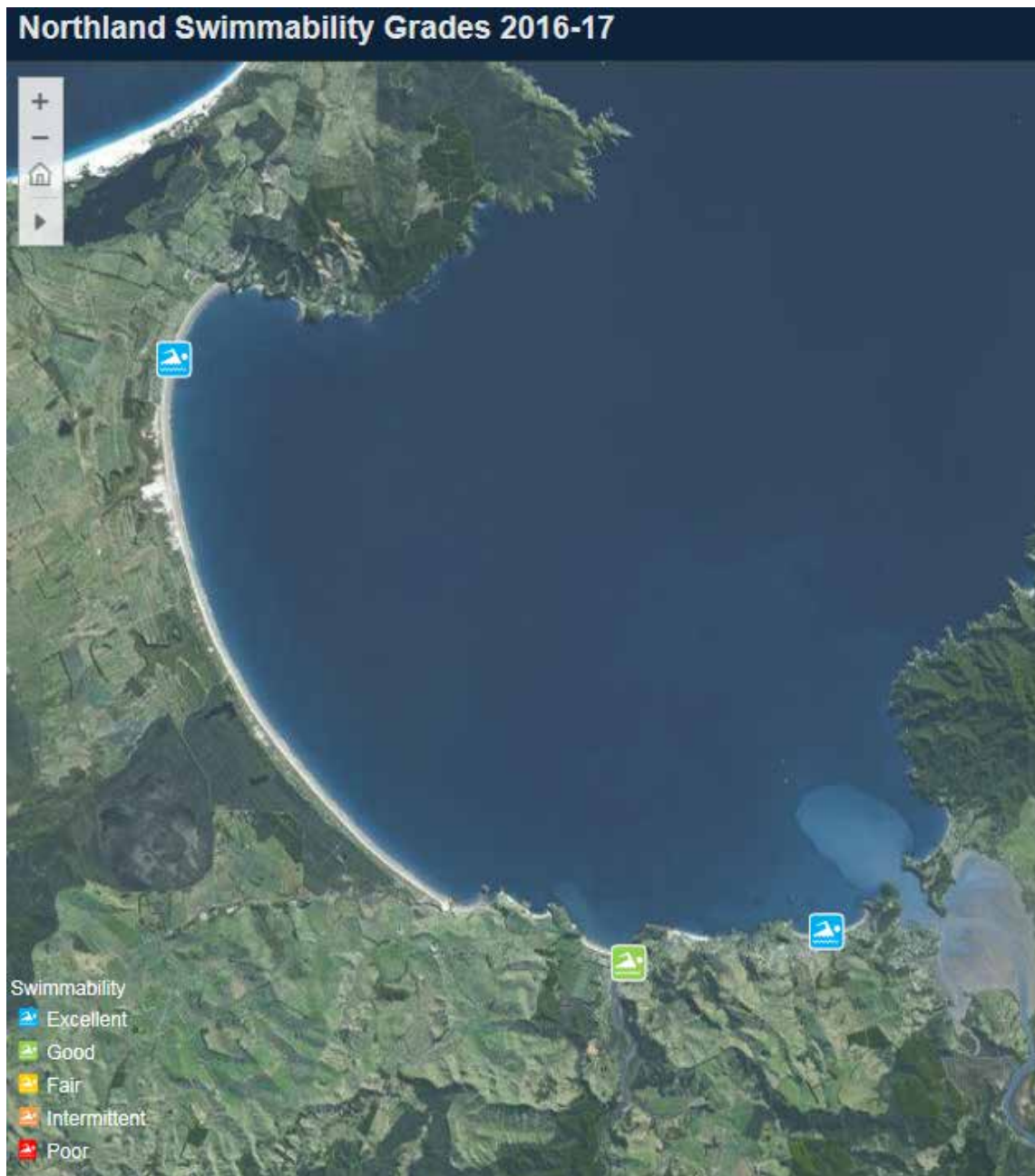





Figure 4: Coastal bathing water quality results 2016/17.

Table 2: Coastal bathing water quality results 2014/15.

| Site name     |   | Result | Risk  |
|---------------|---|--------|---|
| Coopers Beach |  | Blue   | Suitable for swimming 95-100% of the time.      |
| Taipā         |  | Green  | Suitable for swimming 90-95% of the time (92%). |
| Tokerau Beach |  | Blue   | Suitable for swimming 95-100% of the time.      |

## Water quantity

There are 15 active water take consents within the Doubtless Bay catchment; three of these are surface water takes and 12 are groundwater takes (See Figure 5). The two largest surface water takes are 3110m<sup>3</sup>/day for domestic water supply and 3000m<sup>3</sup>/day for irrigation. The largest groundwater takes are 2085m<sup>3</sup>/day for stock drinking in Rangiputa and 400m<sup>3</sup>/day and 200m<sup>3</sup>/day, both for public water supply in the Coopers Beach/Cable Bay area. The total consented water allocated in the catchment is 15,587m<sup>3</sup>/day for both ground and surface water takes.

Based on the best information available, water taken for stock drinking and dairy shed use in the Doubtless Bay catchment is estimated at 716m<sup>3</sup>/day. The total consented and estimated allocation of water from rivers in the Doubtless Bay Catchment is comparatively low – the amount of water taken from rivers is around 10% of the Mean Annual Low Flow (MALF) of the river. This indicates that extraction of water for human use has only

altered flows to a small extent.

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. 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 Regional Plan and serve to protect aquatic habitat values and reliability of supply for water users. The limits are expressed as a percentage of the river's MALF. Under the approach adopted in the Draft Regional Plan, the Doubtless Bay Catchment was subject to two FMU – small rivers and coastal rivers (See Figure 6). The Doubtless Bay catchment group recommended the entire catchment be within the Coastal Rivers FMU. The proposed limits for the small and coastal rivers FMU are set out in Table 3.



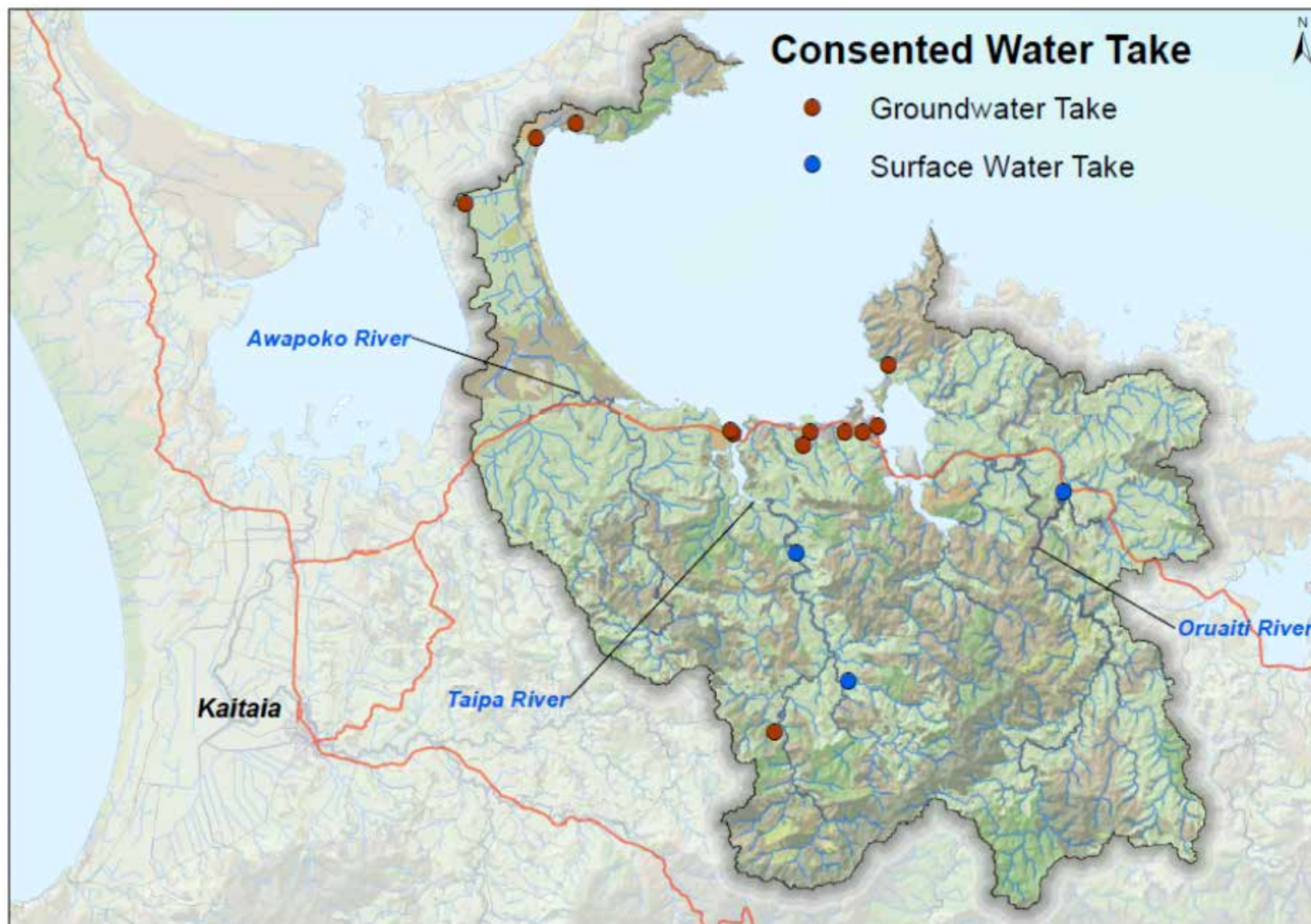


Figure 5: consented water takes.

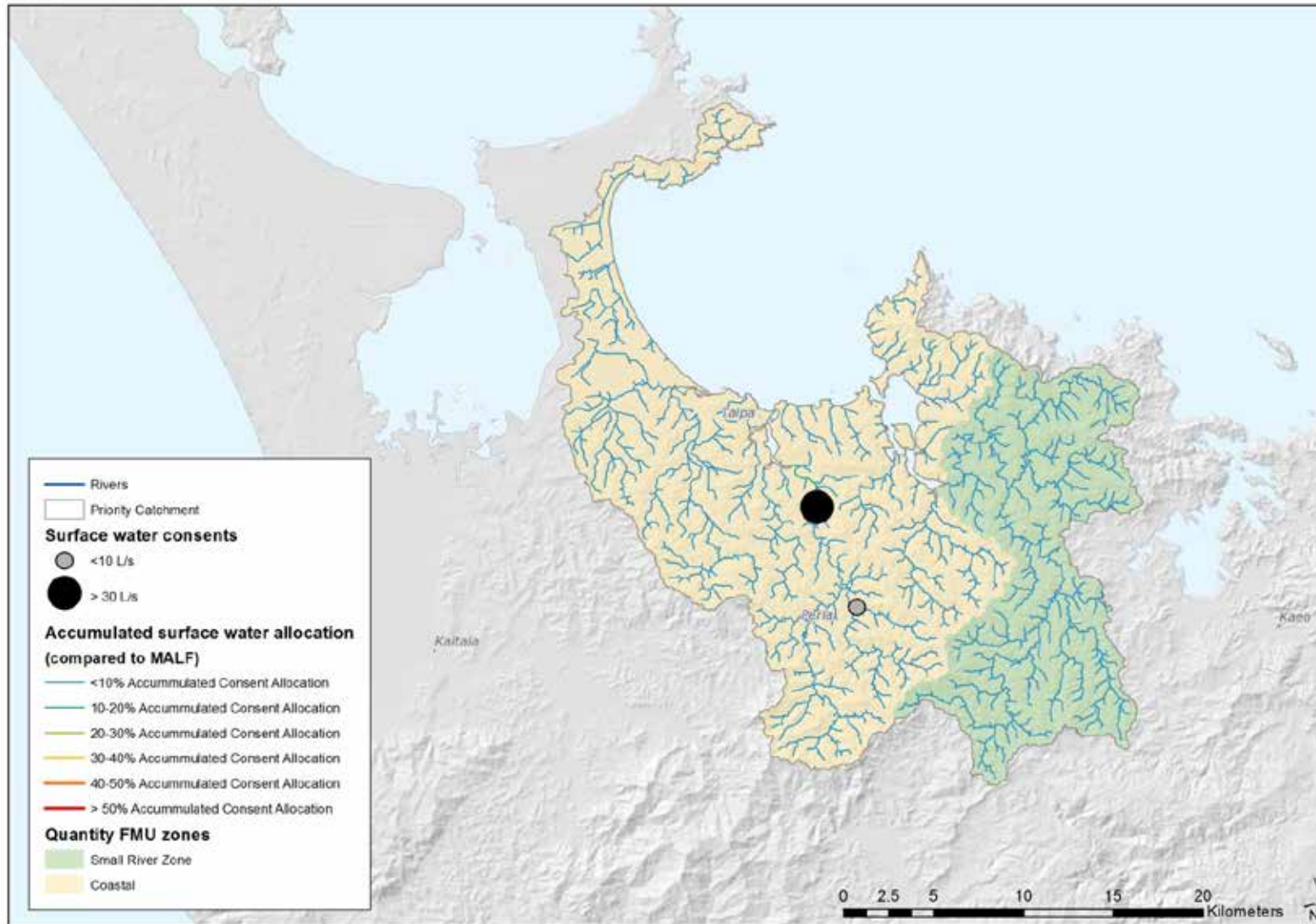


Figure 6: Draft Regional Plan Approach (Note: The Doubtless Bay catchment group has recommended the new regional plan identify the entire catchment as being within the Coastal Rivers FMU)

Table 3: water quantity freshwater management unit limits.

| <b>FMU</b>          | <b>Minimum flow</b> | <b>Allocation limit</b> | <b>Rationale</b>  |
|---------------------|---------------------|-------------------------|---|
| Coastal rivers      | 90% MALF            | 30% MALF                | Coastal rivers have the highest diversity in native fish (as many native fish move between fresh and coastal waters as part of their life cycle). These rivers are sensitive to water takes given their typically small flow, which also means they have the lowest natural reliability for users. The limits for coastal rivers deliver higher minimum flows and lower allocation to provide for aquatic habitat values but still allow for use. |
| Small inland rivers | 80% MALF            | 40% MALF                | Small rivers have less fish diversity than coastal rivers given the distance from the coast and are used more for productive use. The small river limits provide for a lower minimum flow and higher allocation given the less sensitive habitat value.   |

For more detail on the state of water quality and quantity in the Doubtless Bay catchment see [www.nrc.govt.nz/waiora](http://www.nrc.govt.nz/waiora)



## Catchment objectives (the outcomes sought)

Table 3 identifies draft objectives (high level and specific) to address the issues that affect the values identified by the Doubtless Bay Catchment Group. These issues and their impacts as identified by the Doubtless Bay Catchment Group are set out in Appendix 2.

Table 4: catchment objectives.

| Uses and values   | Issues that impact uses and values <sup>2</sup> .  | High level objectives   | Catchment-specific objectives  |
|---|--|---|--|
| <b>Ecosystem health</b> <ul style="list-style-type: none"> <li>• Native fish nursery/habitat.</li> <li>• Native birdlife.</li> <li>• Conservation land.</li> <li>• Wetlands.</li> <li>• Connection between estuary and rivers.</li> </ul> | <ul style="list-style-type: none"> <li>• Livestock access to waterbodies.</li> <li>• Sediment from hill slope and stream bank erosion.</li> <li>• Nutrient enrichment in Lake Waiporohita.</li> <li>• Extraction of water from rivers (during low flows).</li> <li>• Exotic species (for example, trout, alligator weed).</li> <li>• Effluent discharges to rivers.</li> </ul> | <b>Improve fresh and coastal habitats for native aquatic species.</b><br><br><b>Measures:</b><br>Macroinvertebrates index; Stream habitat assessment;<br>Turbidity & Trophic state (lakes). | <ul style="list-style-type: none"> <li>• Reduce the amount of sediment in fresh and coastal waters from high yield areas on pasture and from stream bank erosion.</li> <li>• Ensure the management of water quantity and water takes from rivers provides for flow variation and a high level of protection for the habitat of native fish species.</li> <li>• Adopt a precautionary approach to protect Lake Waiporohita from the potential impacts of water extraction.</li> <li>• Reduce nutrient inputs into Lake Waiporohita and maintain its outstanding ecological status.</li> </ul> |

<sup>2</sup> Note: all dairy effluent discharges to water require resource consent

| Uses and values  | Issues that impact uses and values <sup>3</sup> .   | High level objectives   | Catchment-specific objectives   |
|--|---|---|---|
| <b>Recreation</b> <ul style="list-style-type: none"> <li>· Swimming (fresh and coastal waters).</li> <li>· General recreation.</li> <li>· Education.</li> <li>· Kayaking.</li> </ul> | <ul style="list-style-type: none"> <li>· Livestock access to waterbodies.</li> <li>· Effluent discharges to land and rivers.</li> </ul>   | <b>Improve the water quality of fresh and coastal waters for recreational activity and food gathering purposes.</b><br><br><b>Measures:</b> E.coli (freshwater)   | <ul style="list-style-type: none"> <li>· Reduce <i>E.coli</i> levels during base-flows so that there is a very low risk (&lt;0.1% risk) from activities in freshwater with occasional immersion (Annual median of &lt;260 E.coli/100mL).</li> <li>· Reduce the incidence of water quality non-compliance for shellfish gathering at Cable Bay, Coopers Beach and Taipā monitoring sites.</li> <li>· Improve bathing water quality at the Taipā estuary site (at the boatramp).</li> </ul>       |
| <b>Cultural values</b> <ul style="list-style-type: none"> <li>· Significant sites.</li> <li>· Healing waters.</li> <li>· Mahinga kai (traditional food sources).</li> </ul>          | <ul style="list-style-type: none"> <li>· Livestock access to waterbodies and effluent discharges.</li> <li>· Exotic species (for example, trout, alligator weed).</li> <li>· Commercial harvest of native fish/eels.</li> <li>· Lack of public awareness of cultural values/sites of significance.</li> </ul> | <b>Improve cultural ‘health’ and awareness.</b><br><br><b>Measures:</b><br>Incidents of damage to cultural sites.<br>Native fish records.<br>Incidents of ‘closures’ of fresh or coastal waters for food gathering. | <ul style="list-style-type: none"> <li>· Improve public awareness and understanding of cultural values at sites of significance to tangata whenua within the Doubtless Bay catchment.</li> <li>· Improve public ‘conduct’ at popular recreational sites in order to protect cultural values.</li> <li>· Enhance the sustainability of populations and habitat of important mahinga kai species.</li> <li>· Reduce the risk of consuming food gathered from fresh and coastal waters.</li> </ul> |

<sup>3</sup> Note: all dairy effluent discharges to water require resource consent

| Uses and values   | Issues that impact uses and values <sup>4</sup> .   | High level objectives   | Catchment-specific objectives   |
|---|---|---|---|
| <p><b>Socio-economic</b></p> <ul style="list-style-type: none"> <li>· Tourism.</li> <li>· Dairy washdown/cooling.</li> <li>· Apiculture.</li> <li>· Forestry.</li> <li>· Small industry water use/discharge.</li> <li>· Quarrying.</li> <li>· Horticulture.</li> <li>· Drinking water.</li> </ul> | <ul style="list-style-type: none"> <li>· Availability of freshwater (in rivers).</li> <li>· Hill-slope erosion on pasture.</li> <li>· Streambank erosion (and associated damage to assets, for example, fences).</li> </ul> | <p><b>Enhance the productive capacity of land in the Doubtless Bay catchment.</b></p> <p><b>Measures:</b><br/>Incidents of streambank erosion/debris damage.</p> <p>Total allocation / number of water takes.</p> | <ul style="list-style-type: none"> <li>· Ensure minimum flows and allocation limits provide capacity for economic growth and reasonable reliability of supply for the use of water.</li> <li>· Minimise the loss of productive soils through erosion.</li> <li>· Minimise damage to land or infrastructure from flood debris and streambank erosion.</li> </ul> |
| <p><b>Natural character</b></p> <ul style="list-style-type: none"> <li>· Isolation.</li> <li>· High biodiversity in upper reaches.</li> </ul>   | <ul style="list-style-type: none"> <li>· Sediment from hill slope and stream bank erosion.</li> <li>· Exotic species (for example, trout, alligator weed).</li> </ul>   | <p><b>Maintain the natural character of waterbodies in the Doubtless Bay catchment.</b></p> <p><b>Measures:</b><br/>Reports of new pest species.<br/>% increase in riparian cover.</p>                            | <ul style="list-style-type: none"> <li>· Encourage the retention and enhancement of riparian vegetation, particularly where this will most benefit native aquatic species and avoid erosion.</li> <li>· Minimise the impact of pest plants on important aquatic habitats.</li> <li>· Restrict the introduction of exotic fish species.</li> </ul>               |

<sup>4</sup> Note: all dairy effluent discharges to water require resource consent

## Implementation measures

This section outlines the implementation methods identified by the Doubtless Bay Catchment Group to achieve the objectives. Table 5 (below) sets out the regulatory measures (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 applied specifically to the Doubtless Bay catchment, in addition to the other region-wide rules in the Regional Plan. Implementation of non-regulatory measures can be set-out in an Implementation Plan after considering community feedback.

Table 5: Implementation measures

| Issues and current management approach  | Doubtless Bay catchment plan approach   |
|---|---|
| <p><b>Livestock access to water bodies</b><br/>           Stock exclusion can reduce sediment (under normal flow conditions) by up to 80% and <i>E.coli</i> by up to 60% (annual averages). Stock exclusion can also limit damage to physical habitat by stock, and stock losses in waterways. However, there are currently no regional rules requiring stock to be excluded from rivers and lakes (in the operative Regional Water &amp; Soil Plan).</p> <p>Despite this, dairy farmers have largely excluded livestock from streams wider than 1m and deeper than 30cm through industry good practice and supplier contracts.</p> <p>It is estimated approximately 36% of rivers in the lowland area (land &lt;15° slope) of the Doubtless Bay catchment are fenced (meaning about 300km of stream margins are unfenced). This figure is likely to be much lower in steeper land (&gt;15° slope) where exclusion is more difficult and costly (e.g. fencing and stock water reticulation costs) – stocking rates are also typically lower in such areas and therefore benefits tend to be less.</p> | <p><b>Regulatory:</b><br/>           Defer to Proposed regional plan rules</p> <p><b>Non regulatory:</b></p> <ul style="list-style-type: none"> <li>Encourage livestock exclusion from waterbodies in hill country (land &gt;15° slope).</li> </ul> |

| Issues and current management approach  | Doubtless Bay catchment plan approach   |
|---|---|
| <p><b>Effluent discharges</b></p> <p>Operative 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 to water. Of the 24 dairy farms in the catchment, 20 have consent to discharge to water during extremely wet conditions (they normally apply it to land); four rely solely on land application and three do not use land application but have consent to discharge treated effluent to water (these are small farms with a high level of treatment).</p> <p>Regional rules also apply controls to on-site effluent disposal and wastewater treatment systems. The Far North District Council currently monitors on-site effluent disposal systems through an 'on-site wastewater disposal systems bylaw' that requires an inspection every five years.</p> | <p><b>Regulatory:</b><br/>Not applicable.</p> <p><b>Non regulatory:</b></p> <ul style="list-style-type: none"> <li>• Work with dairy industry to encourage more dairy effluent disposal to land<sup>5</sup>.</li> <li>• Regional council to consider need for tighter controls on on-site human effluent treatment and disposal systems.</li> <li>• Encourage Far North District Council compliance with regional wastewater rules for Taipā wastewater treatment plant.</li> <li>• Encourage effluent disposal to land.</li> <li>• Encourage remedy for stormwater intrusion into the wastewater network, including into the treatment ponds.</li> <li>• Review faecal source tracking to assess proportion of contributions (human, stock, wildfowl) when technology becomes available.</li> <li>• Targeted follow-up where issues are identified.</li> </ul> |
| <p><b>Hill slope erosion from pasture</b></p> <p>The current approach to managing hill slope erosion is:</p> <ul style="list-style-type: none"> <li>• Working with land owners to address erosion on a voluntary basis through Farm Erosion Control and Farm Water Quality Improvement Plans, with some financial assistance provided (for example, for poplars).</li> </ul> <p>Critical erosion areas have been modelled for the Doubtless Bay catchment (using SEDNET<sup>6</sup>). This indicates gully and landslide erosion are responsible for most of the sediment generated from pasture (gully erosion generates 63% of the erosion on pasture (5% by area), while landslide generates</p>   | <p><b>Regulatory:</b><br/>Erosion control plans for pastoral land use on High Sediment Yielding land to be compulsory after 1 January 2025 (See Figure 3)</p> <p>Controlled activity - Use of <i>High sediment yielding land</i> after 1 January 2025 is a controlled activity if an Erosion Control Plan has not been developed for the land.</p> <p>Matters of control:</p> <ol style="list-style-type: none"> <li>1. the effectiveness of measures to control or mitigate sediment from areas of gully, landslide and earthflow erosion, and</li> <li>2. the location, timing and prioritisation of measures to control or mitigate sediment from areas of gully, landslide and earthflow erosion, and</li> <li>3. information and monitoring requirements.</li> </ol>   |

<sup>5</sup> Note: all dairy effluent discharges to water require resource consent

<sup>6</sup> SEDNET is a model used to identify types of erosion processes and their relative yield to total sediment load

| Issues and current management approach  | Doubtless Bay catchment plan approach  |
|---|--|
| <p>34% (18% by area). Streambank erosion is estimated to generate around 23% of sediment.</p> | <div style="background-color: #e0f2f7; height: 20px; margin-bottom: 10px;"></div> <p><i>Meaning of words:</i></p> <p><b>“Erosion Control Plan”</b> 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”.</p> <p><b>“High sediment yielding land”</b> means: land mapped as having high potential sediment yield from erosion processes. In the Doubtless Bay catchment this is land with an estimated sediment yield of &gt;500 tonnes/km<sup>2</sup>/year (See Figure 3).</p> <p><b>“Pastoral land use”</b> means: effective grazing area and includes all contiguous land areas in herbaceous species including isolated trees. It excludes those forested areas which achieve 100% canopy closure or other woody vegetation which prevents pastoral growth.</p> <p><b>Non regulatory:</b></p> <ul style="list-style-type: none"> <li>· Provide a 50-100% subsidy for poplars/willows associated with erosion control plan implementation (case by case basis).</li> <li>· Encourage Erosion Control Plans on land subject to other areas of erosion.</li> <li>· Review uptake and implementation of compulsory Erosion Control Plans by 2023.</li> <li>· Examine potential for use of native plant species for erosion control and where practical incorporate into soil conservation programmes.</li> <li>· Hold workshops / or produce advisory material on the benefits of soil health for reducing erosion / sediment discharge to water and increased productivity.</li> </ul> |



| Issues and current management approach   | Doubtless Bay catchment plan approach  |
|--|--|
| <p><b>Stream bank erosion</b></p> <p>The current approach to managing streambank erosion is primarily reactive in that operative regional rules:</p> <ul style="list-style-type: none"> <li>· Enable removal of obstructions from rivers (for example, debris and gravel) to maintain the free flow of water.</li> <li>· Limit the removal of riparian vegetation (this is for a number of reasons that also relate to water quality and aquatic ecosystems).</li> <li>· Enable construction of erosion protection structures (subject to conditions).</li> </ul> <p>However, there are currently no regional rules restricting stock access to rivers and lakes.</p>  | <p><b>Regulatory:</b><br/>Not applicable.</p> <p><b>Non regulatory:</b></p> <ul style="list-style-type: none"> <li>· Encourage riparian setbacks when fencing waterways (through education and regional council land management advice).</li> <li>· Facilitate land owner removal of gravel/debris from rivers where it exacerbates stream bank erosion.</li> <li>· Identify and address areas of severe stream bank erosion (through Erosion Control Plans and the potential for a regional council consent to extract nuisance debris).</li> <li>· Actively encourage landowners to manage riparian vegetation and address waterbody obstructions/debris on their land.</li> <li>· Investigate the potential for regulatory requirements to remove obstructions/debris causing erosion and/or a flood hazard.</li> </ul> |
| <p><b>Exotic/pest species</b></p> <p>Pest species (such as alligator weed) 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 (CPCAs). There is a CPCA established at Whakaangi in Doubtless Bay. Alligator weed has built up in a number of areas causing nuisance, damage to fences during floods and impeding recreational use of rivers.</p> <p>The release/transfer of exotic fish species (for example, trout) is authorised by the Department of Conservation and typically implemented by Fish &amp; Game. Trout have been released in Doubtless Bay rivers in the past.</p> | <p><b>Regulatory:</b><br/>Not applicable.</p> <p><b>Non-regulatory:</b></p> <ul style="list-style-type: none"> <li>· Regional council to investigate options to address alligator weed and <i>Egeria densa</i> (waterweed), including the potential for a community control programme.</li> <li>· Seek formal restrictions on the release of exotic fish species (for example, trout) from Fish &amp; Game/Department of Conservation.</li> </ul>  |

| Issues and current management approach   | Doubtless Bay catchment plan approach  |
|--|--|
| <p><b>Nutrient enrichment</b></p> <p>Operative regional rules currently restrict discharges of contaminants into lakes and require setbacks for land disturbance, vegetation clearance and discharges of effluent/fertiliser from water bodies.</p> <p>However, there are currently no nutrient water quality limits for lakes and rivers, nor are there rules requiring stock to be excluded (however lake Waiporohita is currently well fenced with a vegetated riparian buffer).</p> <p>The effects of waterfowl are also a likely cause of nutrient enrichment in Lake Waiporohita and council is currently investigating this issue (for a number of lakes/habitats).</p> | <p><b>Regulatory:</b><br/>Not applicable.</p> <p><b>Non-regulatory:</b></p> <ul style="list-style-type: none"> <li>• Design and construct wetlands/interception devices on surface drains prior to discharge into Lake Waiporohita.</li> <li>• Work with land owners to encourage fencing of farm drains that drain to Lake Waiporohita.</li> <li>• Regional council to continue assessing the impacts of waterfowl on water quality in Lake Waiporohita and the need for population control.</li> <li>• Investigate potential for targeted lake monitoring at wildfowl congregation areas on Lake Waiporohita.</li> <li>• Recommend council undertake sampling to determine dissolved nutrient concentrations in Mangonui Harbour (sampling slime on vessel hulls was suggested).</li> <li>• Trial use of alternative fertilisers to reduce nutrient run-off / leaching.</li> </ul> |
| <p><b>Water extraction – Lake Waiporohita</b></p> <p>Operative regional rules currently provide a high level of protection for extraction of water from listed dune lakes (including Lake Waiporohita).</p> <p>Lake Waiporohita is listed as an outstanding waterbody due to its biodiversity. The lake is nutrient enriched likely due to surrounding land use and waterfowl.</p>   | <p><b>Regulatory:</b><br/>Require all water takes from Lake Waiporohita to obtain resource consent as a discretionary activity.</p> <p><b>Water takes from Lake Waiporohita:</b></p> <p>The taking and use of freshwater from Lake Waiporohita for any purpose is a discretionary activity, provided:</p> <ol style="list-style-type: none"> <li>1. water is not taken when a flow or water level is below a minimum flow or water level in freshwater quantity limits, and</li> <li>2. any new take (after the notification date of this plan) does not cause an allocation limit in freshwater quantity limits to be exceeded</li> </ol>   |

| Issues and current management approach   | Doubtless Bay catchment plan approach   |
|--|---|
| <p><b><i>Water extraction/flows in rivers</i></b></p> <p>Operative 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.</p> <p>Currently the total volume of water extracted from rivers (by resource consent or permitted activity rules) in the Doubtless Bay catchment is low at around 10% of Mean Annual Low Flow. This means there is a relatively high level of habitat protection for aquatic species and good reliability of supply.</p> | <p><b>Regulatory:</b></p> <p>The Doubtless Bay Catchment Group has recommended the coastal river FMU water quantity limits and rules apply to the entire Doubtless Bay catchment. See Appendix 1 for map.</p> <p><b>Regional plan freshwater quantity management units be amended to show all rivers in the Doubtless Bay catchment to be “the coastal river” freshwater management unit. This will have the effect of more stringent freshwater quantity limits for those rivers that would otherwise be classified as “small rivers”.</b></p> <p><b>Non-regulatory:</b></p> <ul style="list-style-type: none"> <li>· Regional council to continue to work with industry to encourage water use efficiency and good practice.</li> <li>· Encourage storage of peak winter river flows.</li> </ul>  |
| <p><b><i>Impacts on mahinga kai species</i></b></p> <p>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. Currently commercial harvest of eels is occurring in the catchment and is of concern to tangata whenua.</p> <p>There are current regional rules that provide protection for aquatic species including:</p> <ul style="list-style-type: none"> <li>· Restrictions on the removal of riparian vegetation.</li> <li>· Restrictions on discharges of contaminants to water.</li> <li>· Controls on structures in/disturbance to, coastal and freshwater bodies.</li> <li>· Minimum flows for rivers and controls on the extraction of water.</li> </ul>               | <p><b>Regulatory:</b></p> <p>Apply the more precautionary Coastal Rivers FMU water quantity limits and rules to the entire Doubtless Bay catchment (minimum flow 90% MALF and allocation limit 30% MALF) and associated water extraction rules). See Appendix 1 for map.</p> <p><b>Non-regulatory:</b></p> <ul style="list-style-type: none"> <li>· Regional council to facilitate identification of important native fish spawning sites in the catchment in order to focus habitat enhancement/riparian restoration efforts.</li> <li>· Seek restrictions on the release of exotic fish species (for example, trout) from Fish &amp; Game/Department of Conservation.</li> <li>· Continue catchment survey to identify structures and other impediments to fish passage up and down rivers.</li> <li>· Investigate (with the assistance of MPI) the sustainability of commercial eeling within the catchment to restrict commercial take to short fin eels only.</li> </ul> |

| Issues and current management approach   | Doubtless Bay catchment plan approach  |
|--|--|
| <p><b><i>Limited public awareness of cultural values and sites of significance to tangata whenua</i></b><br/>           There are few sources of information advising the public of cultural values or appropriate conduct in general and at culturally sensitive sites in particular.</p> <p>There are no sites of significance to tangata whenua currently identified in regional plans (an acknowledged gap).</p> | <ul style="list-style-type: none"> <li>· Investigate the potential to use traditional tools or other fisheries management options for the eel fishery in the catchment.</li> </ul> <p><b>Regulatory:</b><br/>Not applicable.</p> <p><b>Non-regulatory:</b></p> <ul style="list-style-type: none"> <li>· Interpretative/story board signage at important cultural sites to raise awareness (Taipā estuary was identified).</li> <li>· Signs at Lake Rotopokaka to outline a 'code of care' for the lake and advising that use of soaps, shampoos and other contaminants should be avoided.</li> </ul> |

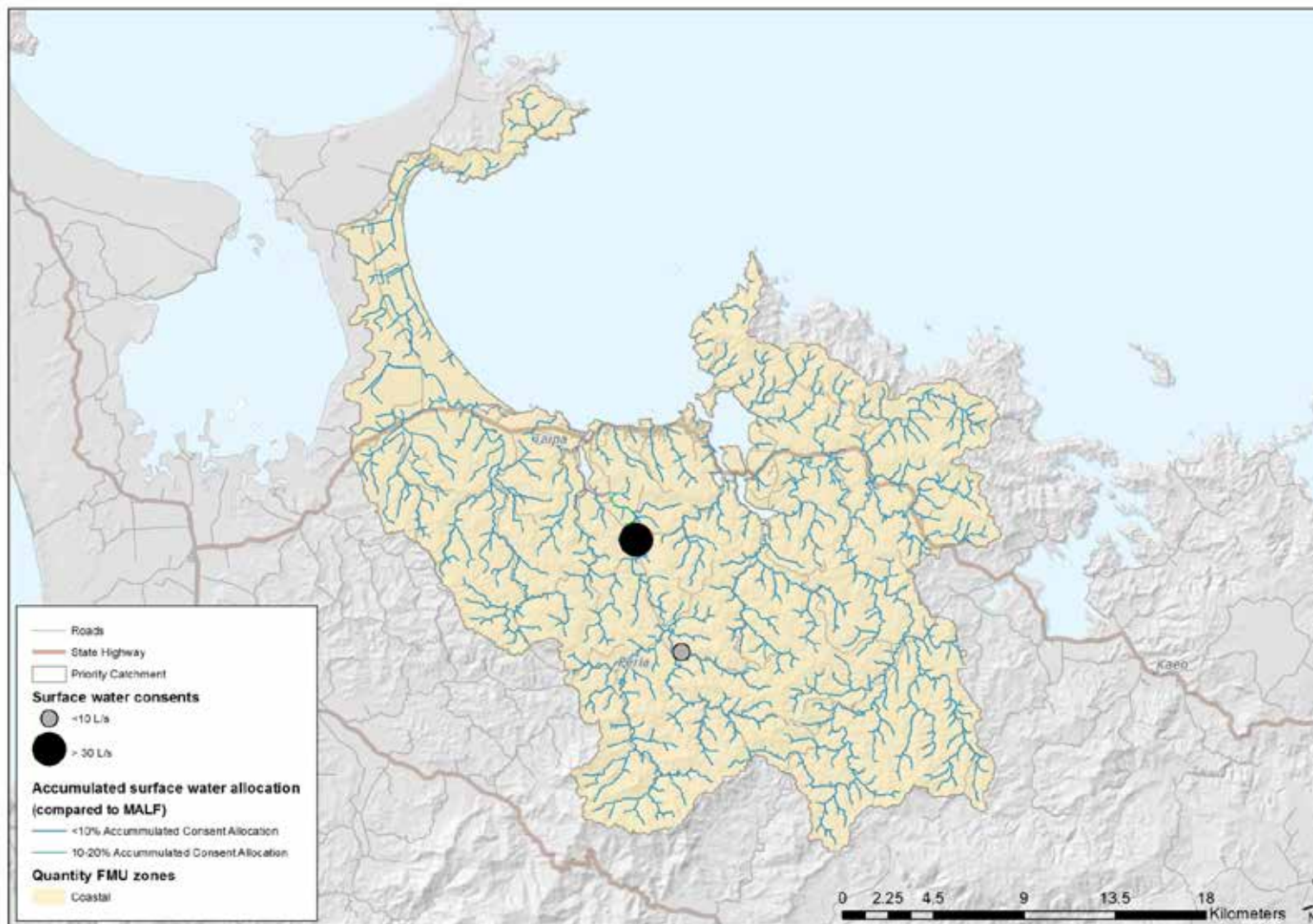
## Conclusion

The recommendations of the Doubtless Bay Catchment Group can be grouped into two types – regulatory (that is, rules) and non-regulatory (that is, voluntary measures or actions). Regulatory measures only have effect once adopted into statutory documents by local authorities or other agencies with regulatory powers.

The regulatory measures identified by the Doubtless Bay 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.

Non-regulatory measures will rely on operational initiatives by the Doubtless Bay 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.

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



## Appendix 1: Coastal Rivers FMU applied to whole Doubtless Bay catchment.



## Appendix 2: Issues and impact on values identified by the Doubtless Bay catchment group

| Issues identified by the catchment group   | Ecosystem health impacts  | Natural form and character impacts   | Cultural values  | Recreational impacts  | Socio-economic impacts   |
|--|---|--|--|---|--|
| <i>Livestock access to water bodies.</i>   | <ul style="list-style-type: none"> <li>• <i>Damage to in-stream and riparian vegetation.</i></li> <li>• <i>Damage to streambed habitat.</i></li> <li>• <i>Nutrient toxicity (reduced habitat quality for aquatic species).</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Damage to in-stream and riparian vegetation.</i></li> <li>• <i>Stream bank erosion.</i></li> <li>• <i>Increased sediment.</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Impact on mauri of water.</i></li> <li>• <i>Restriction on traditional uses of water.</i></li> </ul> | <i>Increased health risk from contact with water (E.coli/pathogens).</i>  | <i>Stock losses.</i>   |
| <i>Effluent discharges.</i>  | <i>Nutrient toxicity (reduced habitat quality for aquatic species)</i>  |  | <i>Impact on mauri of water.</i>   | <i>Increased health risk from contact with water (E.coli / pathogens).</i>  |  |
| <i>Erosion</i><br><i>Hill-slope erosion from pasture.</i><br><br><i>Stream bank erosion.</i> | <ul style="list-style-type: none"> <li>• <i>Impacts on native aquatic plant growth and fish habitat due to reduced water clarity.</i></li> <li>• <i>Sediment deposition</i></li> </ul>  | <ul style="list-style-type: none"> <li>• <i>Reduced water clarity.</i></li> <li>• <i>Sediment deposition in estuaries.</i></li> </ul>  | <i>Smothering of shellfish beds.</i>   | <ul style="list-style-type: none"> <li>• <i>Reduced water clarity.</i></li> <li>• <i>Sediment deposition in estuaries.</i></li> </ul> | <i>Loss of productivity.</i><br><br><i>Damage to land/infrastructure (for example,</i> |

| <b>Issues identified by the catchment group</b>             | <b>Ecosystem health impacts</b>   | <b>Natural form and character impacts</b>       | <b>Cultural values</b>   | <b>Recreational impacts</b>  | <b>Socio-economic impacts</b>   |
|---|---|---|--|--|---|
|   | <i>in estuaries.</i>  |   |  |  | <i>fences).</i>   |
| <i>Exotic species (for example, trout, alligator weed).</i> | <ul style="list-style-type: none"> <li>• <i>Predation of native fish.</i></li> <li>• <i>Competition for space/smothering.</i></li> </ul>  | <i>Impact on native species populations.</i>    | <ul style="list-style-type: none"> <li>• <i>Predation of eels (for example, trout).</i></li> <li>• <i>Smothering/reduced habitat for traditional foods (for example, alligator weed).</i></li> </ul> | <i>Reduced access to recreational sites (due to prolific weed growth).</i> | <i>Damage to infrastructure (for example, fences/water intakes) from weed debris.</i> |
| <i>Nutrient enrichment in Lake Waiporohita.</i>             | <ul style="list-style-type: none"> <li>• <i>Frequent algal blooms.</i></li> <li>• <i>Reduced water clarity and impact on native plant growth).</i></li> <li>• <i>Reduced habitat quality for native species.</i></li> </ul> | <i>Reduced habitat for native species.</i>      |  |  |   |
| <i>Extraction of water from rivers.</i>                     | <ul style="list-style-type: none"> <li>• <i>Risk to fish habitat due to reduced flows.</i></li> <li>• <i>Reduced flow variation (flushing flows).</i></li> </ul>  | <i>Reduced flow variation (flushing flows).</i> | <i>Reduced habitat for aquatic mahinga kai species.</i>  |  | <i>Reliability of water supply for users of water.</i>                                |
| <i>Impact on mahinga kai species (for</i>                   |   |   | <ul style="list-style-type: none"> <li>• <i>Reduced availability of mahinga kai.</i></li> <li>• <i>Reduced capacity for</i></li> </ul>   |  |   |

| Issues identified by the catchment group  | Ecosystem health impacts | Natural form and character impacts | Cultural values  | Recreational impacts | Socio-economic impacts |
|---|--------------------------|------------------------------------|--|----------------------|------------------------|
| <i>example, commercial harvest, habitat modification).</i>                                      |                          |                                    | <i>manaakitanga.</i>   |                      |                        |
| <i>Limited public awareness of cultural values and sites of significance to tangata whenua.</i> |                          |                                    | <ul style="list-style-type: none"> <li>· <i>Impacts on the mauri of waterbodies.</i></li> <li>· <i>Damage to sensitive sites.</i></li> </ul> |                      |                        |

## Glossary

|  |   |
|--|---|
| Ammonia  | A highly soluble nitrogen compound, chemical formula NH <sub>3</sub> , 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. They specify 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 if 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 an inorganic orthophosphate (PO <sub>4</sub> ) 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 mātaītai                        | 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 <sub>3</sub> .   |
| 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.   |