



REPORT NO. 2829

INVENTORY OF VALUES IN THE TANK CATCHMENTS OF HAWKE'S BAY

INVENTORY OF VALUES IN THE TANK CATCHMENTS OF HAWKE'S BAY

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Prepared for Hawke's Bay Regional Council and the Greater
Heretaunga and Ahuriri Collaborative Stakeholder Group

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EXECUTIVE SUMMARY

This document compiles available spatially-referenced information on the uses and values of freshwater in the greater Heretaunga and Ahuriri area in Hawke's Bay, consisting of the Tūtaekuri, Ahuriri, Ngaruroro and Karamū catchments. It is intended to assist a collaborative planning group, known as the TANK Group, in its task of making recommendations to the Hawke's Bay Regional Council on objectives, policies and methods for freshwater management in these catchments.

The report summarises values in the following broad categories:

- ecological and intrinsic values
- cultural values
- social and recreational values
- commercial and other 'out of stream' values
- property protection values.

Categories of values are simplifications that approximate the complexity of how people value water bodies. Such categories often overlap. Some values may therefore be reflected in more than one section of this report; for example, there is a section on native fish, a section on ecological values that includes assessments of native fish populations, and another on mahinga kai, which also includes native fish—each section provides a different perspective.

Identification of a value by its inclusion in this report does not guarantee any particular level of protection for that value. Rather the report documents 'things that matter' in the TANK catchments so that people involved in planning can better account for the aspirations of all members of the community and the possible consequences of different management options. Except where reporting assessments that have been done by others, the report gives no assessment of the significance of any values, nor is there any attempt to compare the significance of one type of value with any other. Likewise, we have made no attempt to critique the methods or results as reported by others, but rather have tried to present them in a way that is consistent with the source material.

This report is not an exhaustive inventory of values of freshwater in the TANK catchments. There are many other values that have been mentioned by the TANK Group but for which no documented spatial information has been located. The members of the TANK Group will continue to draw upon their own local knowledge of these values during their consideration of objectives, policies and planning methods for freshwater management.

This report describes the values of tangata whenua only in their broadest context, except for some values of Ngāti Hori related to Kohupātiki marae, for which more detailed information is available. Further work on tangata whenua values is planned so that places that are culturally important to tangata whenua can be given an appropriate level of protection through the planning process.

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1. INTRODUCTION

1.1. Purpose of this report

This document compiles available spatially-referenced information on the uses and values of freshwater in the greater Heretaunga and Ahuriri area in Hawke's Bay, consisting of the Tūtaekuri, Ahuriri, Ngaruroro and Karamū catchments. Its purpose is to assist a collaborative group (known as the TANK group) convened by Hawke's Bay Regional Council (HBRC). The group is tasked with making recommendations to HBRC on objectives, policies and methods for freshwater management in these catchments to give effect to the National Policy Statement on Freshwater Management 2014 (NPS).

Under the NPS, regional councils must set objectives and limits in their regional plans for abstractions and discharges for all freshwater bodies so that overall quality of fresh water in the region is maintained or improved (New Zealand Government 2014).

The NPS includes an expectation that freshwater management objectives will be based on both national and local 'freshwater values'. The Preamble states:

Water quality and quantity limits must reflect local and national values
(New Zealand Government 2014, p 4).

To manage increasing demands on water and to give effect to the NPS, HBRC is undertaking a plan change for the greater Heretaunga and Ahuriri area, encompassing the Tūtaekuri, Ahuriri, Ngaruroro and Karamū (TANK) catchments and the underlying groundwater systems.

At a full Council meeting in August 2012, HBRC agreed to establish a collaborative group of Māori, community and stakeholder representatives to make recommendations on objectives, policies and methods for freshwater bodies in the TANK catchments. The greater Heretaunga and Ahuriri Collaborative Stakeholder Group is known colloquially as the TANK Group.

The Council gave a good faith undertaking to implement any consensus outcome agreed by the TANK Group provided the recommendations are consistent with the Resource Management Act 1991 and HBRC's Regional Policy Statement, Land and Water Strategy and Long Term Plan.

The freshwater bodies in the TANK catchments have many diverse uses and values. The TANK Group has discussed many of the freshwater values in the TANK area; these values are documented in various meeting records and associated papers but the documentation is incomplete. The TANK Group requested that more work be done

to document the values and present them in a more accessible format, to better inform consideration of management options for the TANK catchments.

This report is a response to that request, but it is not an exhaustive inventory of values of freshwater in the TANK catchments. The TANK Group has mentioned many other values for which no documented spatial information has been located. The members of the TANK Group will continue to draw upon their own local knowledge of these values during their consideration of objectives, policies and planning methods for freshwater management.

1.2. What are values and why are we documenting them?

Although the term ‘values’ has multiple meanings, as used in the NPS, the term generally refers to things that are worth protecting or maintaining, or simply ‘things that matter’. In the context of some assessment tools and methods, the term ‘value’ refers to how much worth something has, implying that the value of one thing can be compared to the value of something else (Pascual et al. 2010; Sinner et al. 2014).

Categories of values are simplifications that approximate the complexity of how people value water bodies, and these categories often overlap. Cultural values are not distinct from social values; social values can overlap with environmental values or economic values, etc. For example, depending on one’s perspective, swimming can be seen as an environmental, social and / or cultural value and swimming by tourists as an economic or commercial value. Categories such as environmental values and social values may be useful as prompts of the different aspects of how people value or find meaning in their environment. However, because such categories often overlap, care must be taken in using them for planning purposes, to avoid double-counting (Sinner et al. 2014).

1.3. Using values to inform decision-making

Inclusion of a value in this report does not guarantee any particular level of protection for that value. Rather, it documents things that matter in a catchment so that those involved in planning can better account for the aspirations of all members of the community and the possible consequences of different management options.

Ideally, every management option would be assessed for its likely effects on every value in each catchment, so that decision makers are fully informed of the likely consequences of each option. In the TANK process, however, with four river catchments and significant groundwater systems spanning a wide area, such a full analysis would require an almost endless amount of time and resources. The result would be ‘paralysis by analysis’ —nothing would be protected because the

assessment process would take too long. By the time the last value was assessed, the importance of the first value might have changed and require re-assessment.

The approach being taken in the TANK planning process, therefore, has been to identify the main values in each catchment and select attributes¹ and other performance measures (i.e. indicators) that can be used to assess the likely consequences of management actions. This report focuses on the main values in the TANK catchments. The selection of attributes and other performance measures is well underway, with the TANK Group having confirmed many and discussing additional measures.

Some values will respond to changes in the environment in a similar way as other values, so planners may be able to identify an attribute or performance measure that can represent multiple values. For instance, natural character, native fish abundance and suitability for whitewater kayaking, although different values, are likely to be closely correlated, such that one performance measure might be used to assess effects on all three. This simplifies the assessment task and also makes it easier for those involved in decision-making to process the resulting information—making a decision is much easier with ten criteria than with twenty-five.

1.4. Significance assessment

Decisions about freshwater management objectives inevitably involve some consideration of the relative significance or importance (or value) to be given to different aspects of freshwater systems. Furthermore, for purposes of policy analysis, it is generally the change in value arising from a policy intervention that is of interest, rather than the total value generated by an ecosystem or parcel of land.

The field of economics provides several methods for assessing the magnitude of values in monetary terms, but there have been numerous critiques of the economics approach to value (e.g. Spash 2008; Gregory et al. 2012). Value as perceived by someone is not always well-defined, stable and hence measurable, as certain methods based in economics tend to assume. Rather, people often construct value in context. That is, how a person's feelings for a freshwater system or place manifest themselves depends not only on the person's experiences but also on other context-specific matters, such as how a question is asked and by whom (McNeil et al. 1982; Kahnemann & Tversky 2000). This suggests that care must be taken when comparing one value with another, especially when the thing being valued is not bought and sold in the economy (Sinner et al. 2014).

¹ An attribute is a measurable characteristic of fresh water that supports particular values (NPSFM definition). A performance measure is a characteristic of a value that provides an indication of how well the value is being provided. Some performance measures (i.e. periphyton cover) relate directly to water bodies and thus are also attributes, while some performance measures (e.g. jobs) relate to values such as social well-being and are not attributes per se but remain important for assessing scenarios.

The River Values Assessment System (RiVAS), described in Section 2.2, is a methodology for assigning relative significance of different rivers within a region for specified values. The methodology has not been calibrated across regions, so it is not yet known how a river assessed as 'high significance' for a value such as kayaking in one region would compare with a river in a different region that was also assessed as having high significance for kayaking.

Except where reporting assessments done by others, this report makes no assessment of the significance of any values, nor is there any attempt to compare the significance of one type of value with any other. We have made no attempt to critique the methods or results as reported by others, but rather have tried to present them in a way that is consistent with the source material.

The Ministry for the Environment is funding a project to develop nationally-consistent methods for identifying 'outstanding water bodies', which is expected to provide guidance on determining the significance of at least some values. Hawke's Bay Regional Council is assisting with this project, the results of which are expected in 2016.

1.5. Values in national and regional policy statements

1.5.1. Values in National Policy Statement for Freshwater Management 2014

Appendix 1 of the NPS contains two compulsory national values ('ecosystem health' and 'human health for recreation'), for which councils must set freshwater objectives in each freshwater management unit (FMU) in the regional plan. The freshwater objectives for the compulsory values must employ the attributes provided in Appendix 2 plus any other attributes the council considers appropriate.

The NPSFM also lists additional national values and uses for freshwater that councils must consider. If a council decides that one or more of these are relevant, it must also establish freshwater objectives for these in the regional plan. The other (optional) national values identified in Appendix 1 of the NPS are as follows (text is verbatim):

Natural form and character – Where people value particular natural qualities of the freshwater management unit.

Mahinga kai – Kai are safe to harvest and eat

Mahinga kai – Kei te ora te mauri (the mauri of the place is intact)

Fishing – The freshwater management unit supports fisheries of species allowed to be caught and eaten

Irrigation and food production – The freshwater management unit meets irrigation needs for any purpose

Animal drinking water – The freshwater management unit meets the needs of stock

Wai tapu – Wai tapu represent the places where rituals and ceremonies are performed

Water supply – The freshwater management unit can meet people's potable water needs

Commercial and industrial use – The freshwater management unit provides economic opportunities to people, businesses and industries

Hydro-electric power generation – The freshwater management unit is suitable for hydro-electric power generation

Transport and tauranga waka – The freshwater management unit is navigable for identified means of transport.

Guidance material provided by the Ministry for the Environment states:

Councils can use the attributes provided in Appendix 2 where these are relevant to the additional national values, or develop their own attributes. In developing freshwater objectives, councils must use the process outlined in Policy CA2 and must ensure that whatever freshwater objectives they set are also sufficient to give effect to the wider objectives and policies of the NPSFM (such as the requirements to support life-supporting capacity, and to maintain or improve overall water quality).

Councils can also derive their own values, besides the ones provided in Appendix 1, to reflect what is important to the local community (Ministry for the Environment 2015, p 92).

The NPSFM also requires that councils define FMUs to provide 'the appropriate spatial scale for setting freshwater objectives and limits and for freshwater accounting and management purposes' (NPS, p 7). Every FMU must have objectives and limits appropriate for its values and should be monitored in at least one location to assess whether the objectives and limits are being met.

1.5.2. Values in Hawke's Bay Regional Policy Statement

The HBRC's Regional Policy Statement (implemented via Plan Change 5) identifies primary and secondary values that will guide management in the TANK catchments (Hawke's Bay Regional Council 2015). Box 1 presents the policy explaining how these primary and secondary values will be used. The values themselves are shown in Table 1.

Box 1. Excerpt from Plan Change 5 to Hawke's Bay Regional Resource Management Plan (emphasis added to highlighted references to **Table 1**)

POL LW2 Problem solving approach - Prioritising values

Subject to achieving Policy LW1.3:

1. Give priority to maintaining, or enhancing where appropriate, the primary values and uses of freshwater bodies shown in **Table 1** for the following catchment areas in accordance with Policy LW2.3:

- a) Greater Heretaunga / Ahuriri Catchment Area;
- b) Mohaka Catchment Area; and
- c) Tukituki Catchment Area.

1A. Policy LW2.1 applies:

- a) when preparing regional plans for the catchments specified in Policy LW2.1; and
- b) when considering resource consents for activities in the catchments specified in Policy LW2.1 when no catchment-based regional plan has been prepared for the relevant catchment.

2. In relation to catchments not specified in Policy LW2.1 above, the management approach set out in Policy LW1.1, Policy LW1.2, Policy LW1.3 and Policy LW1.4 will apply.

2A. In relation to values not specified in **Table 1**, the management approach set out in Policy LW1.1, Policy LW1.2, Policy LW 1.3 and Policy LW1.4 will apply.

3. When managing the fresh water bodies listed in Policy LW2.1:

- a) recognise and provide for the primary values and uses identified in **Table 1**; and
- b) have particular regard to secondary values and uses identified in **Table 1**.

4. Evaluate and determine the appropriate balance between any conflicting values and uses within (not between) columns in **Table 1**, using an integrated catchment-based process in accordance with Policy LW1.1, Policy LW1.2, Policy LW1.3 and Policy LW1.4 or when considering resource consent applications where no catchment-based regional plan has been prepared.

Table 1. Primary and secondary values for the Greater Heretaunga/Ahuriri (TANK) catchments as stated in Table 1 of the Hawke's Bay Regional Policy Statement

Catchment area	Primary Value(s) and Uses – in no priority order	Secondary Value(s) and Uses – in no priority order
Greater Heretaunga /Ahuriri Catchment Area	<ul style="list-style-type: none"> • any regionally significant native water bird populations and their habitats • Cultural values and uses for: <ul style="list-style-type: none"> ○ mahinga kai ○ nohoanga ○ taonga raranga ○ taonga rongoa • Fish passage • Individual domestic needs and stock drinking needs¹ • Industrial & commercial water supply • Native fish habitat in the Ngaruroro River and Tūtaekuri River catchments • Recreational trout angling and trout habitat in: <ul style="list-style-type: none"> ○ the Mangaone River ○ the Mangatutu Stream ○ the Ngaruroro River and tributaries upstream of Whanawhana cableway ○ the Ngaruroro River mainstem between the Whanawhana cableway and confluence with the Maraekakaho River ○ the Tūtaekuri River mainstem above the Mangaone River confluence • The high natural character values of the Ngaruroro River and its margins upstream of Whanawhana cableway, including Taruarau River • The high natural character values of the Tūtaekuri River and its margins above the confluence of, and including, the Mangatutu Stream • Trout spawning habitat • Urban water supply for cities, townships and settlements and water supply for key social infrastructure facilities • freshwater use for beverages, food and fibre production and processing and other land-based primary production 	<ul style="list-style-type: none"> • Aggregate supply and extraction in Ngaruroro River downstream of the confluence with the Mangatahi Stream • Amenity for contact recreation (including swimming) in lower Ngaruroro River, Tūtaekuri River and Ahuriri Estuary • any locally significant native water bird populations and their habitats • Native fish habitat, notwithstanding native fish habitat as a primary value and use in the Tūtaekuri River and Ngaruroro River catchments • Recreational trout angling, where not identified as a primary value and use • Trout habitat, where not identified as a primary value and use

¹In line with s14(3)(b)(ii) of the RMA, it is recognised that drinking water for stock is allowed, provided that it does not have an adverse effect on the environment.

2. METHODS

2.1. General methodology for report

This report is a collation of existing documentation on values related to freshwater bodies in the TANK catchments. The documentation was identified by Hawke's Bay Regional Council staff and by members of the TANK Group. For each value, we have provided references to the documents or other sources used, summarised the methods used in those sources, briefly described the values identified and, where possible, provided a map showing the spatial distribution of the values.

The River Values Assessment System has been used to document several values in Hawke's Bay. To avoid repetition of the methodology in subsequent sections of this report, this method is described in the following section.

To complement published sources of information on values, some TANK Group members participated in a drop-in workshop on 19 May 2015 to share additional information on values. This process is described in Section 2.3.

2.2. RiVAS – the River Values Assessment System

The River Values Assessment System, or RiVAS, is a multi-criteria method for assessing the relative significance (i.e. contribution) of rivers within a region for a particular use or value (Hughey & Baker 2010; Hughey & Booth 2012).

Using RiVAS, an expert group assesses rivers within a region for their significance for a particular value, which requires weighting the importance of the various attributes of that value as identified by the expert group (Hughey & Baker 2010). While questions have been raised about the inherent assumptions of RiVAS, e.g. that the processes that produce the value do not vary across space or over time (Tadaki & Sinner 2014), the methodology has been applied in a number of regions to a total of ten different river values.

In Hawke's Bay, the RiVAS methodology has been applied to the following values:

- salmonid angling
- native fish
- native birds
- natural character
- kayaking
- irrigation
- swimming.

These assessments are reported in subsequent sections of this report.

An extension of the RiVAS methodology, called RiVAS+, has been developed to compare the restoration potential of rivers for a particular value (Hughey et al. 2011). RiVAS+ involves the RiVAS expert panel considering a list of possible interventions to improve river values (e.g. enhance access, increase minimum flow). The panel selects the two most important interventions for each river, which must be practical and feasible rather than ideal. Then the panel considers the net effect of these interventions upon the value of the river and identifies where there is greatest scope for improvement. The RiVAS+ assessment has been applied to swimming, natural character and native bird values in Hawke's Bay, all described in later sections of this report.

It is important to note that RiVAS does not provide for comparison between the importance of one value (e.g. native fish or natural character) and another (e.g. tangata whenua values or irrigation). If a river is assessed to have 'nationally significant' native fish and 'regionally significant' irrigation, this does not mean that native fish should take priority as a management objective over irrigation (Sinner et al. 2014).

Also, RiVAS is designed for assessing rivers only. Other freshwater bodies such as lakes, wetlands, aquifers and springs are not included.

2.3. TANK value mapping workshop and online tool

At the request of TANK Group members for an opportunity to map their values, HBRC organised a workshop on 19 May 2015 and invited TANK Group members to attend. As noted in the meeting record for TANK Meeting 16, the principal objectives of the workshop were:

1. To map the location of known uses and values of freshwater in TANK area that are likely to be affected by HBRC policies and actions.
2. Based on Objective 1, reveal potential information 'gaps' about values which can then be examined in future if those gaps are 'material' or influential to developing regional plan policy.
3. To identify (and refine) performance measures (preferably from the current set) that can be used to assess how well these uses and values are being provided for currently and under potential policy alternatives.

The online tool provided access to a map with ability to zoom in and out, and participants were able to draw points, lines and shapes on the map to indicate the location of a value. The shapes and locations identified using the mapping tool are approximate only, as the tool had some limitations that made precise mapping difficult.

To identify the nature of the value, users were asked to choose from a list based on the values included in the TANK Group First Report (see Figure 1). After drawing the feature, users were asked to name the feature or value, provide a description, indicate the source of the knowledge (including if it was 'personal knowledge'), indicate the significance of the feature relative to others of the same type, and suggest up to three performance measures that could be used to assess how well the value was provided for in HBRC's regional plan.

HBRC staff also used the online tool to add some features that had been marked on physical (i.e. paper) maps at a TANK Group meeting in 2014, and which had not been mapped by others using the online tool.

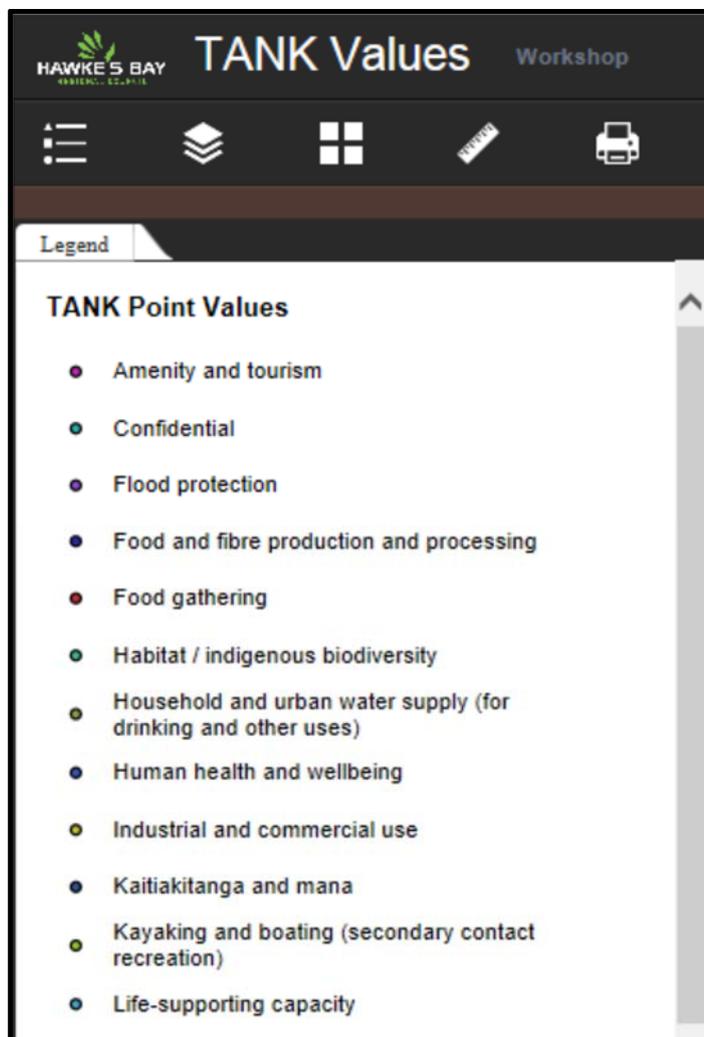


Figure 1. Categories of values that TANK Group members could use to label values being mapped using an online tool developed by Hawke's Bay Regional Council (source: Instructions for TANK values mapping application, unpublished HBRC document).

While some TANK Group members found the mapping tool relatively straightforward to use, tangata whenua members indicated that “the online tool was difficult to use and the values listed were incomplete for our needs.”² They provided a list for all mana whenua values and some context around these; see Section 4.6.

It was agreed at TANK Meeting 16 that the online values mapping tool be left open for a further three week period (until 22 July 2015) for TANK Group members to map location of known uses and values of freshwater, plus any associated suggestions for performance measures. One member commented that the online mapping tool is just a tool; it is not definitive.

The information on values collected using the online mapping tool has been consolidated into five maps that are presented in Sections 3.5, 4.6, 5.9, 7.6, and 8.2 of this report. The detailed information submitted via the online tool is included in the Appendix to this report.

2.4. Past, present and future values

Mostly this report documents present values, i.e. values that are present and manifest today. In a few instances, past values are also identified, e.g. where habitat has been modified and valued species are no longer abundant or, in some cases, may be extinct.

Similarly, in some instances this report documents the potential for a value to be enhanced or in some cases created in the future, through restoration or rehabilitation of an area or through intensification or development. The RiVAS assessment of irrigation value is an example where both present values and potential for further development have been assessed and documented. As described above in Section 2.2, the RiVAS+ methodology can be used to assess the restoration potential of rivers for a particular value.

The Stream Ecological Valuation method (Section 3.4.1 of this report) also assesses future value, in terms of the potential of a stream or reach for ecological rehabilitation.

² Tāngata whenua TANK hui, 25th June 2015. Email from Marei Apatu to Gavin Ide .

3. ECOLOGICAL AND INTRINSIC VALUES

3.1. Natural character

3.1.1. *Natural character values in the RPS*

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values –

- The high natural character values of the Ngaruroro River and its margins upstream of Whanawhana cableway, including Taruarau River
- The high natural character values of the Tūtaekuri River and its margins above the confluence of, and including, the Mangatutu Stream

3.1.2. *RiVAS assessment of natural character*

Following the RiVAS methodology, an expert panel used eight resource attributes to assess 46 river reaches in the Hawke's Bay region for their natural character. Few data were available, so the expert panel relied on their own assessments for most attributes (Booth 2012).

The assessment identified 14 river reaches of high natural character, 20 with moderate natural character, and 12 with low natural character. Within the TANK area, the upper reaches of the Ngaruroro River (above Whanawhana and including the Taruarau) and the Tūtaekuri River (above and including the Mangatutu) were assessed as having high natural character; see Figure 2 (Booth 2012).

The RiVAS+ methodology was also applied as a trial to six river reaches to assess their potential for improved natural character. The assessment suggested that two river reaches could improve from low significance (in their current state) to moderate significance if identified management actions were taken to restore or enhance naturalness. The two reaches were the upper Karamū Stream catchment (Poukawa, Awanui, Karewarewa, Irongate) and the Taipo, Saltwater Creek and Purimu drainage areas. Interventions most frequently identified as a means to enhance natural character were: increase minimum flow, control weeds (in-stream, including active river bed), plant riparian native vegetation, and create a natural channel (Booth 2012).

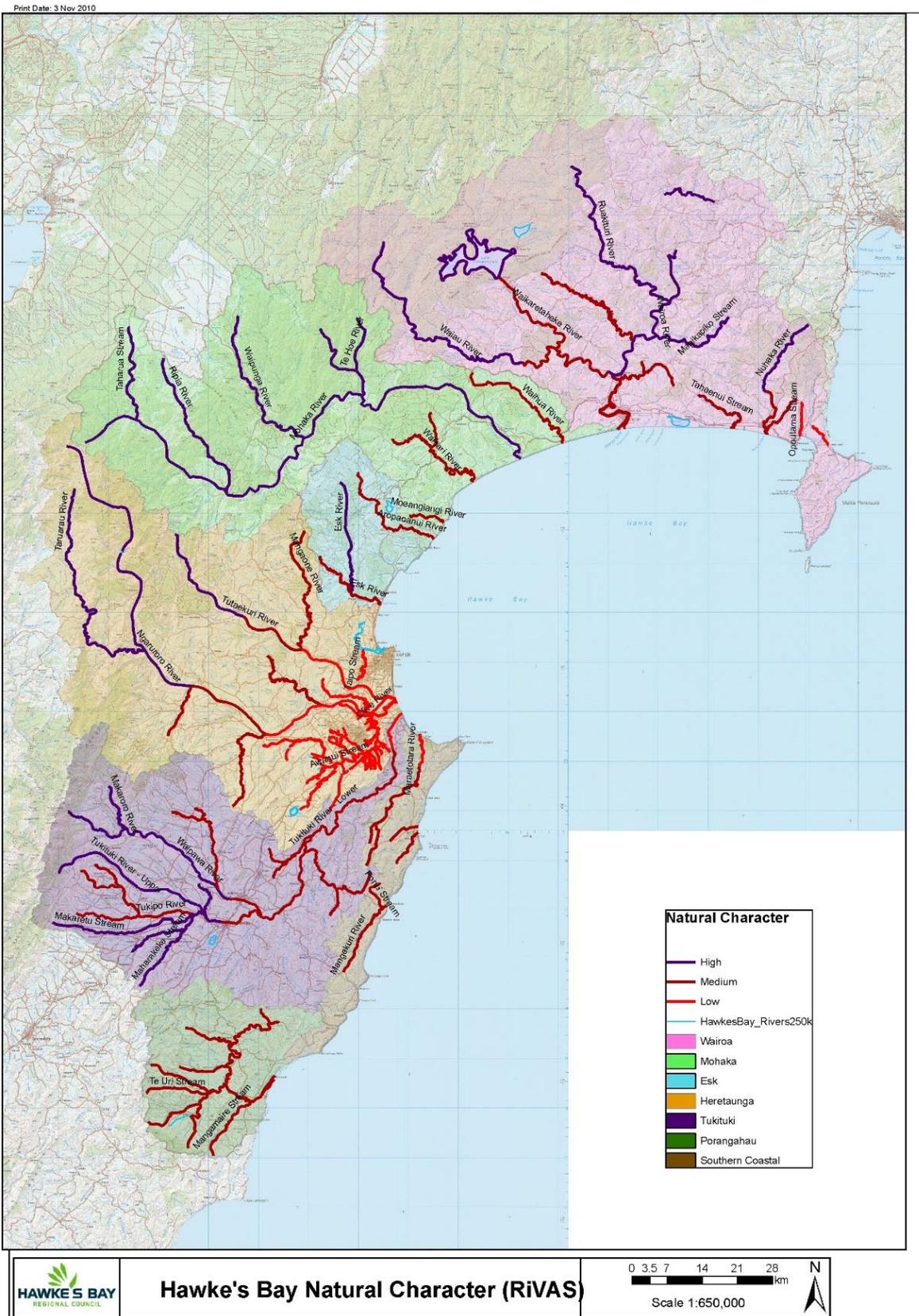


Figure 2. Significance of natural character of Hawke's Bay rivers as assessed using the RiVAS methodology (Booth 2012, p 4)

3.2. Native fish

3.2.1. Native fish values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values –

- Fish passage
- Native fish habitat in the Ngaruroro River and Tūtaekuri River catchments

Secondary values listed in that table include –

- Native fish habitat, notwithstanding native fish habitat as a primary value and use in the Tūtaekuri River and Ngaruroro River catchments

3.2.2. RiVAS assessment for native fish

The RiVAS methodology was applied and further developed for assessing the significance of Hawke's Bay rivers for native fish populations. In the executive summary, Hughey et al. (2012a, p ii) report:

Of 16 rivers or river clusters evaluated, four were considered of national significance, namely the Tukituki, Ngaruroro, Tūtaekuri, and Wairoa; the remainder, except the Napier Coast cluster which is 'local', are of regional significance.

Data for nine out of ten indicators were provided from modelling undertaken by Cawthron Institute using a variety of databases including the NZFFD³ and FENZ⁴; the expert panel then checked the modelling results and adjusted where appropriate based on local knowledge, and it populated the Population Stronghold indicator.

The RiVAS+ methodology was also applied to assess future potential value. Of the 16 rivers or clusters, eight altered their sum total score, all in a positive direction. The Tukituki, Karamū and Napier Coast all shifted most but still remained in their same importance categories. The interventions most frequently identified for enhancing native fishlife value (with the number of times it was identified across all rivers given in brackets) were: Enhance Water Quality – remove/fence out stock (6) (but noting

³ New Zealand Freshwater Fish Database <https://www.niwa.co.nz/our-services/online-services/freshwater-fish-database>

⁴ Freshwater Environments of New Zealand <http://www.doc.govt.nz/our-work/freshwater-ecosystems-of-new-zealand/>

this intervention for Hawke's Bay is mostly around protecting Inanga spawning sites), and Enhance Water Quality – reduce sediment input (3).

The assessed significance levels of Hawke's Bay rivers are shown in Figure 3.

Hughey et al. (2012a) noted that lakes, wetlands and estuaries all have important native fish values. However, these water bodies were not included in the assessment as the RIVAS methodology was not designed for these different habitat types.

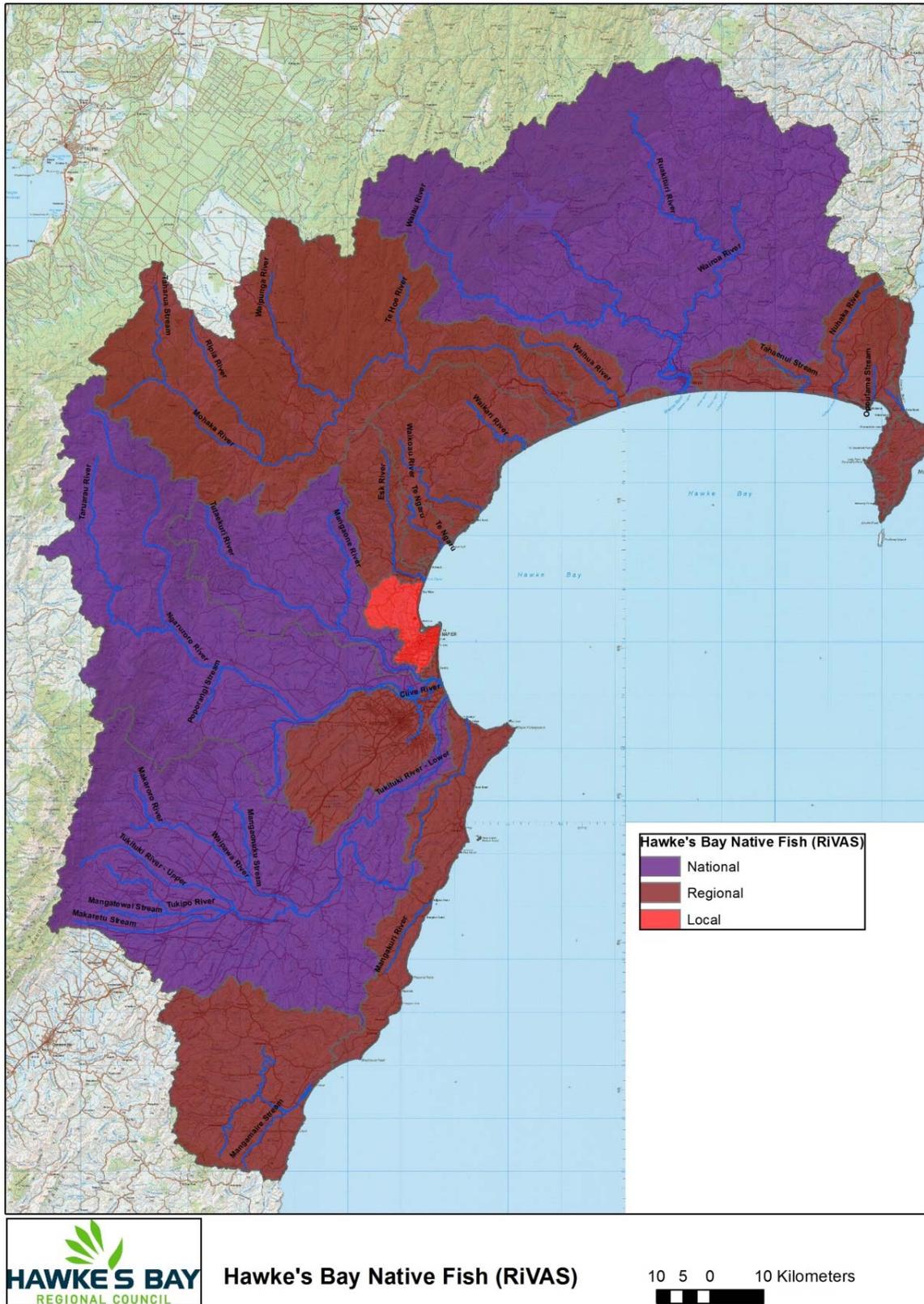


Figure 3. Hawke's Bay native fish rivers and river clusters mapped by significance level (national, regional and local), assessed using RiVAS methodology (Hughey et al. 2012a, p 9)

3.2.3. Whitebait spawning areas

HBRC developed an environmental code of practice for river control and drainage works⁵ in 2007, which identifies protected areas for whitebait spawning. Damage to these areas can be caused by grazing stock, general public access, and weed spraying. Accordingly, the identified areas have been fenced off to protect from damage (HBRC 2007).

Figure 5 shows spawning areas at the mouth of the Esk River, in Te Ngarue Stream, and two sites within the Ahuriri Estuary catchment. Figure 6 shows protected whitebait spawning areas in the Clive, Tukituki, and Tūtaekuri rivers.

The code of practice says that if further spawning areas are identified, fencing of these areas will also be considered (HBRC 2007, p 18).

3.2.4. Freshwater fish of the Ngaruroro River

The *Ngaruroro River Flood Protection and Drainage Scheme Ecological Management and Enhancement Plan* (MWH 2011b) contains information on freshwater fish found within the Ngaruroro River area, based on information in the New Zealand freshwater fish database (Figure 4).

Freshwater Fish Presence Data for the Ngaruroro River		Aldrichetta forsten	Anguilla australis	Anguilla dieffenbachii	Cheimarrichthys fosteri	Galaxias divergens	Galaxias maculatus	Gambusia affinis	Geotria australis	Gobiomorphus basalis	Gobiomorphus cotidianus	Gobiomorphus gobioides	Gobiomorphus hubbsi	Gobiomorphus huttoni	Grahamina sp.	Retropinna retropinna	Rhombosoea retziaria	Salmo trutta			
Distance from Sea (km)	Reach of river	Yelloweyed mullet	Shortfin eel	Longfin eel	Torrentfish	Koaro	Dwarf galaxias	Inanga	Gambusia	Lamprey	Crans bully	Common bully	Giant bully	Bluegill bully	Redfin bully	Estuarine triplefin	Rainbow trout	Common smelt	Black flounder	Broun trout	
0 to 6	Hawke Bay to Chesterhope Bridge	■	■	■	■		■	■	■		■	■			■		■	■	■		
6 to 36	Chesterhope Bridge to Mangatahi		■	■	■		■				■				■		■	■	■		
98 to 136	Upstream of Whanawhana			■	■											■					■

Figure 4. Freshwater fish in the Ngaruroro River Flood Protection and Drainage Scheme area (source: MWH 2011a, p 15).

⁵ Methods for the identification of values may be found in the main section of the code of practice—Section 8.1.

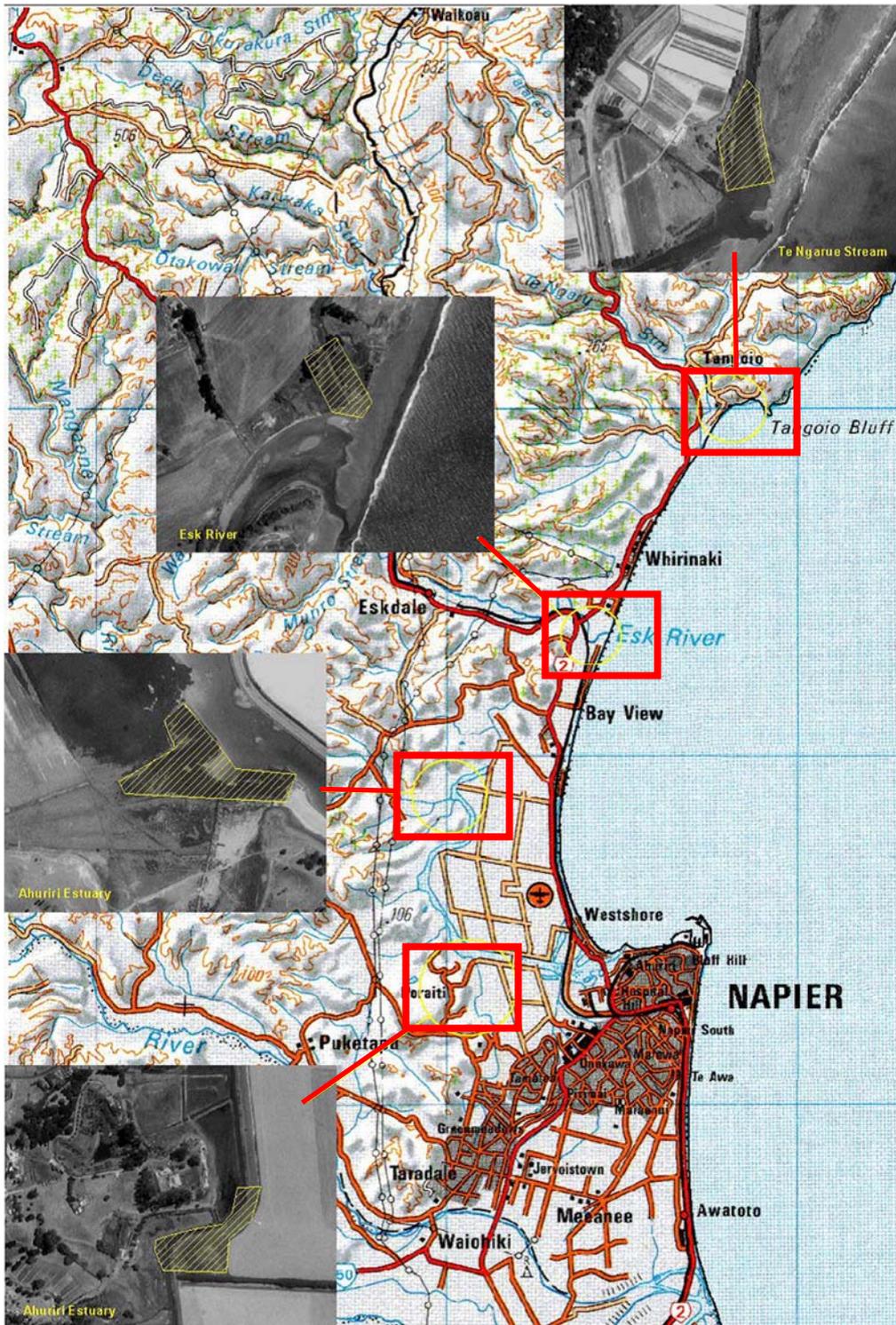


Figure 5. Protected whitebait spawning areas (HBRC 2007, p 13).

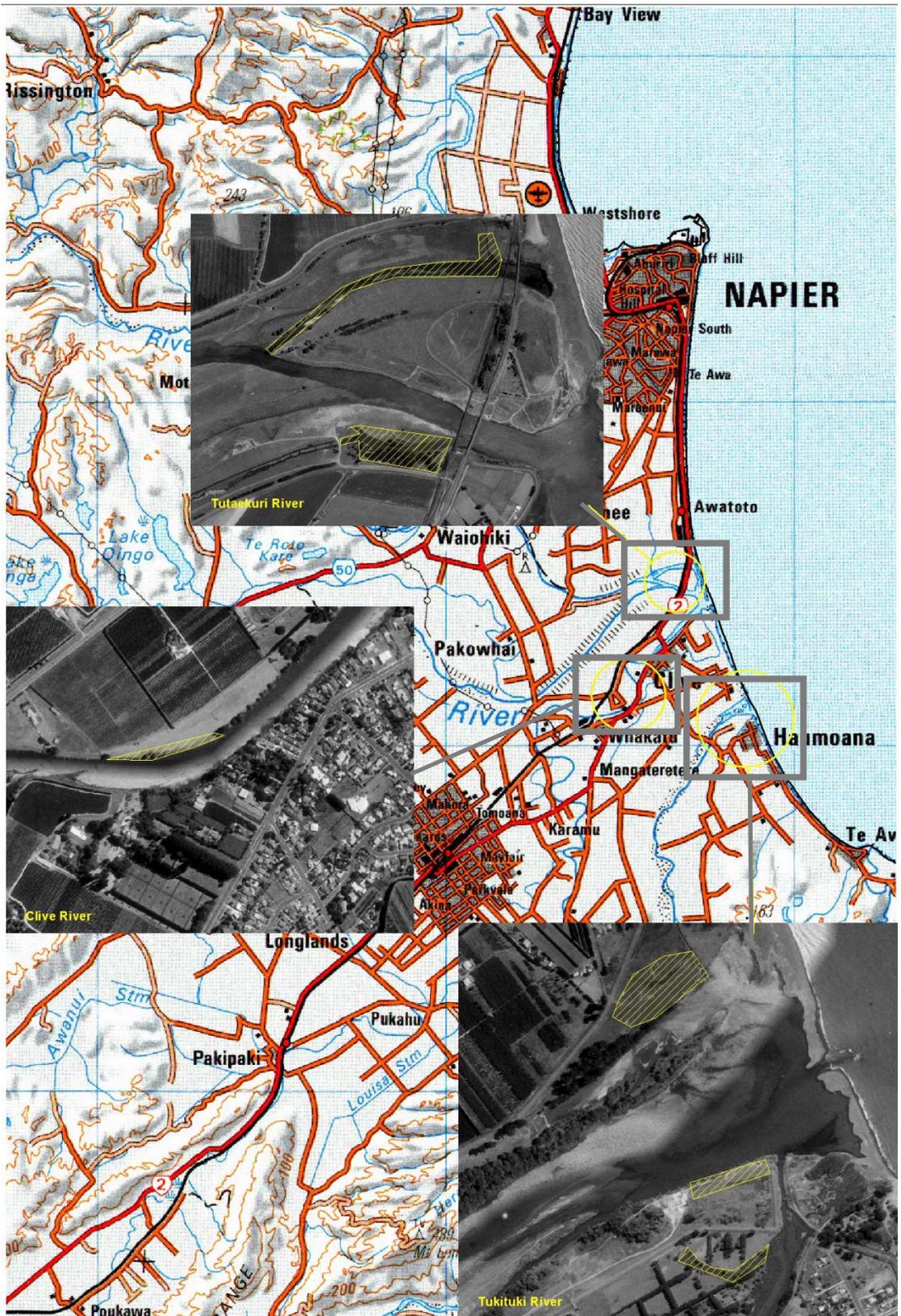


Figure 6. Protected whitebait spawning areas (HBRC 2007, p 14).

3.3. Native birds

3.3.1. *Native bird values in the RPS*

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- any regionally significant native water bird populations and their habitats.

Secondary values listed in that table include—

- any locally significant native water bird populations and their habitats.

3.3.2. *RiVAS assessment for native birds*

The RiVAS methodology, including RiVAS+ (see Section 2.2), was used to assess the significance of Hawke's Bay rivers for supporting populations of native birds (Hughey et al. 2012b). In terms of coverage, the report notes:

Lagoons and/or estuarine systems are excluded from analysis and a separate evaluation of all lagoons, estuaries, etc., is required. ... an important feature of many surveys and much evidence presented in hearings is associated with total bird numbers of a river. We note the imprecision of the survey data, but again reiterate it is the best available information (Hughey et al. 2012b, p 2).

Rivers in the TANK area rated as having significance for native birds are listed in Table 2 and shown in Figure 7.

Table 2. Significance of rivers in TANK area for native bird habitat (Hughey et al. 2012b, pp 15-16).

River or reach	Significance	Comment
Mangaone (tributary of Tūtaekuri)	Local	
Upper Tūtaekuri (above Mangatutu)	Local	very old blue duck records
Lower Tūtaekuri	Regional	NZ pipit, grey duck
Upper Ngaruroro (Whanawhana cableway)	Regional	blue duck increasing, grey duck
Lower Ngaruroro (below Whanawhana)	Regional	NZ pipit, grey duck
Upper Karamū (Poukawa, Awanui, Karewarewa stream)	Regional	connected to Lake Poukawa; bittern, crake species
Muddy Creek (Karamū)	Local	bittern, spotless crake, grey duck
Lower Karamū (Clive, Ruahapia stream, Irongate, Raupare)	Local	bittern
Karamū (Havelock streams: Mangarau, Herehere)	Local	
Taipo Stream (Ahuriri)	Local	odd bittern*

* 'odd bittern' is the phrase used in Hughey et al. 2012b; it presumably means that bitterns are occasionally present.

All river sections identified in the RiVAS assessment were also assessed for potential enhancement using the RiVAS+ methods. The lower Ngaruroro and lower Tūtaekuri were both identified as rivers with the potential to improve habitat for native birds using the following measures:

- improve bed and instream habitat by controlling weeds (in-stream, including active river bed)
- improve bed and instream habitat by improving timing of management within flood control area, including root raking
- improve riparian habitat by pest control (Hughey et al. 2012b, pp 8,17).

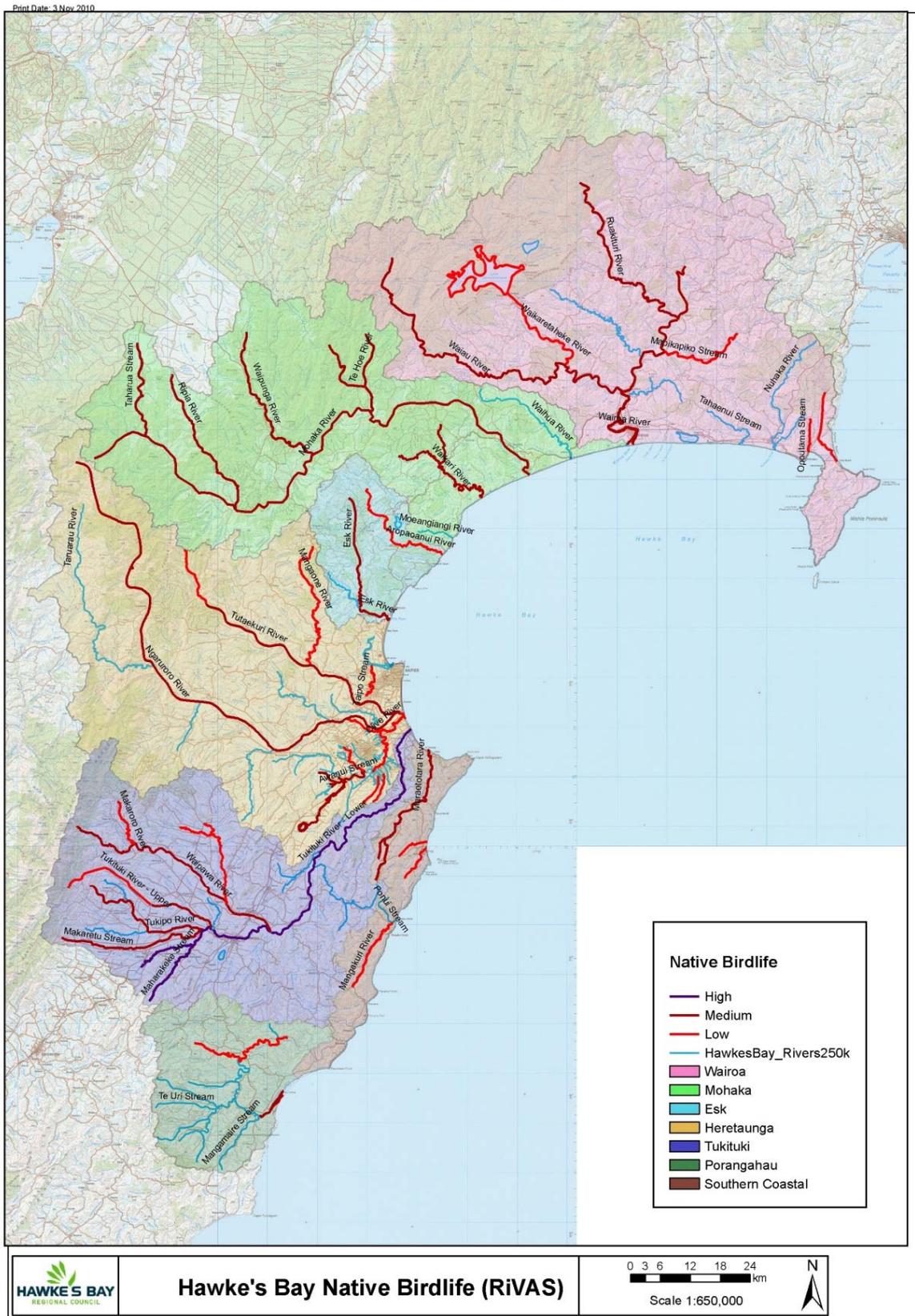


Figure 7. Significance of Hawke's Bay rivers for native bird habitat, assessed using RiVAS methodology (Hughey et al. 2012b, p 5).

3.3.3. Native birds in the Ngaruroro River corridor

According to a report for HBRC (MWH 2011a): '83 bird species have either been recorded within the river corridor or would be expected to be present. Almost one third (27%) of those species are considered by DOC to be Threatened or At Risk' (MWH 2011a, p 16) (Table 3).

Table 3. Bird species in the Ngaruroro River corridor and their classification status (source: MWH 2011a, p 17).

Species	Designation	Status
great egret (white heron)	Native	Nationally Critical
Pacific black (grey) duck	Native	Nationally Critical
shore plover	Endemic	Nationally Critical
Australasian bittern	Native	Nationally Endangered
black-billed gull	Endemic	Nationally Endangered
black-fronted tern	Endemic	Nationally Endangered
banded dotterel (double-banded plover)	Endemic	Nationally Vulnerable
caspian tern	Native	Nationally Vulnerable
eastern reef egret (heron)	Native	Nationally Vulnerable
New Zealand falcon	Endemic	Nationally Vulnerable
New Zealand grebe (dabchick)	Endemic	Nationally Vulnerable
New Zealand plover (dotterel)	Endemic	Nationally Vulnerable
red-billed gull	Native	Nationally Vulnerable
wrybill	Endemic	Nationally Vulnerable
New Zealand fernbird	Endemic	At Risk. Declining
New Zealand pipit	Endemic	At Risk. Declining
pied (black-winged) stilt	Native	At Risk. Declining
south island oystercatcher	Endemic	At Risk. Declining
white-fronted tern	Native	At Risk. Declining
variable oystercatcher	Endemic	At Risk. Recovering
Baillon's (marsh) crane	Native	At Risk. Relict
spotless crane	Native	At Risk. Relict

3.4. Other ecological values

3.4.1. Stream Ecological Valuation

The Stream Ecological Valuation (SEV) method has been applied to multiple streams in the Hawke's Bay region. The SEV method was developed to provide a method of assigning values to stream ecology attributes and calculating the required amount of restoration to offset loss of ecological value at an impact site (Forbes 2011). Forbes (2011) applied SEV as a valuation tool for establishment of a baseline state, against which future change can be measured.

The SEV method uses data from four functional groups of ecological performance: hydraulic, biogeochemical, habitat provision, and biodiversity (Figure 8). Variables are scored and combined to obtain an overall SEV score for the studied reach. Overall scores range between 0 and 1, with 0 being low ecological performance, and 1 being high ecological performance. Streams that score between 0.4 and 0.8 are considered to have the greatest ecological enhancement potential.

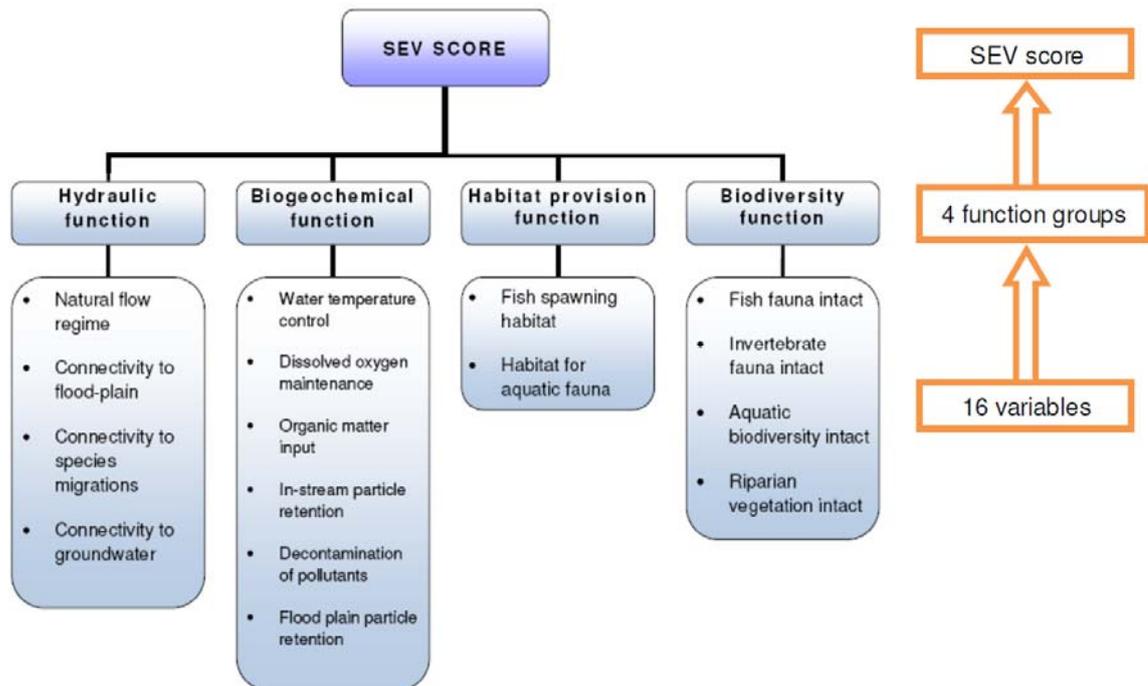


Figure 8. Structure of the SEV (MWH 2011b, p 11; adapted from Rowe et al 2009).

Many streams and drains in the Heretaunga Plains have been assessed using the SEV. Figure 9 shows SEV scores for the County Drain, Old Tūtaekuri River Bed (OTRB), Plantation Drain, and Purimu Stream (MWH 2009); Figure 10 shows scores for Ruapahia and Raupare streams (MWH 2011a); and selected upper tributaries of the Karamū Stream are shown in Figure 11, Figure 12, and Figure 13 (MWH 2010).

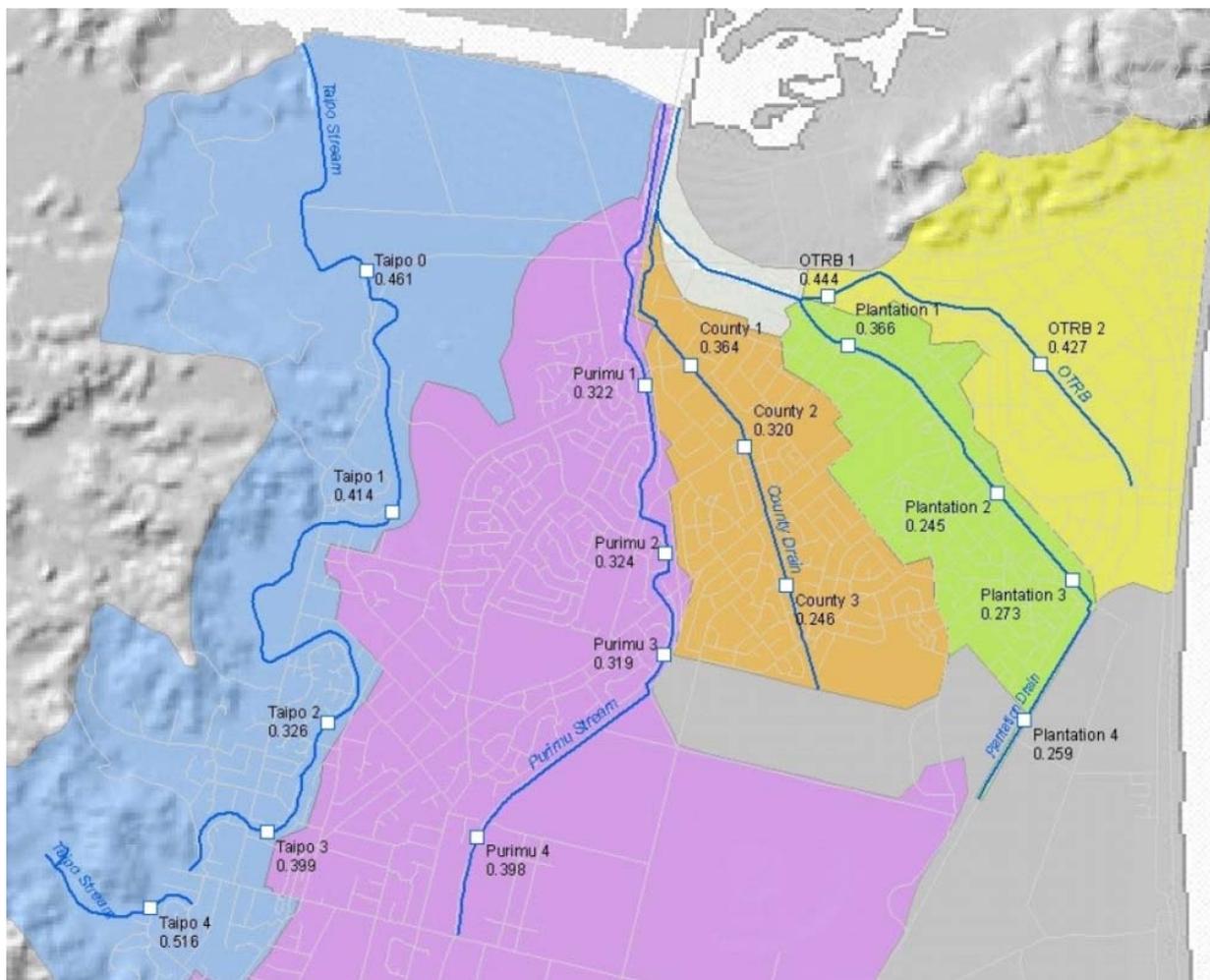


Figure 9. Spatial distribution of Napier Urban SEV scores. Colours represent catchments of different streams (MWH 2009, p 21).

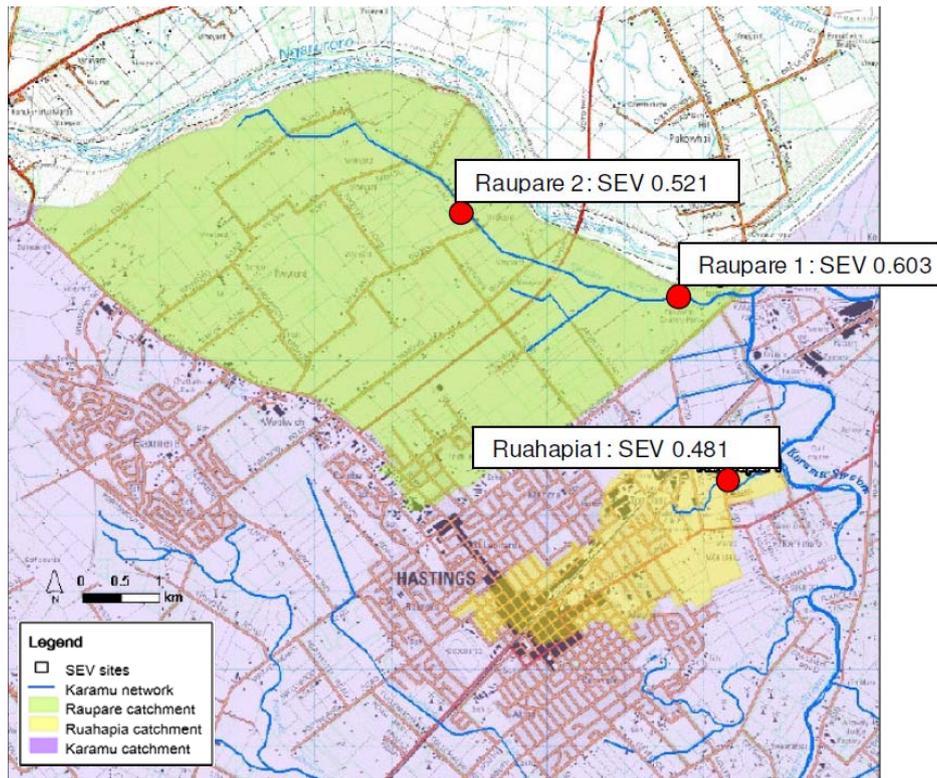


Figure 10. SEV scores for the Raupare Stream and Ruahapia Stream study reaches (MWH 2011a, p 15). The Raupare Stream scored 0.603 in the lower reach and 0.521 in the upper reach using the SEV. The Ruahapia Stream scored 0.481.

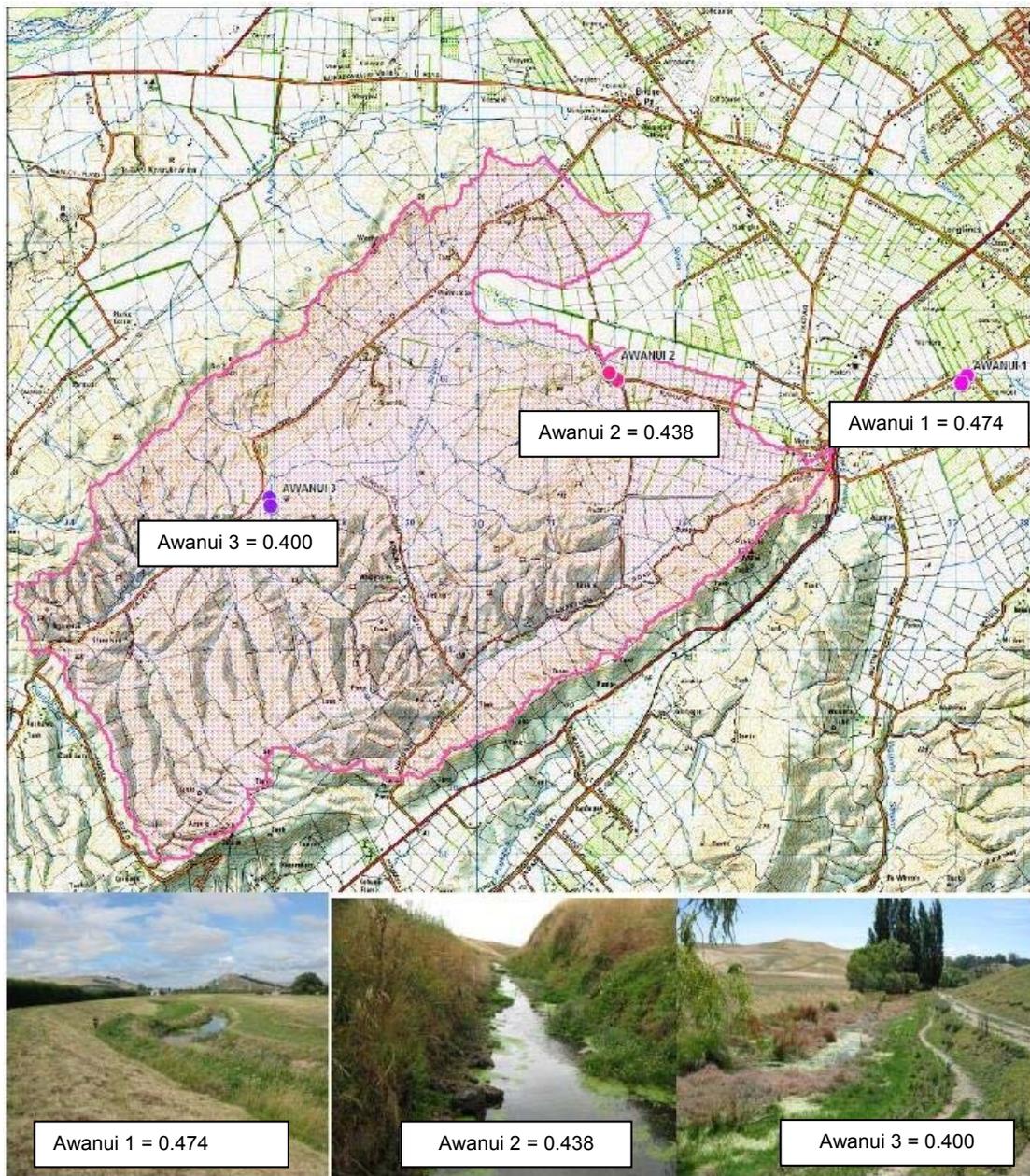


Figure 11. Awanui Stream study sites and SEV scores (MWH 2010, p 10). The Awanui Stream scored 0.474 in the lower reach, 0.438 in the middle reach, and 0.400 in the upper reach.

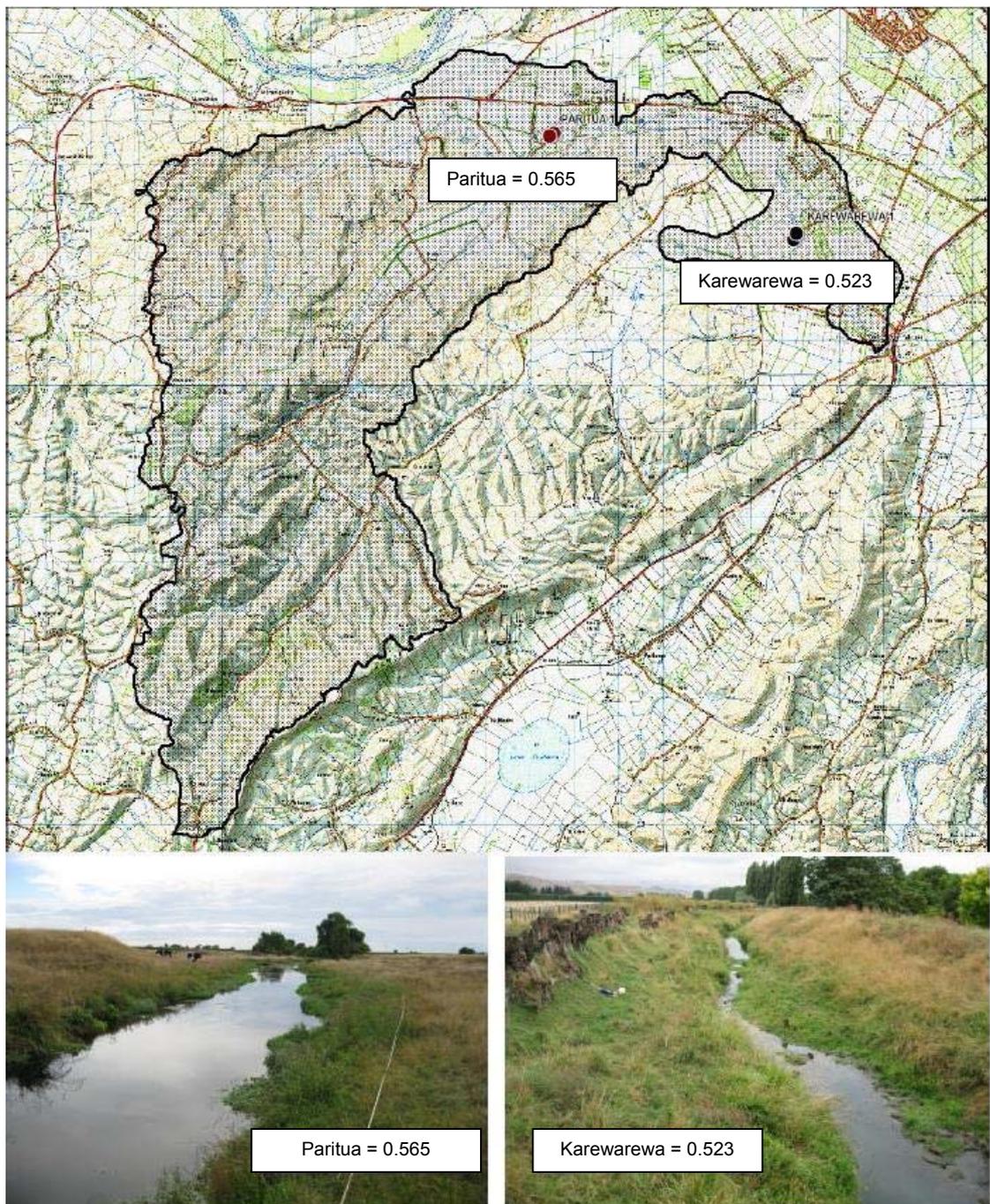


Figure 12. Paritua and Karewarewa stream sites and SEV scores (MWH 2010, p 12).

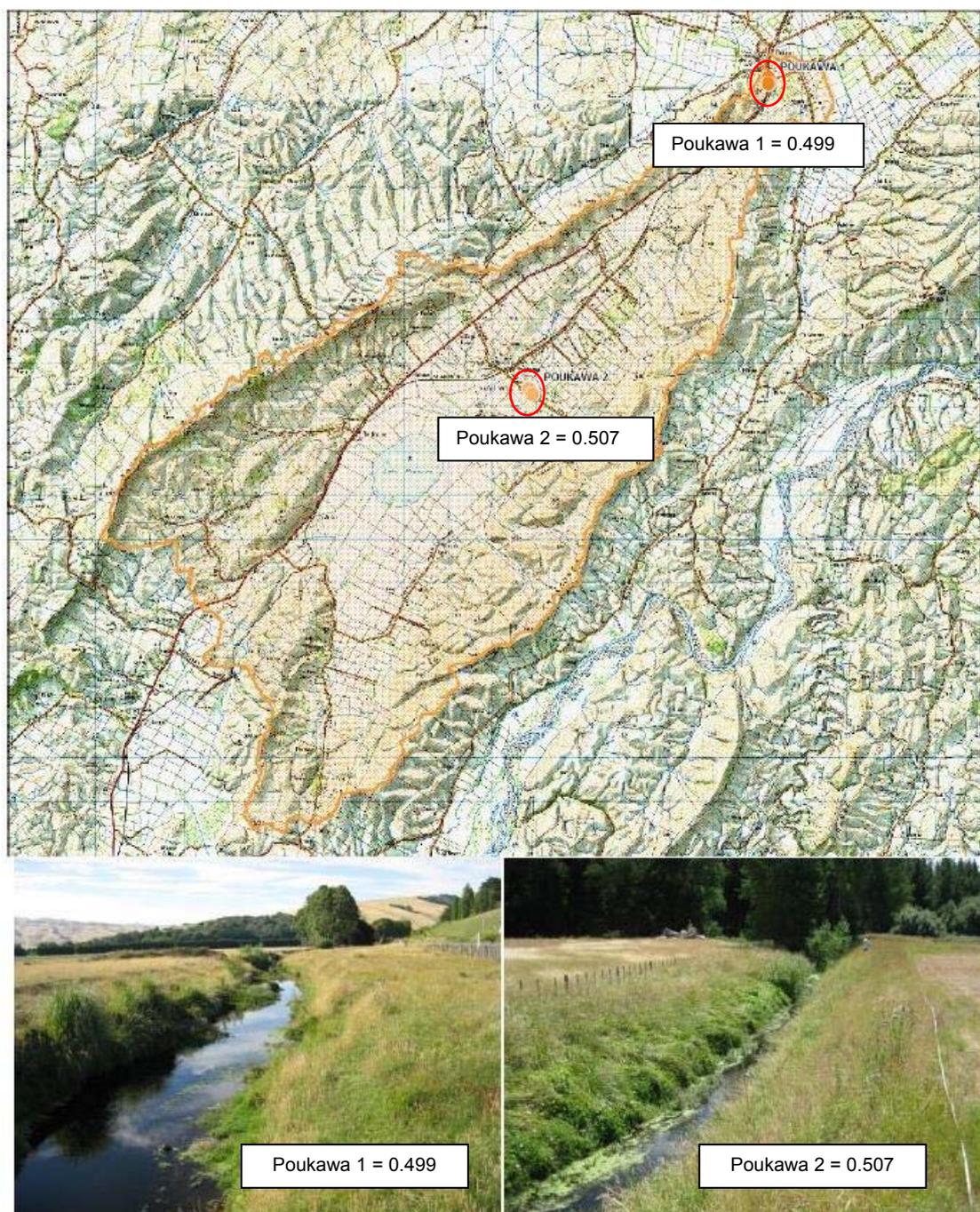


Figure 13. Poukawa Stream sites that scored 0.499 and 0.507 using the SEV (MWH 2010, p 14).

SEV assessments have also been undertaken for two sites on Saltwater Creek (Figure 14) in the Napier catchment and a further ten sites on tributaries of the Clive River (Figure 15) (HBRC 2010). The maps in that report (HBRC 2010) do not show SEV scores, although the report has information that can be used to calculate scores.

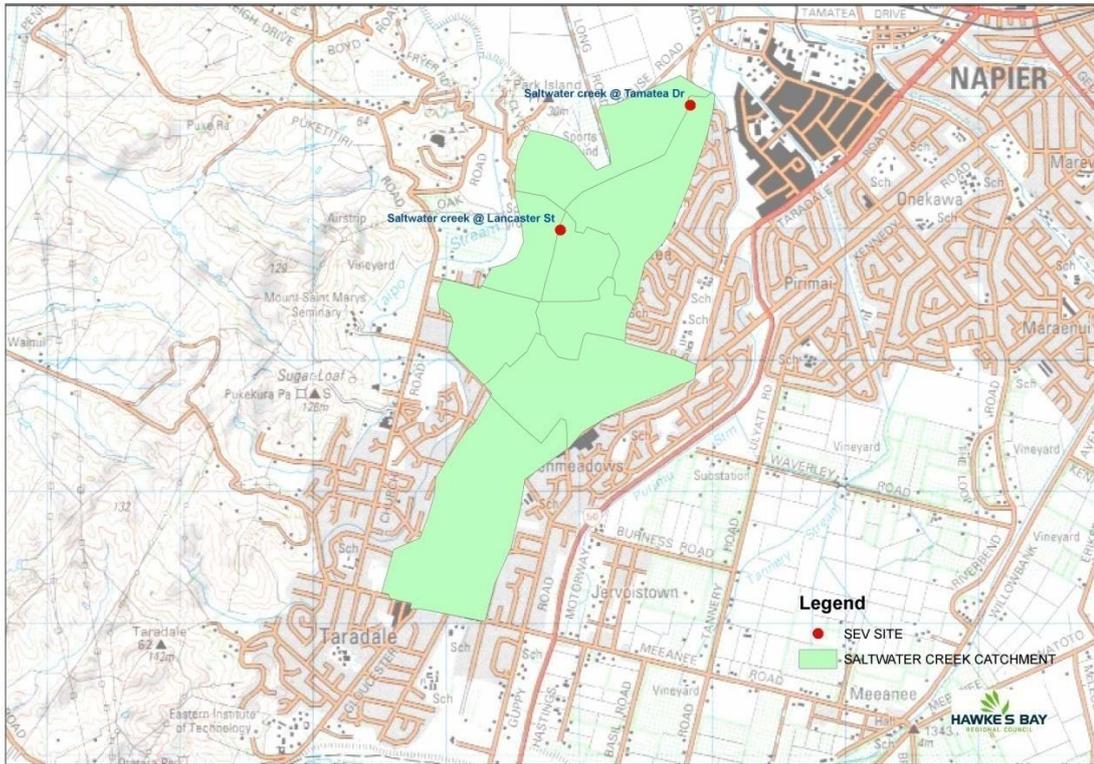


Figure 14. SEV sites for the Saltwater Creek study reaches (HBRC 2010, p 29).

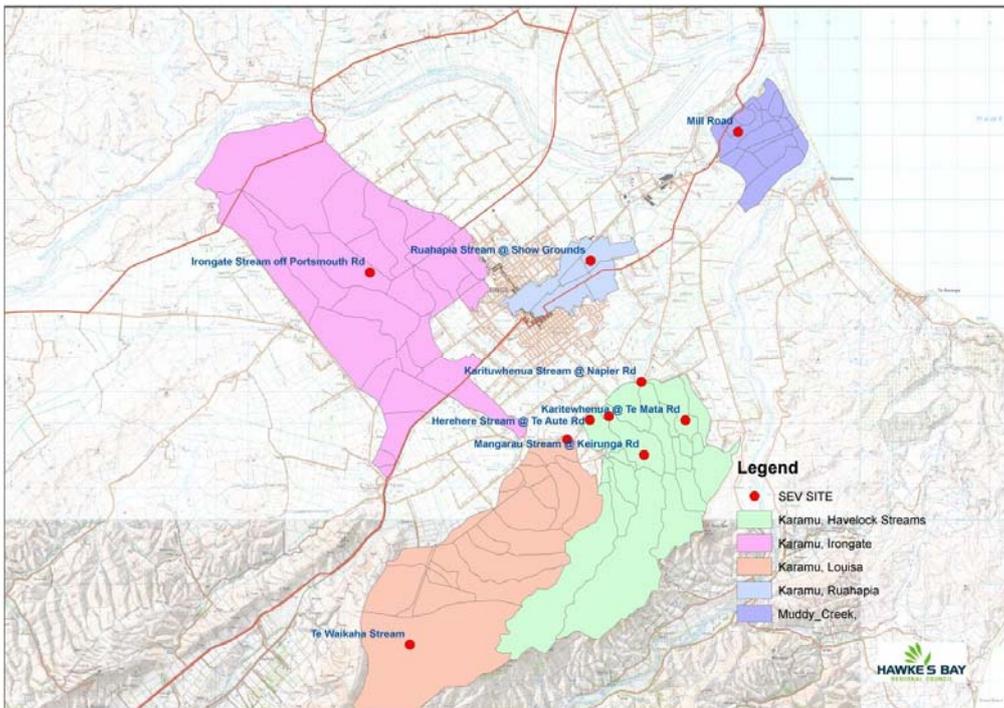


Figure 15. SEV sites within the Karamū Stream catchment (HBRC 2010, p 32).

3.4.2. Wetlands

Note that the RiVAS methodology only applies to rivers; it is not designed for and has not been applied to wetlands, lakes and estuaries. The TANK catchments include some important wetlands, including Lake Poukawa and the Pekapeka wetland, which is the second highest ranking wetland in the Department of Conservation (Hawke's Bay) Heretaunga Ecological District (Department of Conservation 2016).

Hawke's Bay Fish & Game has several reports on wetlands in the TANK catchments (John Cheyne, pers. comm.). Summarising all of these reports was beyond the scope for the preparation of this inventory but could be a worthwhile exercise.

3.4.3. Other ecological values

The *Ngaruroro River Flood Protection and Drainage Scheme Ecological Management and Enhancement Plan* (MWH 2011b) contains spatial information on ecological values, as well as cultural and recreational values, associated with the Ngaruroro River Flood Control Scheme. The scheme area extends approximately 36 km upstream from the mouth of the Ngaruroro River to a point above the Mangatahi area.

The report includes detailed information about the Ngaruroro River catchment under the following headings:

- Habitat values and their ecological significance [including freshwater fish]
- Bird values
- Terrestrial invertebrate values
- Lizard values
- Flora values
- Detailed description of vegetation communities of the Scheme
- Cultural setting
- Cultural values
- Management and enhancement opportunities
- Recreational assessment
- Findings [Recreational values]
- Management of conflicts between recreation and ecological values.

Ecological values were assessed through a literature review and a survey of flora in the area covered by the Scheme, along with surveys and studies of river bird, terrestrial invertebrates, freshwater fish and lizard communities.

'Maori cultural values of the river were assessed by way of oral-history. Recreational use (type, location and intensity) of the river was investigated through site visits, knowledge of the river and publicly available information' (MWH 2011a, pp 2–3).

‘Where possible, enhancement activities are planned to achieve outcomes across multiple values, in particular to achieve ecological as well as cultural and/or recreational benefits’ (MWH 2011b, p 1).

3.5. Biodiversity and natural character mapped by TANK Group members

In addition to the ecological and intrinsic values reported in the previous sections, TANK Group members used an online mapping tool to record some of the values that they were familiar with (see Section 2.3). Values categorised as ‘Biodiversity’ or ‘Other – Natural Character’ are shown in Figure 16. As noted earlier, the shapes and locations identified using the mapping tool are approximate only. Further detail on each of the features mapped can be found in the Appendix to this report.

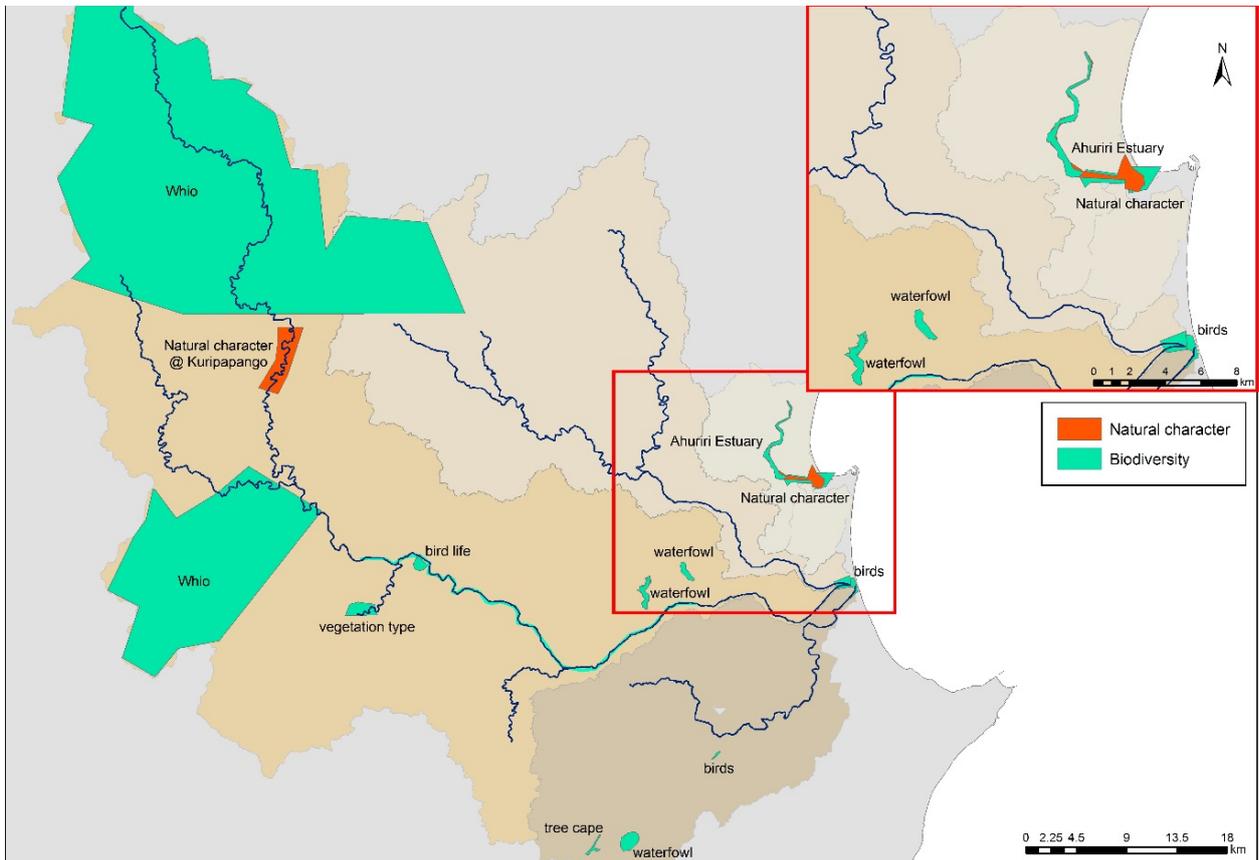


Figure 16. Biodiversity and natural character values mapped by TANK Group members using an online mapping tool. Note the line feature indicating biodiversity values along the middle reaches of the Ngaruroro River (land area in medium brown colour).

4. TANGATA WHENUA VALUES

Many of the values of tangata whenua relate to all waters in a catchment, both surface and groundwater, and hence have not been mapped. Further, where values are specific to a site, this information is often culturally sensitive and confidential. This section summarises information identified to date from documents available to the authors of this report. Additional information on culturally important sites might be found as statutory acknowledgements in deeds of settlement between the Crown and claimants under the Treaty of Waitangi and in management plans developed by iwi and hapū (eg see Hawaikirangi et al. 2014). At least some of these are likely to be covered in a report being prepared by Tangata Whenua on Māori values of the Ngaruroro.

4.1. Tangata whenua values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- Cultural values and uses for:
 - mahinga kai
 - nohoanga
 - taonga raranga
 - taonga rongoa

4.2. Mauri

The report *Mana Ake* describes the importance of *mauri* as follows:

The importance of *mauri* to *ngā hapū* with regards to resource management is expressed as follows, '*Mauri* is the life essence of nature itself on this planet. Once *mauri* is extinguished within a species, the result is extinction because the natural restorative and regenerative powers are lost'.

Of absolute importance to Heretaunga marae hapū, is the preservation and protection of *mauri*. To see to this preservation and protection is to provide for conservation of bio-diversity, the outcomes of which are the restoration and regeneration of ecosystems (Te Manaaki Taiao 2015).

The authors of this report understand that all water bodies have *mauri*, although in some water bodies the *mauri* has been impaired to a greater or lesser degree. We are

not aware of any documents that record this spatial information – it is held by tangata whenua.

A report on values in the Tukituki catchment describes mauri (Sharp et al. 2012, pp 1-2) and says that “it may include (but is not limited to):

- a. the metaphysical concepts of ‘life force’ or ‘life essence’;
- b. a quality inherent in all things, both animate and inanimate;
- c. a special power which makes it possible for everything to move and live in accordance with the conditions and limits of their existence;
- d. the characteristic that permits ‘living things’ (in the sense that land, seas and rivers also have a ‘life force’) to exist in their own realms and spheres;
- e. a concept that encompasses, but is wider than, the protection of mahinga kai and taonga species;
- f. a concept with spiritual and intangible elements, separate to economic and agricultural considerations;
- g. a concept of life force that is wider than a force that gives life to humans;
- h. a concept that varies between iwi; and
- i. in relation to water, physical responses to promote the metaphysical concept of mauri can include:
 - i. maintaining water quality or ‘health’;
 - ii. protecting the water’s capacity to renew its groundwater and surface water flows and stocks;
 - iii. sustaining habitats, breeding, food sources and migratory requirements of mahinga kai species such as eels, flax, and watercress, in their freshwater and coastal environments;
 - iv. providing seasonal flow variability via a range of flows including seasonal floods of different magnitudes;
 - v. protecting the exchange of freshwater and seawater at river mouths, maintaining freshwater flows in estuaries, and preventing the unnatural closing of a river mouth;
 - vi. prohibiting the unnatural mixing of water from different bodies.”

4.3. Mahinga kai

The term *mahinga kai* refers to places where tangata whenua collected food, to the species (plant or animal) that provided that food, or to the act of food gathering. Each of these is a value in its own right, though they are obviously related.

Iwi management plans highlight the importance of mahinga kai values and the relationship to kaitiakitanga and customary use, for example:

The concept of kaitiakitanga is an integral component of resource use. Customary use comes with management responsibilities to care and protect natural resources, which in effect translates into carefully regulated access to Mahinga kai for example, and sustainable use of all resources (Te Manaaki Taiao 2015, p 18)

Although a few sites are mentioned in iwi management plans, the authors are not aware of any documents that attempt to provide a more detailed record of the location of mahinga kai sites in the TANK area – this information is held by tangata whenua. A few mahinga kai sites were mapped by TANK members using the online mapping tool (see Section 4.6).

4.4. Wāhi tapū

The Hastings District Plan (Hastings District Council 2010) includes provisions for the protection of wāhi tapū (sacred sites) and identifies a number of such sites. The introduction to section 12.4 of the plan states:

Traditional Maori culture and values are closely linked to the environment. Land confers dignity and rank, is the resting place for the dead, a spiritual base for traditional beliefs and a heritage for future generations. Tangata Whenua have expressed concern for the quality and condition of resources of significance to them and these are identified in the District Plan. It is these areas that are Waahi Tapu. Tangata Whenua and Council have endeavoured to identify Waahi Tapu in the District, though there is a reluctance by Tangata Whenua to identify the exact location of some Waahi Tapu sites because of the need to protect their sacredness. Accordingly not all Waahi Tapu in the District have been identified, although it is only those that have been identified which are protected by the provisions.

Waahi Tapu sites include:

- old pa sites, excavations and middens (pa tawhito)
- old burial grounds and caves (ana tupapaku)
- current cemeteries (urupa)
- battlefields (wahi pakanga)
- sacred rocks, trees or springs (nga toka, rakau tapu)
- water courses, swamps, lakes and their edges (waipuna, awa, roto) (Hastings District Council 2010, section 12.4.1)

Appendix 12.4-1 of the Hastings District Plan lists a number of wāhi tapū at Bridge Pa, Haumoana, Pakowhai/Whakatu, Pekapeka Swamp, Waimarama, Ruahapia, Waitapu, Paki Paki, Omahu and Waiohiki.

Napier City Council also has provisions in its district plan for the protection of wāhi tapū. These are included in general provisions concerning heritage areas, which are identified in five groups. Group 4 includes some features of importance to Maori in terms of their history, culture, and traditions (Napier City Council 2016). These are shown on planning maps rather than listed in the plan. However, according to council staff, identification of the sites was based on a report (Parsons 1997) that lists the following sites:

- | | |
|--------------------------------------|--|
| 1. Kaimata Pa | 14. Site on Mataruahau (Scinde Island) |
| 2. The Canoe Slips (Nga Urunga Waka) | 15. Te Ahi a Te Waru |
| 3. Heipipi Pa | 16. Upokopoito |
| 4. Central Pa | 17. Te Awapuni Pa |
| 5. Burial Site | 18. Te Ikatuwhenua Pa |
| 6. Kaiarero | 19. Urupa of the Poraiti Cliff Line |
| 7. Te Iho o Te Rei | 20. Te Umuroimata Pa |
| 8. Otaia Pa | 21. Te Roropipi |
| 9. Otirere Pa | 22. Fish Scaling Deposits |
| 10. Keteketerau | 23. Tareha's Reserve (Te Whare o Maraenui) |
| 11. Matawhero Island | 24. Burial Grounds off Meeanee Rd |
| 12. Tapu Te Ranga | 25. Otatara Pa |
| 13. Pukemokimoki Island | 26. Manahuna Pa. |

4.5. Cultural values of the Karamū Stream

The *Ngāti Hori Freshwater Resources Management Plan* (Ngāti Hori 2012) details Ngāti Hori priorities and objectives in relation to freshwater of the Karamū Stream from the mouth upstream to where it flows past Kohupatiki and up to Pakowhai, the beginning of the Raupare Stream (Figure 17). The document aims to influence the regional policy on freshwater and flows, and to assist Ngāti Hori to realise their unique cultural values within the larger social-ecological system of the Karamū Stream. The document clarifies that Maori values to date have been provided for under the generic category of amenity values, but that cultural values are distinct from these. The importance of the Karamū Stream is articulated as,

...very much part of daily life for Ngāti Hori ki Kohupatiki and provided an abundant source of mahinga kai (wild food resources such as fish, waterfowl and plants). The importance of the Ngaruroro River to Ngāti Hori is reflected in the location of

Kohupatiki Marae which is situated on the true left bank of the lower Karamū Stream (Ngāti Hori 2012, p 5).

The management plan presents four priorities for management of the Karamū Stream based on Ngāti Hori values:

- Achieving sufficient water flow
- Improving water quality
- Protection and restoration of traditional riparian vegetation
- Protection and restoration of fish and fish habitat.

According to the management plan, the priorities were developed through hui in 2008 and 2009 and a cultural mapping exercise and customary fisheries survey.

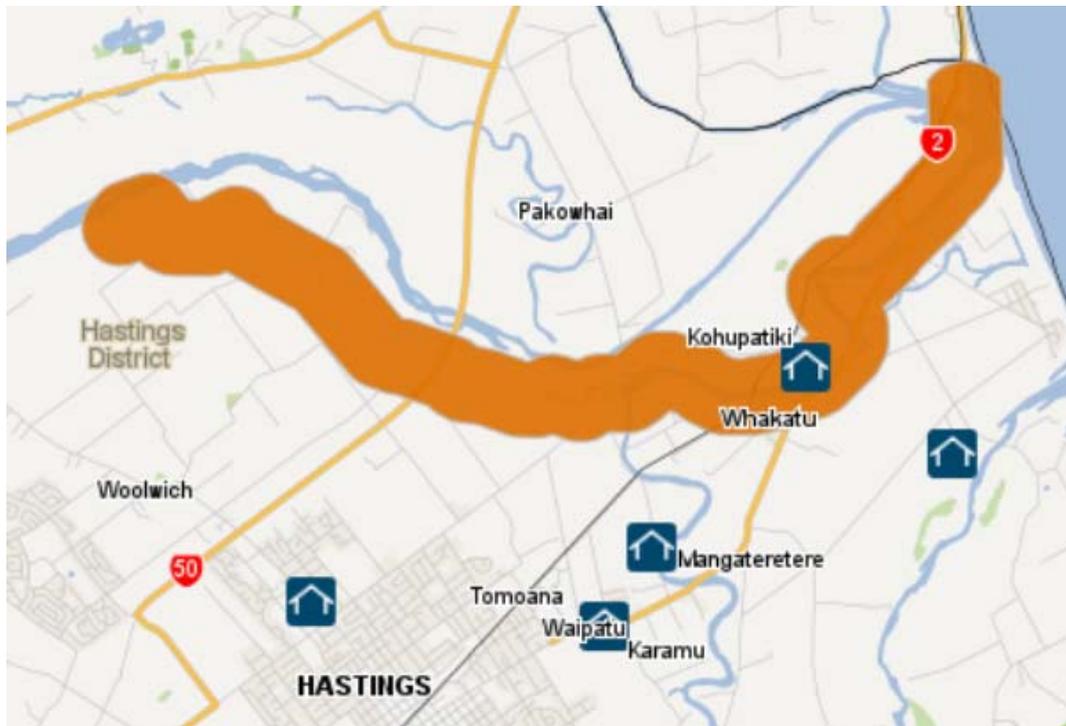


Figure 17. Reach of the Karamū Stream of relevance to the Ngāti Hori Freshwater Resources Management Plan (Ngāti Hori 2012, p 5).

4.6. Tangata whenua values mapped by TANK Group members

In addition to the mana whenua values reported in the previous sections, TANK Group members used an online mapping tool to document some of the values that they were familiar with (see Section 2.3). Values categorised as Food ('kai, e.g. tuna'), Mana, Tangata Whenua or Tangata Whenua-All were mapped for the lower Ngaruroro and

are shown in Figure 18. Further detail on each of the features mapped can be found in the Appendix to this report.

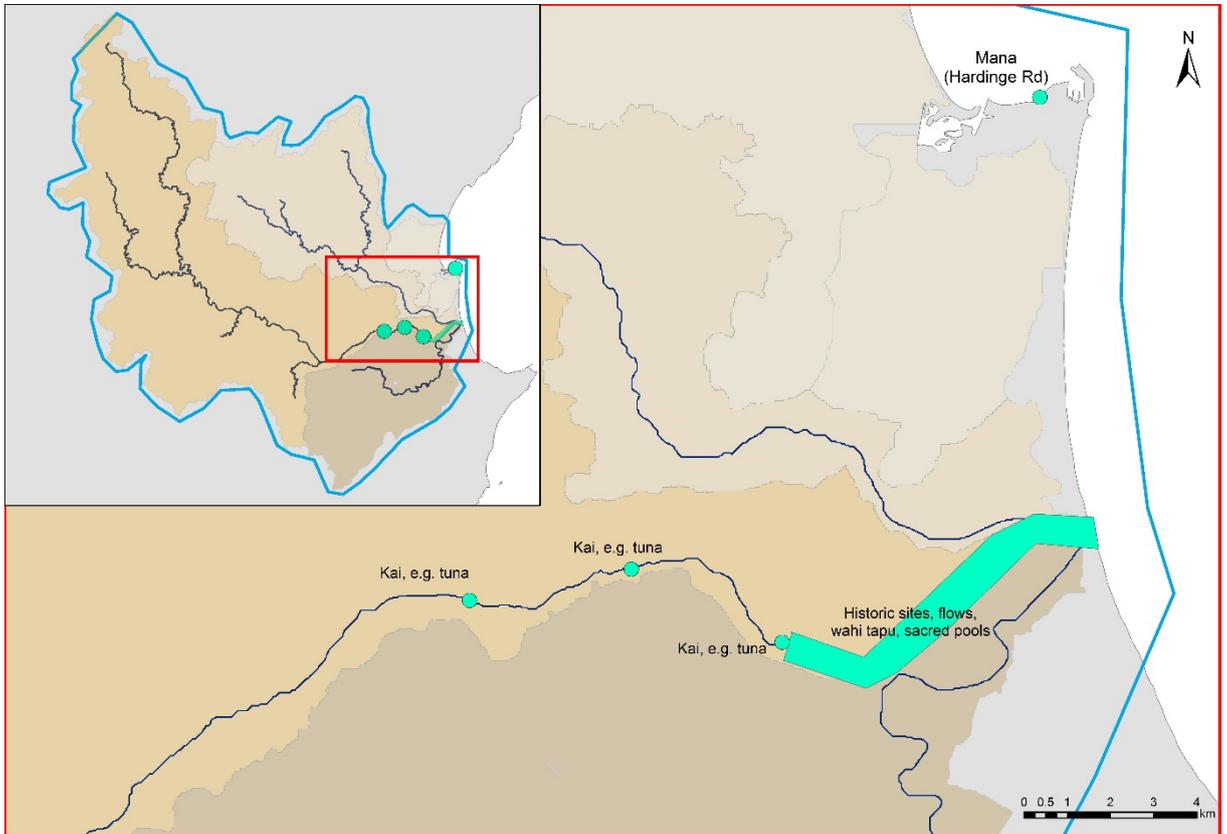


Figure 18. Tangata whenua values mapped by TANK Group members using an online mapping tool. The inset shows that the entire TANK area has been identified as an area with multiple tangata whenua values. See text, Section 4.7.

4.7. Mana whenua values

Some tangata whenua members of the TANK Group have provided additional information on tangata whenua values in the TANK catchments. This is quoted in Box 2 on the next page.

Box 2. Information on tangata whenua values and views provided by some tangata whenua members of the TANK group.

The following was provided in an email from Marie Apatu to Gavin Ide, 25 June 2016:

“The online tool was difficult to use and the values listed were incomplete for our needs. Hence we provide an attached list and korero.

Values:

- | | | |
|-----------------|--------------------|-----------------------|
| • Mauri | • Matauranga Maori | • Nohoanga* |
| • Mahinga kai | • Wananga | • Taonga Raranga* |
| • Kaitiakitanga | • Tiakiteina | • Migratory Pathways |
| • Whakapapa | • Ki Uta, Ki Tai | • Whitebait Spawning* |
| • Manaakitanga | • Mahinga mataitai | • Recharge zones* |
| • Taonga | • Wahi Tupuna* | • Swimming |
| • Wairuatanga | • Wahi Tapu* | |
| • Pupuri taonga | • Wahi Taonga* | |

* may be site-specific

Above is a list of mana whenua¹ (default) values for all the TANK waterways including the Heretaunga Muriwaihou (aquifer). Importantly underpinning these values is the holism and their connectivity with each other. This is highlighted by the overarching non-negotiable values of Mana Atua, Mana Moana, Mana Whenua, Mana Awa, Mana Tangata (Water first, the land, then the people).

This is not a comprehensive list of mana whenua values; mana whenua / hapū maintain a right to define what values are or are not essential to them and how these values should be interpreted. However, we have attempted to provide a generic list that is interdependent and applicable across all TANK sub-catchments and Freshwater Management Units (for mana whenua), except those values with an asterisk which may be site specific. In addition we have also included a number of specific values in English to provide further clarity.

The majority of mana whenua values should be relatively familiar without necessarily fully understanding their meaning.

We view that a substantial piece of work is required to provide an accurate narrative and interpretation for these values, for planning purposes and to assist towards understanding the mana whenua world view.”

¹Tangata whenua

5. SOCIAL AND RECREATIONAL VALUES

There are a number of documents that provide information on social and recreational values in the TANK catchments. These include management plans for the region's parks and public access to rivers, navigation safety bylaws, and RiVAS assessments of river value for swimming, kayaking and salmonid angling. In addition, TANK Group members have mapped some recreational values using an online mapping tool.

5.1. Amenity values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as secondary values—

- Amenity for contact recreation (including swimming) in lower Ngaruroro River, Tūtaekuri River and Ahuriri Estuary.

5.2. Hawke's Bay regional park network

The *Hawke's Bay Regional Park Network Plan* (HBRC n.d.) aims to ensure the best approach to developing and managing the region's park network. It does this by:

- establishing a consistent framework for regional parks in Hawke's Bay
- representing a contract with the general public as to how HBRC will manage the regional parks assets on their behalf
- highlighting the unique nature and values of each individual park and addressing the specific management needs of these areas.

The *Hawke's Bay Regional Park Network Plan* is values-based, meaning that decisions about future use and development of the parks will be based on the core values for the network as a whole and then individually for each park. While not specific about the method by which values were identified, or the plan developed, the plan states that 'HBRC consulted with a number of key stakeholders in the region... to gain an understanding of open space / park issues in the region and identify the level of support for the shift to a regional park approach' (HBRC n.d. p 54). Those consulted included Napier City Council, Hastings District, Wairoa District Council, Central Hawke's Bay District Council, Ngāti Kahungunu Iwi Incorporated, Department of Conservation, Tourism Hawke's Bay, Sport Hawke's Bay, and Te Mata Park Trust.

Contained within the *Hawke's Bay Regional Park Network Plan* is a map that shows the parks in the TANK area, including the ecological and recreational corridors that link the parks; see Figure 19.

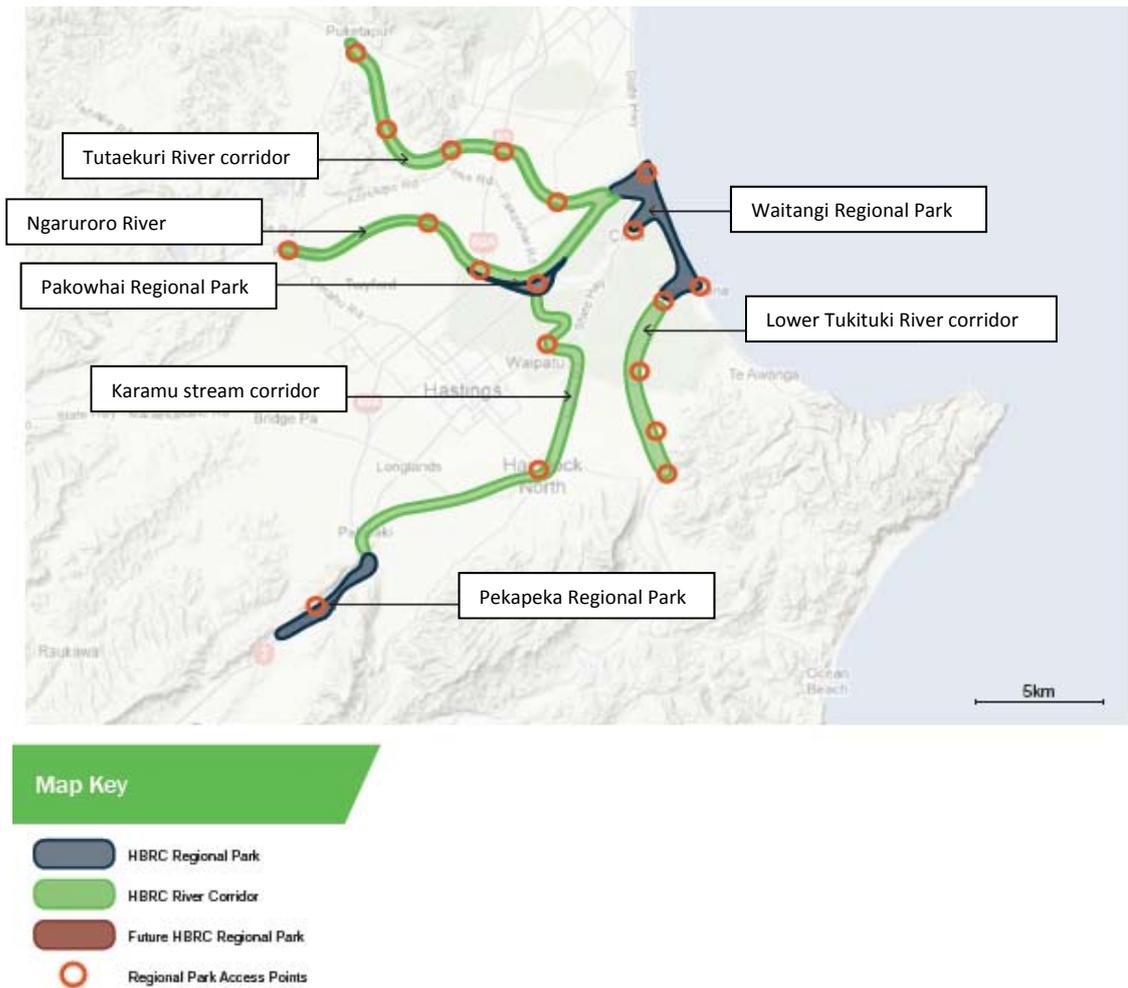


Figure 19. Hawke's Bay regional parks and corridors (Boffa Miskell 2013, p 4).

More detailed maps of each park and corridor are contained within individual park plans which are, in part, contained in the associated document, *Hawke's Bay Regional Parks Network - Schedules* (Boffa Miskell 2013). Waitangi Regional Park, for example, links a significant chain of river and coastal reserve areas which have ecological and biodiversity values. The lower reaches of the rivers are popular for fishing, whitebaiting, rowing, waka ama, kayaking, jetboating, jet skiing and kite surfing. The Waitangi Estuary area was an early arrival site for both Māori and Europeans (HBRC n.d.).

5.3. Public access points

Public access points to rivers of the Heretaunga Plains are described in the *Environmental Code of Practice for River Control and Drainage Works* (HBRC 2007). Figure 20 shows public access points to the Karamū Stream, Ngaruroro and Tūtaekuri

rivers and their tributaries. There are public access points in other parts of the TANK catchments, but no documents identifying these points were identified for this report.

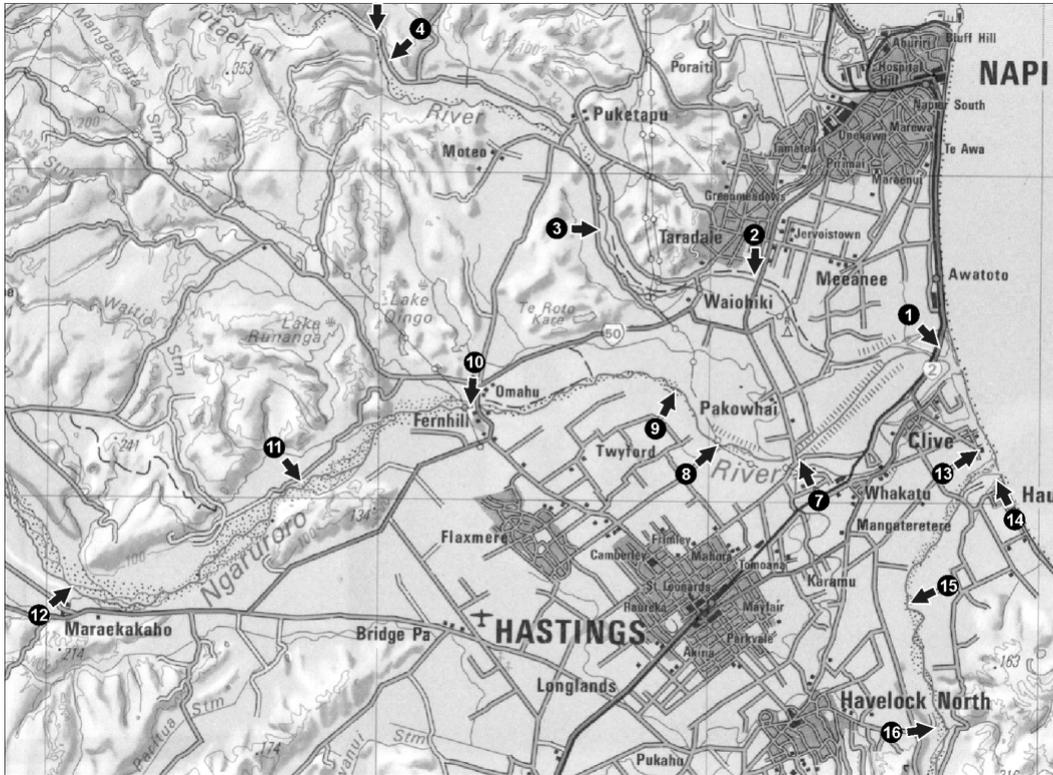


Figure 20. Public access points on Heretaunga Plains (HBRC 2007, p 17).

5.4. Navigation Safety Bylaws

The Navigation Safety Bylaws ‘ensure boaties, jetski users, kayakers, waka ama, rowers, fishers and swimmers are able to safely enjoy their time in and on Hawke’s Bay rivers and coastal waters’⁶. The bylaws, developed in 2011 through public consultation and community input, contain a suite of legal requirements to ensure the safety of these activities (HBRC 2012).

While the Navigation Safety Bylaws do not identify recreational values *per se*, schedule 2 contains maps and location-specific information about the areas of importance for recreational water use in both coastal (schedule 1) and inland waterbodies. For inland waterbodies, maps and information are provided for certain reaches of the Wairoa River, Mohaka River, Clive and Ngaruroro rivers, Porangahau River, and Te Paerahi Beach. Figure 21 provides an example for the Ngaruroro and Clive rivers, where area ‘A’ is available to all motorised craft, ‘B’ is a safety buffer

⁶ www.hbrc.govt.nz

area, C is a regulated area, rowing is allowed in area 'D', 'E' is designated as a passive water activity area, and 'F' is a shared area.

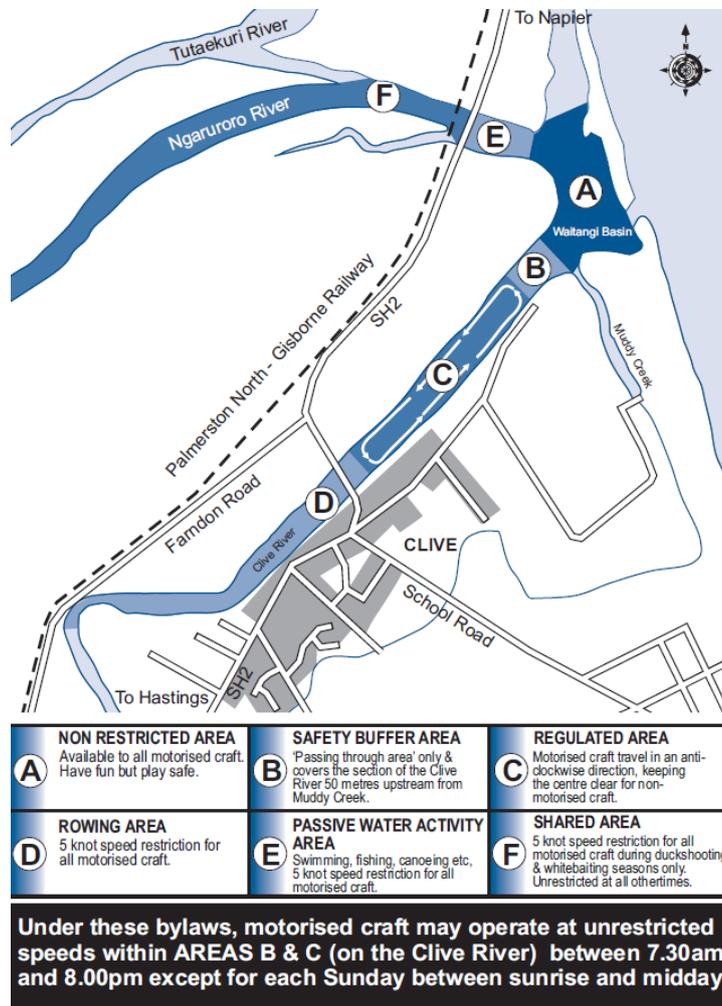


Figure 21. *Navigation Safety Bylaws* map of the Ngaruroro and Clive rivers. The map shows which activities are permitted in the different areas of the two rivers (HBRC 2012, p 35).

5.5. Kayaking

Booth et al. (2012c) used the RiVAS methodology (see Section 2.2) to assess the significance of rivers in Hawke's Bay for whitewater kayaking. Rivers were assessed by an expert panel using the following attributes (actual indicators in brackets):

- number of users (number of kayaker days per annum)
- user catchment (kayakers' home district/region-furthest 10%)
- density of high quality hydraulic features (expert panel perception of density)
- flow reliability (expert panel assessment of percent of time river is kayakable)
- scenic attractiveness (expert panel assessment)

- wilderness character (expert panel assessment)
- scarcity of the kayaking opportunity (expert panel assessment).

Booth et al. (2012c, p 3) noted that the lack of data about kayaking and kayakers' views meant the appropriateness of these attributes was unconfirmed.

The expert panel noted that access is a big issue for Hawke's Bay kayakers and restricts kayaking on certain rivers. The RIVAS method does not have an unambiguous way to assess this however, so while access for kayaking was assessed by the expert panel, it was not included in the final scores and ratings.

The results are shown in Figure 22. The assessment of kayaking river reaches pertained to present-day kayaking opportunities. The Panel stressed that river value may change over time, subject for example ease of access can change quickly if landowners change (Booth et al. 2012c, pp 2–3).

The Ngaruroro River from Boyd's airstrip to Whanawhana was assessed as having high significance, particularly as a multi-day kayaking experience that is 'nationally scarce'. Individual reaches of this segment were also rated separately as having high significance. The Ngaruroro reach from Kuripango camping ground to Kuripango bridge was rated as medium, with the panel noting that it has easy access and is often used by school groups (Booth et al. 2012c, p 22).

On the Tūtaekuri, the reach from Donald (Lawrence Hut) to Dampney Road (near Dartmoor) was rated as being of medium significance. The panel noted the rocky gorge section and recorded that it had limited knowledge of this segment (Booth et al. 2012c, p 23).

Flatwater reaches (Grade 1) were excluded from the assessment. However a separate list of flatwater reaches used by whitewater kayakers (in whitewater kayaks) was made in order to alert the regional council to these places. This included areas popular for whitewater kayak training (e.g. schools), slalom training, etc. (Booth et al. 2012c, p 2).

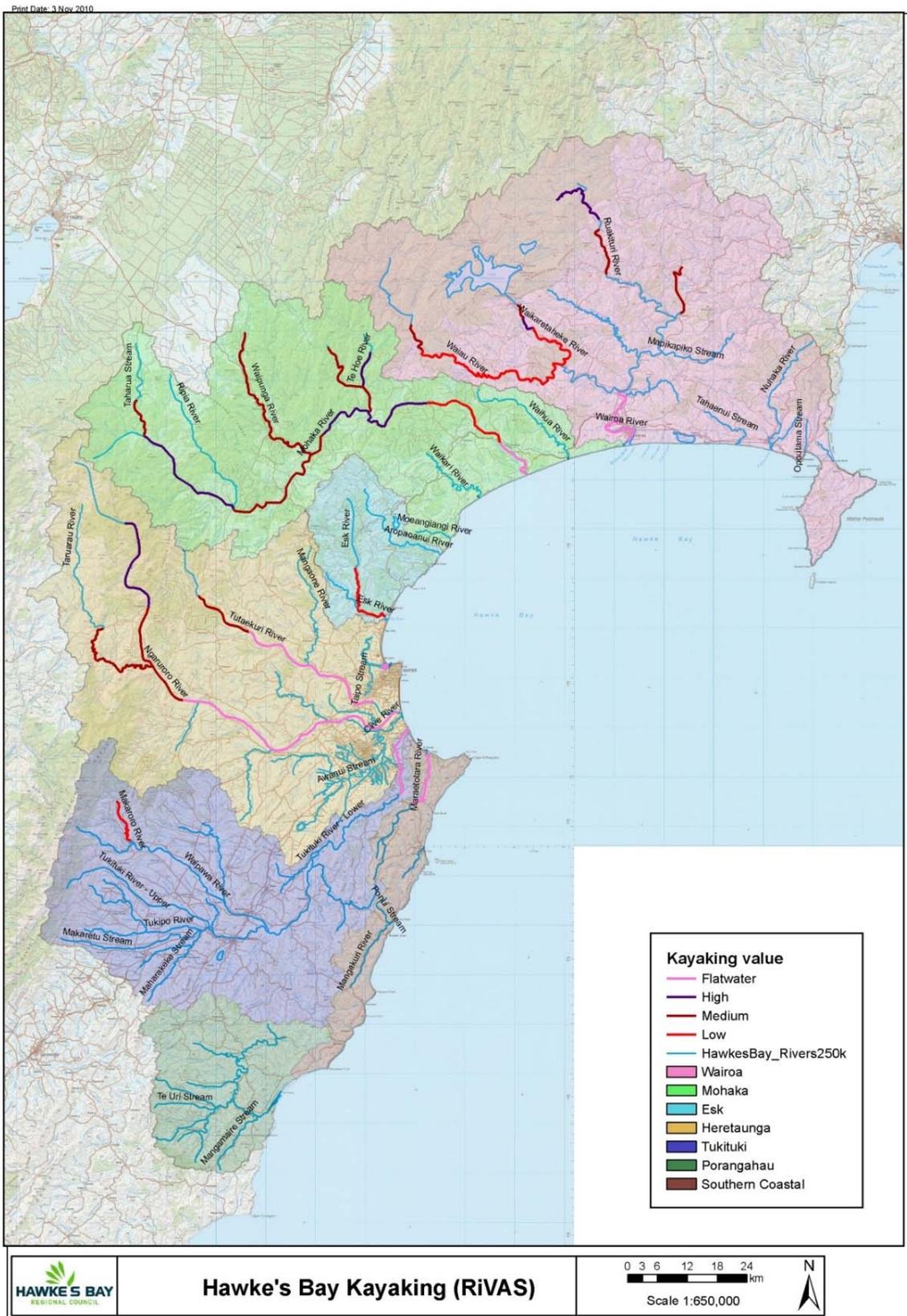


Figure 22. Significance of Hawke's Bay rivers for kayaking, assessed using RiVAS methodology

5.6. Swimming

The RiVAS methodology was also used to assess rivers for their significance for swimming.

Following the RiVAS methodology, an expert panel used eight attributes to assess 49 known river swimming locations in the Hawke's Bay region. Few data were available, so the panel relied on its own assessments for most attributes. Swimming sites without public access were excluded from the analysis, as were estuaries.

Hughey and Baker (2010), in developing the RiVAS methodology, concluded that while swimming as an activity (or river value) is nationally significant, no individual river or site is likely to be nationally significant. The method was therefore used to identify regionally and locally significant swimming sites within the Hawke's Bay region.

Twelve sites were assessed as having regional significance. Only one of these, Kuripapango camping site on the Ngaruroro, is in the TANK area. Assessed as being locally significant for swimming were, on the Ngaruroro River, Carrick Road, Chesterhope and Fernhill bridges and, on the Karamū, Karewarewa, Pakipaki and the rest of the Karamū/Clive from Havelock North down to the boat ramp (see Figure 23).

The RiVAS+ methodology was also applied to assess potential for enhancing the value of swimming sites. This suggested that eight more sites could be of regional swimming value (rather than local significance in their existing state) if identified management actions were taken to enhance the site for swimming. Of the six sites identified as having the greatest potential for improvement, one site, the Tūtaekuri at Guppy Road, is within the TANK area:

- Tūtaekuri at Guppy Rd
- Boundary Stream at Shine Falls
- Tangoio at Te Ana Falls
- Waiau at Otai Reserve
- Waikaretaheke
- Kopuawhara at Council Reserve.

The measures most often suggested for improving swimming sites were: provision of toilets, excluding stock from waterways, reducing non-point source nutrient pollution from nearby land, and reducing sediment input from land use such as forestry (Booth et al. 2012b, p 6).

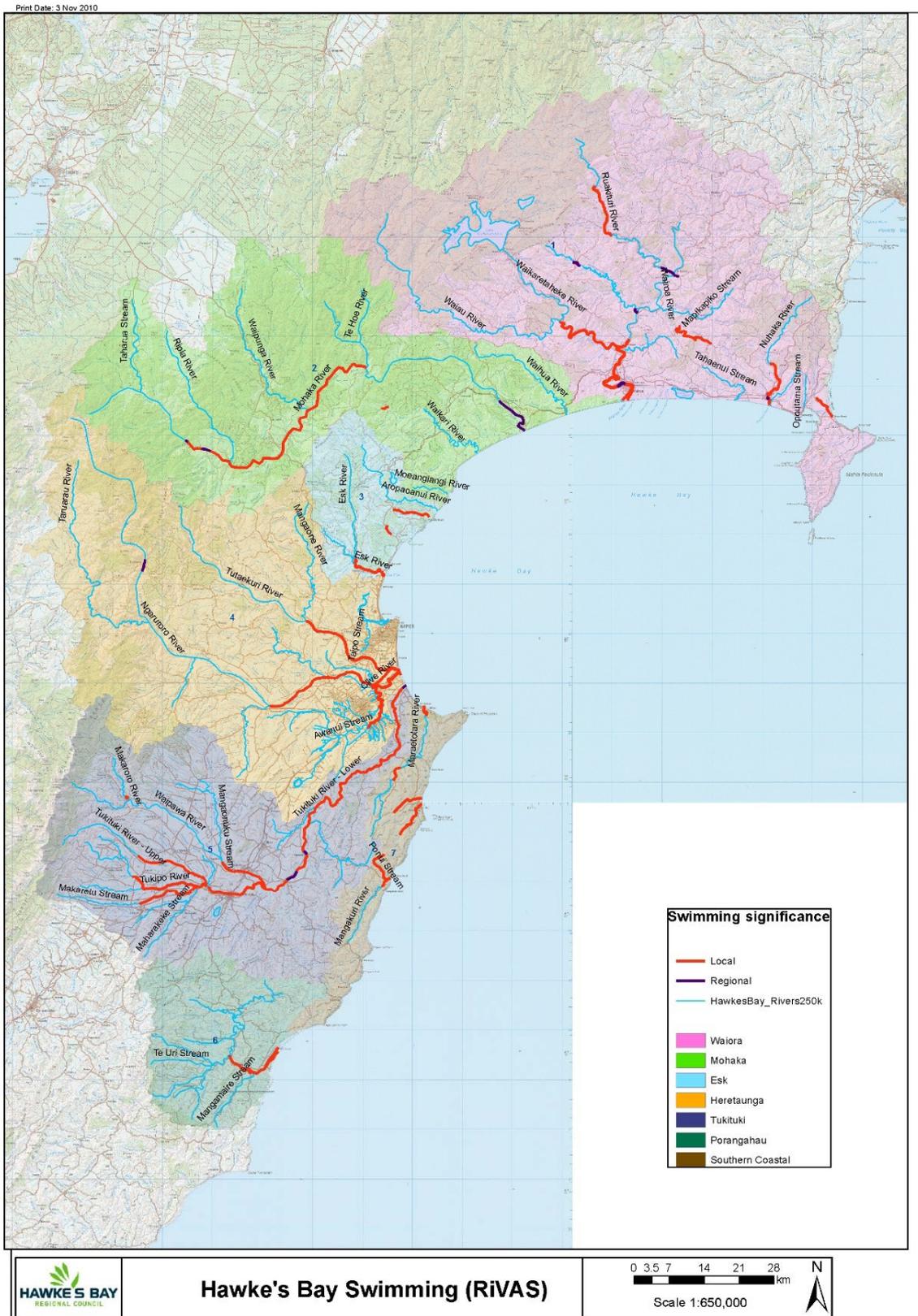


Figure 23. Significance of Hawke's Bay rivers for swimming as assessed using the RiVAS methodology. Red and purple lines denote rivers of local and regional significance for swimming, respectively. The TANK catchments (Heretaunga) are all in light brown.

5.7. Salmonid angling

5.7.1. Angling values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- Recreational trout angling and trout habitat in:
 - the Mangaone River
 - the Mangatutu Stream
 - the Ngaruroro River and tributaries upstream of Whanawhana cableway
 - the Ngaruroro River mainstem between the Whanawhana cableway and confluence with the Maraekakaho River
 - the Tutaekuri River mainstem above the Mangaone River confluence
- Trout spawning habitat.

Secondary values listed in that table include:

- Recreational trout angling, where not identified as a primary value and use
- Trout habitat, where not identified as a primary value and use.

5.7.2. National angling survey

Unwin (2013) reports on an online survey of anglers conducted for Fish and Game New Zealand in 2013. Respondents were asked to: identify rivers they had fished over the last 3 to 5 years; to rate their enjoyment of the fishery on a scale from 1 (least enjoyable) to 5 (most enjoyable); and to identify up to three reasons, from a list of ten, why they fished each river. Unwin concluded that the enjoyment score was a reasonable proxy for the importance of a fishery on a national scale.

Based on its average enjoyment scores, the upper Ngaruroro River (above the Taruarau) was within the top 10% of New Zealand rivers reported by anglers, and some of its tributaries—the Taruarau River and Ikawetea Stream—were in the top 3%. The Tūtaekuri, while ranking just above the median enjoyment score, ranked highly for ease of access for anglers and was mentioned by nearly as many survey respondents as the upper Ngaruroro. The Ngaruroro below Taruarau was also popular, and was fished by even more respondents than the upper reaches, which are more remote and difficult to access (Unwin 2013).

5.7.3. RiVAS assessment of salmonid angling

An expert panel was convened to assess salmonid angling on rivers in Hawke's Bay using the RiVAS methodology (Booth et al. 2012a), using the following attributes (indicators in brackets):

- number of angler days (angler days per year, average of 3 surveys)
- intensity of use (anglers per km)
- travel distance (kilometres from angler place of residence)
- overseas anglers (overseas anglers as percentage of total)
- catch rate and fish size (angler perceptions reported in 1979/80 national angler survey)
- water quality (average score for five water quality parameters)
- perception of scenic attractiveness and perception of wilderness (angler perceptions reported in 1979/80 national angler survey)
- perception of importance (angler perceptions reported in 1979 / 80 national angler survey).

The survey data used for five of the attributes were 30 years old at the time of the assessment. In two instances, where degradation had dramatically altered the angling opportunity, the survey data were replaced by estimates from the expert panel.

The panel indicated that additional work is needed to be confident that the assessment reflects the current values of the wider angling community. The assessment is a best estimate only, given the limitations of existing data.

Lake angling was not assessed. The panel also stated that the assessment is of recreational angling value only and not the value of the fishery itself, i.e. it does not take into account the importance of a stream for spawning or summer refuge, just its angling value.

The panel added that the assessment was primarily intended as an engagement tool to assist the Hawke's Bay Fish and Game Council in planning for more sustainable management of the region's rivers. The assessment was 'not intended to be used definitively in the RMA resource consenting process' (Booth et al. 2012b, p iii).

Rivers in the TANK area that were rated as having significance for salmonid angling are listed in Table 4 and shown in Figure 24. 'Low significance' indicates that a river has local significance for angling, and is higher for example than many other rivers that have little or no significance for angling.

Table 4. Significance of rivers in TANK area for salmonid angling (Booth et al. 2012b).

River or reach	significance
Ngaruroro River above Taruarau confluence	High
Ngaruroro River (source to sea)	Medium
Mangatutu Stream (tributary of Tūtaekuri)	Medium
Taruarau River (tributary of Ngaruroro)	Medium
Tūtaekuri River	Medium
Ngaruroro River below Taruarau confluence	Medium
Mangaone River (tributary of Tūtaekuri)	Medium
Ohara Stream (tributary of Ngaruroro)	Low

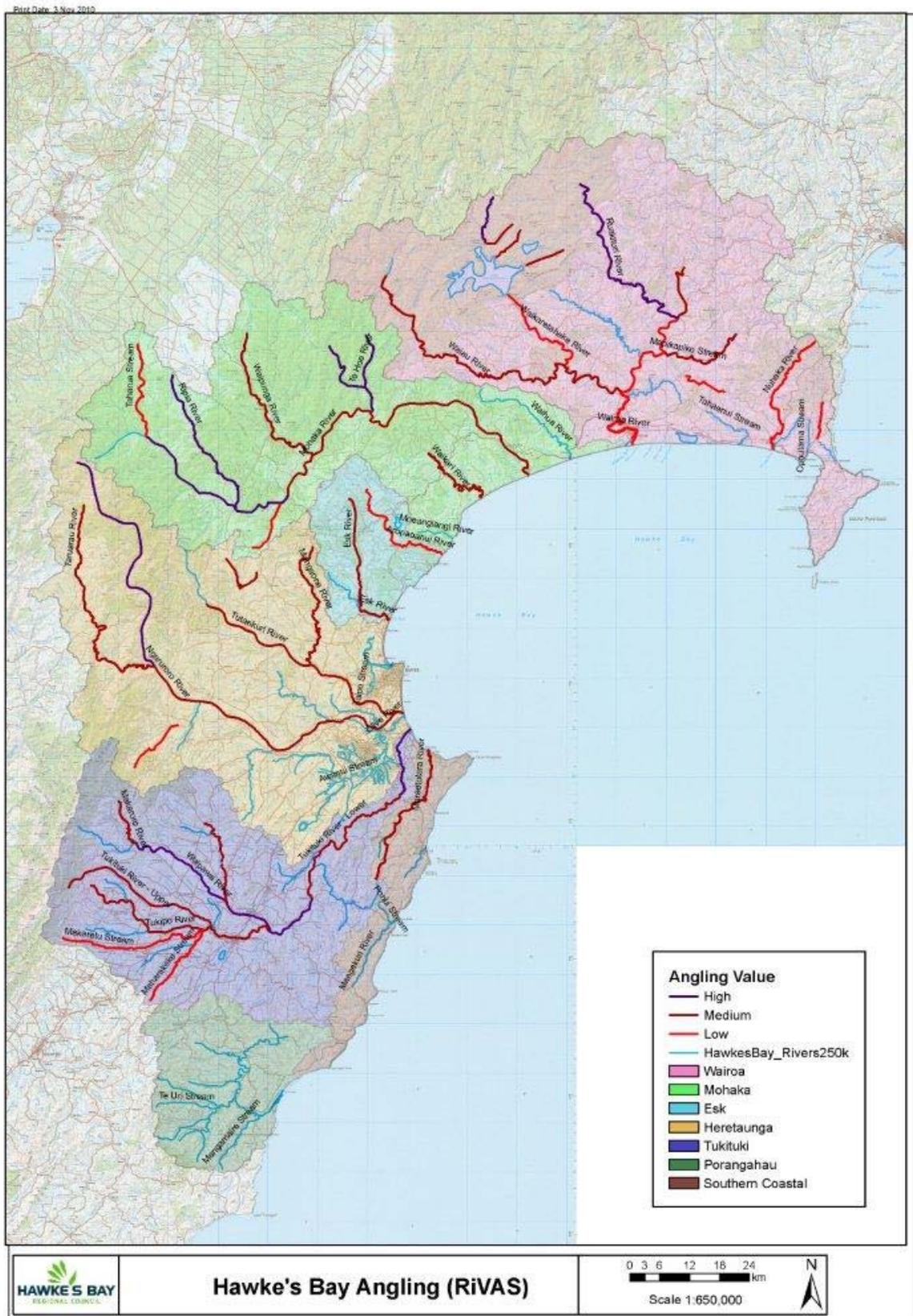


Figure 24. Significance of Hawke's Bay rivers for salmonid angling, assessed using the RiVAS methodology.

5.8. Cycling and walking

Hawke’s Bay Trails is a system of trails primarily for cycling and walking with some sections accessible by wheelchair. The Hawke’s Bay Trails Marketing Management Plan (HBRC 2013) provides a map of the trails, several of which cross or run adjacent to waterways of Hawke’s Bay. These include the Ahuriri Estuary, Clive River, Ngaruroro River, Tukituki River, and Tūtaekuri River (Figure 25). The management plan makes frequent mention of the amenity the waterways provide to trail users.

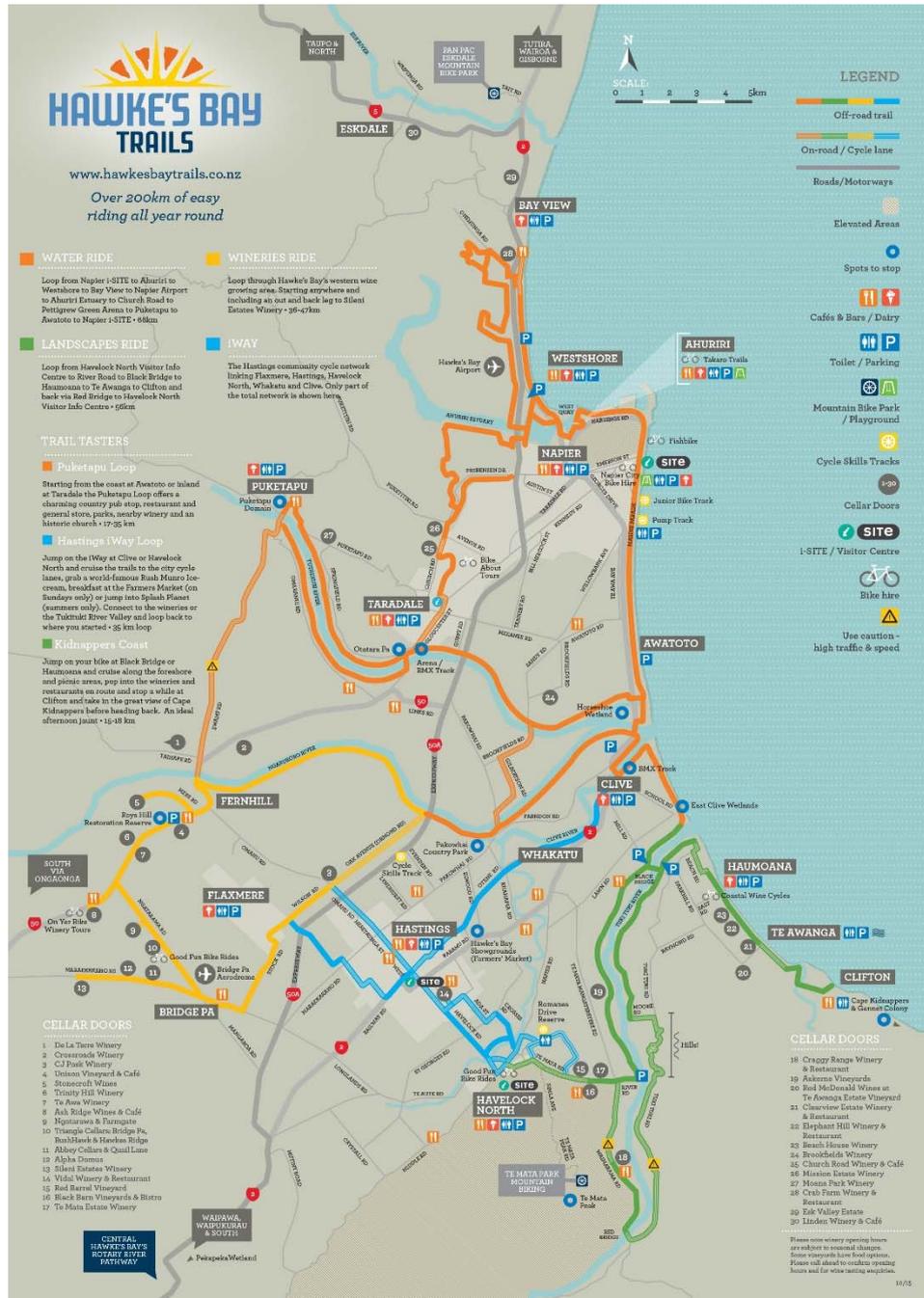


Figure 25. Hawke's Bay Trail Map (HBRC 2013, p 7).

5.9. Recreation values mapped by TANK Group members

In addition to the recreation values reported in the previous sections, TANK Group members used an online mapping tool to document some of the values that they were familiar with (see Section 2.3). Values categorised as Tourism, Trout Fishing, or Primary or Secondary Contact Recreation⁷ are shown in Figure 26. Further detail on each of the features mapped can be found in the Appendix to this report.

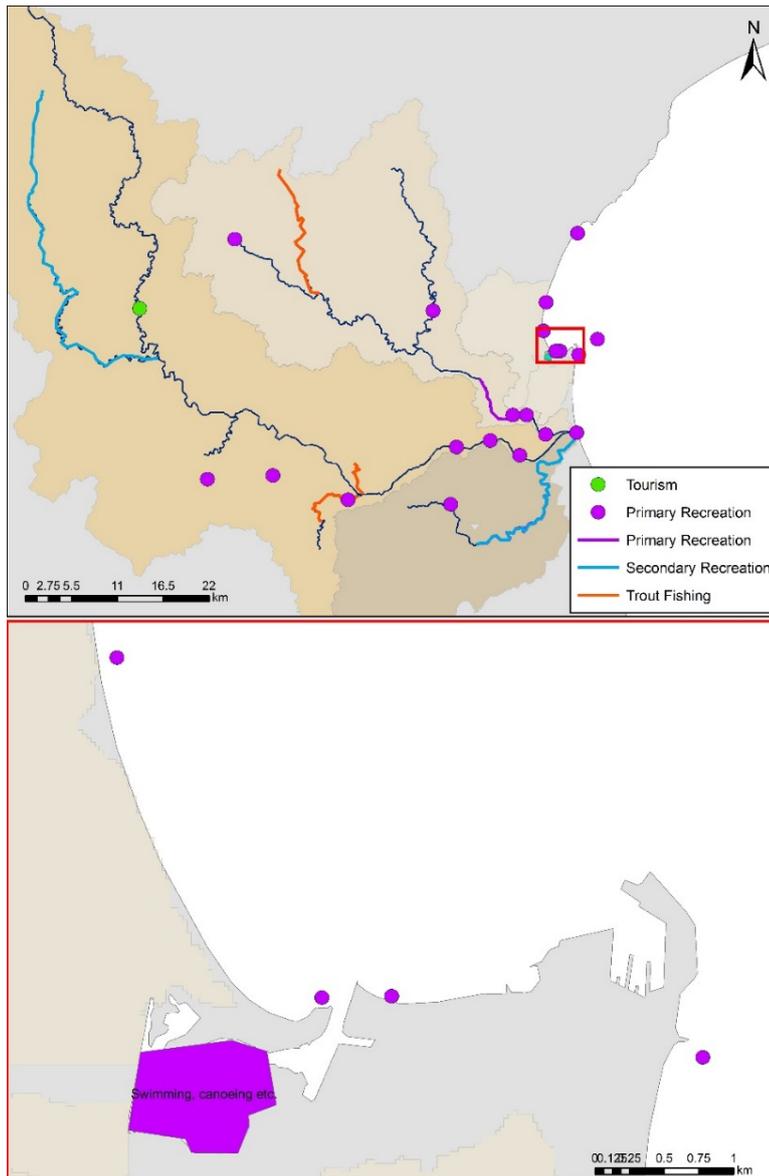


Figure 26. Recreation values mapped by TANK Group members using an online mapping tool. Lower map is an enlargement of Ahuriri Estuary and parts of Napier City.

⁷ Primary contact recreation includes activities such as swimming that frequently involve full immersion of the body, while secondary contact recreation includes activities such as wading and boating, where full immersion is infrequent.

6. DRINKING WATER SUPPLIES

6.1. Drinking water values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- Individual domestic needs and stock drinking needs
- Urban water supply for cities, townships and settlements and water supply for key social infrastructure facilities

6.2. Registered drinking water supplies

The Hawke's Bay District Health Board has provided data on registered drinking water supplies. These are shown in Figure 27.

Most of these are for bores (i.e. groundwater) but there are a number of schools and other supplies that are recorded as 'roof' and a few as 'spring'.

Marae and some village supplies are categorised as 'communal'. 'Hospitality' includes camping grounds and holiday parks, motels, restaurants, and pubs.

Some childcare centres are included as 'school' whereas others are classed as 'communal' or 'private'. The category 'private' also includes four golf clubs, presumably for their drinking water rather than for water for irrigating grass.

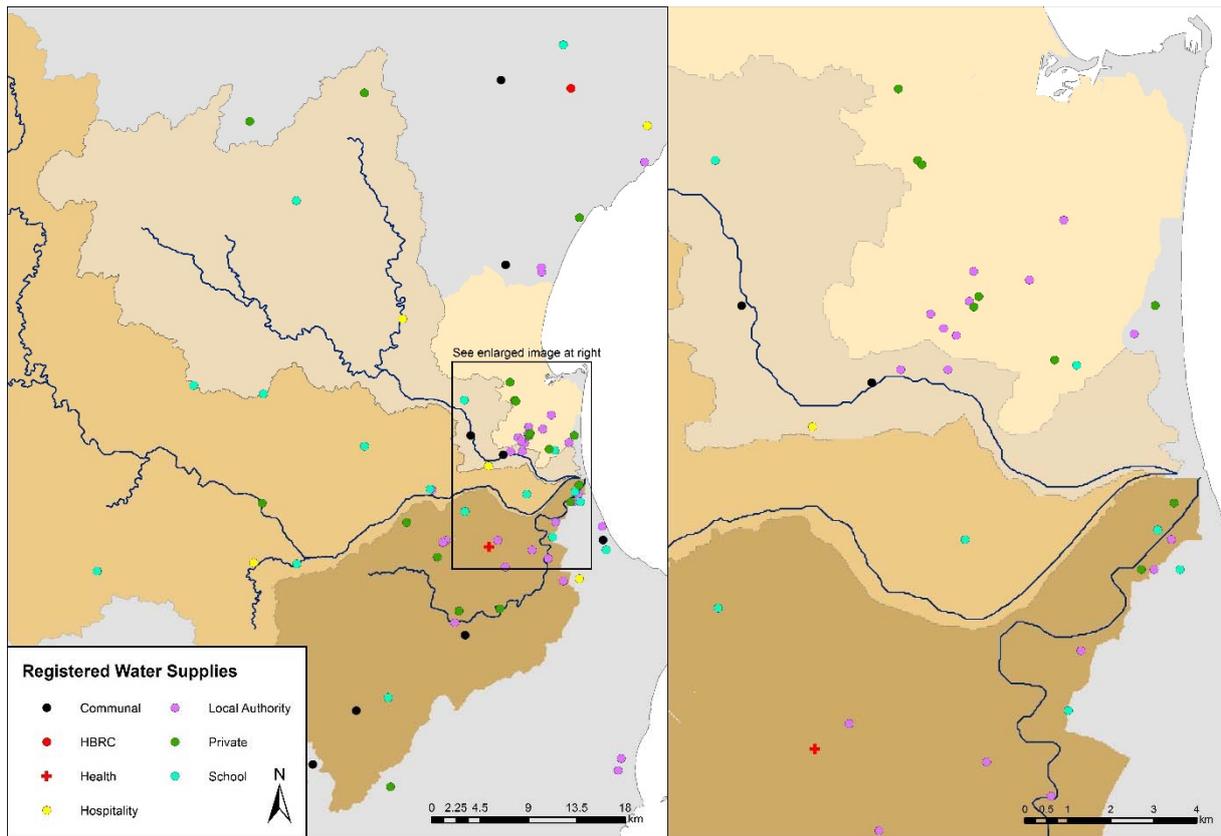


Figure 27. Registered drinking water supplies in the TANK catchments by type of owner (source: Hawkes Bay District Health Board).

7. COMMERCIAL AND OTHER 'OUT OF STREAM' VALUES

Some information has been obtained regarding the location of food production and other commercial activities that involve removal of water or gravel from rivers and aquifers in the TANK catchments. This information includes a RiVAS assessment of the significance of rivers for irrigation, a land use map of the TANK area, and some other features identified by TANK members using an online mapping tool.

7.1. Commercial and industry values in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- industrial & commercial water supply
- freshwater use for beverages, food and fibre production and processing and other land-based primary production

7.2. Irrigation and food production

7.2.1. Food production in Hawke's Bay

Hawke's Bay is a significant producer of fruit, vegetables and other horticultural crops, many of which are produced using irrigation, and the region also produces dairy and meat products. Table 5 shows the production area of the main horticultural crops grown in Hawke's Bay and the share of New Zealand's area of that crop (area in pasture is presented in Section 7.3). As a general rule of thumb, about 90% of Hawke's Bay horticultural production occurs in the TANK catchments (Chris Keenan, Horticulture New Zealand, pers. comm.).

Table 5 also presents indicative revenue and gross margin data for selected crops, both per hectare and total for Hawke's Bay. These financial values are derived from producers outside the TANK catchments so should be seen as indicative only. Gross revenue is the total value of output (for example, number of tonnes times price per tonne), whereas gross margin is gross revenue less expenses directly related to crop production. Some expenses (e.g. fuel, sprays and some labour) are for inputs imported from outside the region, so the added value to Hawke's Bay is less than gross revenue. Conversely, some expenses (e.g. some labour) are derived from within the region, so the added value to Hawke's Bay is greater than gross margin alone would suggest.

Of horticultural crops, apples and viticulture make the biggest economic contribution to the local economy. Statistics New Zealand estimates that Hawke's Bay regional Gross Domestic Product (GDP) was \$6.59 billion for the year ended 31 March 2015.

In recent years, agriculture has accounted for roughly 10% of regional GDP in Hawke's Bay; food processing is additional to this (Statistics New Zealand 2016).

Hawke's Bay producers also contribute to New Zealand's trade balance, earning foreign exchange that helps to pay for imports. Figures specific to Hawke's Bay are not readily available, but New Zealand exports 66% of its wine production, 72% of all fruit production and 34% of all vegetable production (Plant & Food Research 2015).

Table 5. Area and indicative revenue of horticultural production in Hawke's Bay

	Hawke's Bay	% of NZ	Gross revenue	Gross margin	Revenue x area	Margin x area
	ha	%	\$/ha	\$/ha	\$ million	\$ million
Apples ¹	5115	58%	56665	17341	290	89
Wine grapes ²	4936	14%	11295	5301	56	26
Summerfruit ³	854	38%	25040	7512	21	6
Olives	321	19%				
Other subtropical	222	18%				
Total fruits	11773	16%				
Asparagus	110	13%				
Peas & beans ⁴	2506	32%	6475	2675	16	7
Onions	662	12%	31500	13000	21	9
Squash	3248	48%	8800	1000	29	3
Sweet corn	1050	23%	4000	1100	4	1
Other vegetables	537	10%				
Total vegetables	8797	18%				

Sources: Area data are from Plant & Food Research 2015. Gross revenue and gross margin data are from a report on the value of horticulture in the Tukituki catchment, based on a limited number of properties (AgriBusiness Group 2013).

¹Area figures are for apples; revenue and gross margin data are for pipfruit.

²Area figures are for wine grapes; revenue and gross margin data are for viticulture.

³Area figures are for summerfruit (apricots, cherries, nectarines, peaches and plums); revenue and gross margin data are for peaches.

⁴Area figures are for peas and beans; revenue and gross margin data are for beans.

7.2.2. RiVAS assessment of irrigation

Harris (2012) used the RiVAS methodology to assess the irrigation value of rivers in Hawke's Bay. While several attributes were assessed, three attributes are given particular weight and thus dominate the assessment: size of water resource, potentially irrigable area and soil moisture deficit. The initial results of the assessment suggested that the upper and lower Ngaruroro and all parts of the Tukituki are regionally significant for irrigation, and the others including the Karamū are locally significant resources. Harris (2012) reported that:

'Following discussion [by the expert panel] the Ngaruroro was aggregated into a single catchment, and the threshold system adjusted to make the system nationally significant. This was considered to be a one-off situation based on:

- The significant size of the resource irrigated from the Ngaruroro catchment (~40,000 ha in total)
- The very high value of the land uses in the catchment

7.3. Land use

Land in the TANK catchments is used for a range of values, e.g. for commercial activities such as farming, forestry and industry, for housing and mixed purposes such as transport infrastructure, as shown in Table 6. Sheep and beef farming is the most widespread land use, accounting for 42% of total land use in the TANK area. Exotic forest is the next largest commercial land use, representing 18% of the Tūtaekuri catchment and 4% of the Ngaruroro catchment. Orchards, vineyards and short-rotation cropland are significant land uses in the Karamū and Ngaruroro catchments, while most of the dairy land is in the Tūtaekuri. Most of the built-up area (i.e. cities and towns) is in the Karamū and Ahuriri catchments. Figure 29 shows land use in the TANK catchments, with the natural vegetation and non-productive land covers amalgamated into a few classes.

Table 6. Land use in the four TANK catchments (hectares). Land cover that is primarily for human use is shaded. (Source: HBRC data).

Land use/cover	Ahuriri	Karamū	Ngaruroro	Tūtaekuri	Total
Sheep and Beef	7,755	32,056	69,135	38,936	147,882
Orchard, Vineyard	946	8,324	3,796	1,023	14,090
Short-rotation Cropland	1,421	6,089	2,085	717	10,312
Dairy		7	1,535	5,501	7,043
Deer	0.3	279	2,452	439	3,170
Indigenous Hardwoods	42	22	3,087	2,833	5,983
Deciduous Hardwoods	29	205	1,240	574	2,049
Indigenous Forest	39	210	39,449	4,041	43,739
Manuka and/or Kanuka	217	22	40,501	11,943	52,683
Exotic Forest	926	761	9,180	15,218	26,085
Forest—Harvested	36	18	1,635	380	2,069
Sub Alpine Shrubland			1,559	82	1,641
Tall Tussock Grassland			20,562	304	20,866
Depleted Grassland			251		251
Fernland			110	34	144
Gorse and/or Broom	24		570	379	973
Gravel or Rock	5		2,411	449	2,864
River	155	90	643	267	1,155
Herbaceous Freshwater Vegetation	2	164	755	50	972
Herbaceous Saline Vegetation	269	13			282
Built-up Area (settlement)	2,127	2,888	30	100	5,145
Urban Parkland/Open Space	549	566	17	56	1,188
Lake or Pond	41	169	257	50	518
Landslide			506	28	534
Grand Total	14,583	51,886	201,768	83,404	351,640

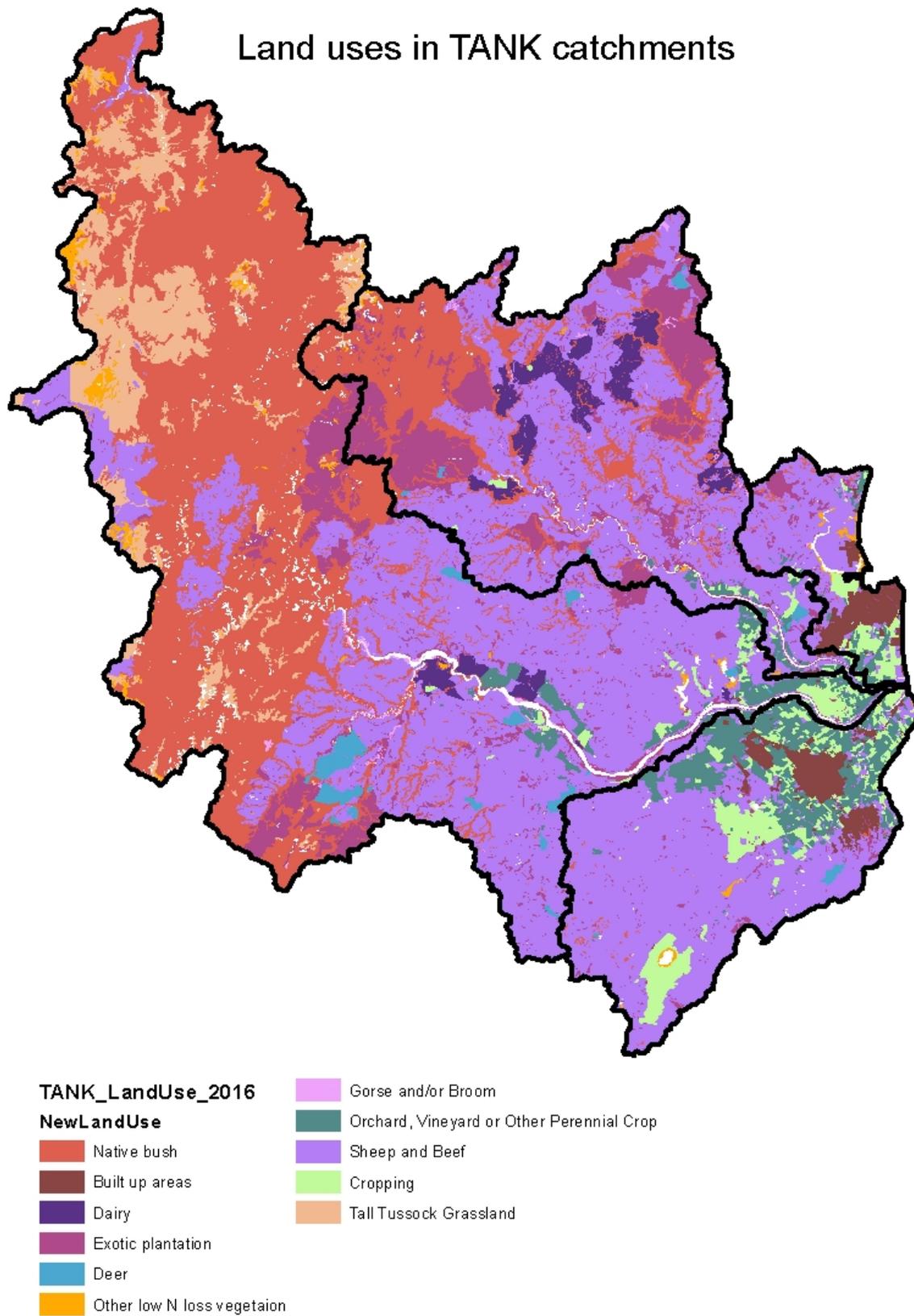


Figure 29. Land use in the four TANK catchments in 2016 (Source: HBRC).

7.4. Water takes and discharges

Hawke's Bay Regional Council grants consents for activities that take, use, divert and discharge to water. HBRC is compiling data on water takes and discharges to meet the water accounting requirements of the NPSFM.

In addition to consented activities, some water takes and discharges are permitted under the regional planning rules. HBRC is required to estimate the volume of permitted and unregulated takes and discharges as part of its freshwater accounting system.

7.5. Gravel extraction

7.5.1. Aggregate extraction value in the RPS

The table of primary and secondary values in the Hawke's Bay Regional Policy Statement (see Section 1.5.2) includes as primary values—

- Aggregate supply and extraction in Ngaruroro River downstream of the confluence with the Mangatahi Stream

7.5.2. Aggregate extraction activities mapped by HBRC

Gravel extraction activities are mapped and documented in the *Environmental Code of Practice for River Control and Drainage Works* (HBRC 2007). Figure 30 shows those reaches of the Ngaruroro, Tukituki, Tūtaekuri and Waipawa rivers where commercial gravel extraction occurs (shaded in pink).

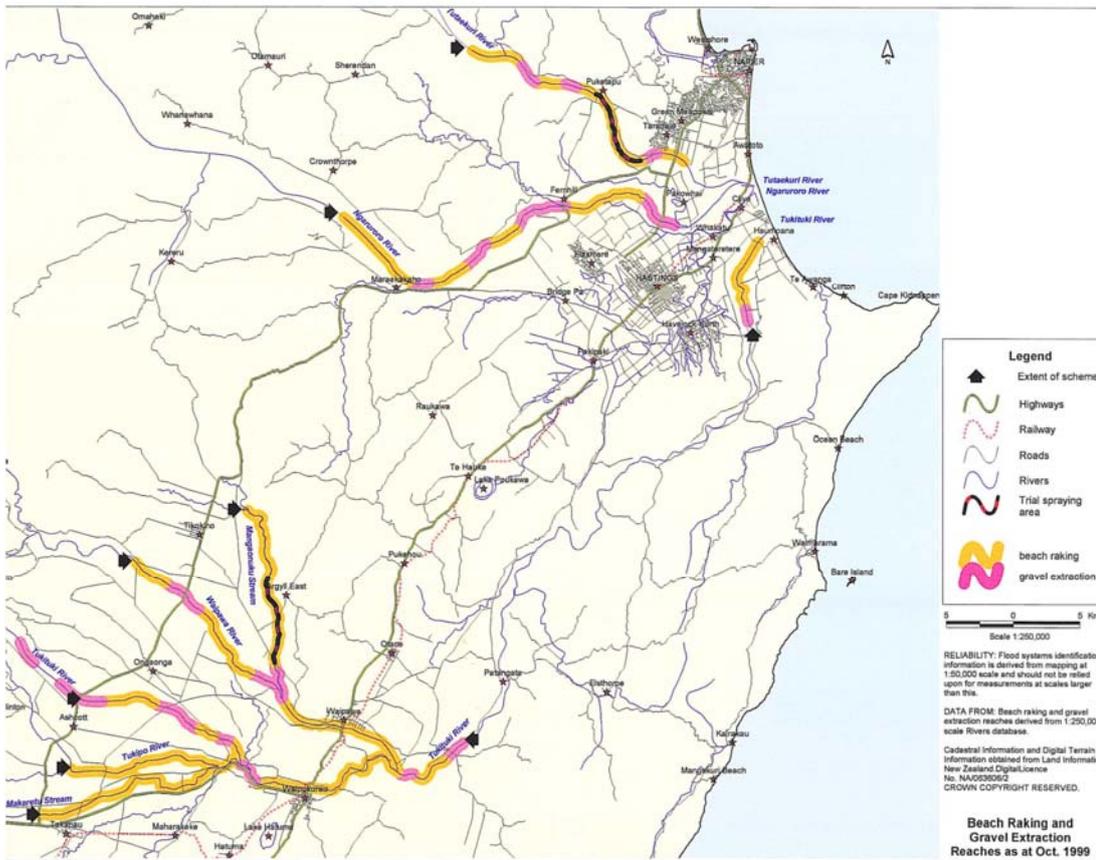


Figure 30. Location of gravel extraction (pink) and beach raking (yellow) (HBRC 2007, p 30).

7.6. Out of stream values mapped by TANK Group

In addition to the values reported in the previous sections, TANK Group members used an online mapping tool to document other ‘out of stream’ values (see Section 2.3). Values categorised as Food and Fibre Production, Urban Water Supply and Gravel Extraction are shown in Figure 31. Further detail on each of the features mapped can be found in the Appendix to this report.

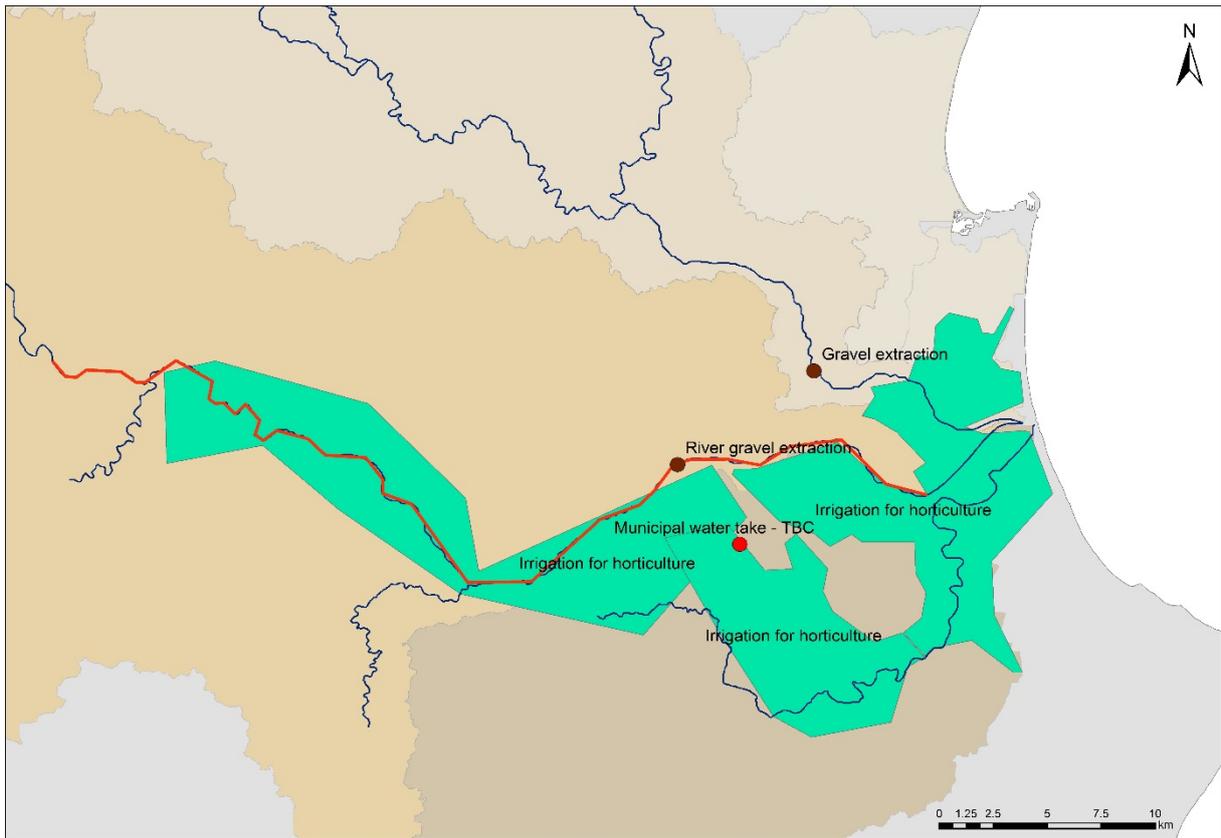


Figure 31. Food, fibre and urban water supply values mapped by TANK Group members using an online mapping tool. Gravel extraction was mapped as a 'placeholder' for an activity that occurs at multiple sites along the Tūtaekuri and Ngaruroro rivers.

8. PROPERTY PROTECTION VALUES

8.1. Engineering, flooding and drainage

River control and drainage activities for the Hawke's Bay region are documented in the *Environmental Code of Practice for River Control and Drainage Works* (HBRC 2007). The *Code* contains general standards of practice that apply to Council works undertaken in any river or drain within the region, be they located inside or outside of Schemes. The *Code's* overarching principles or values are based on the Soil Conservation and Rivers Control Act 1941 and Land Drainage Act 1908. Due to the many competing interests in river and berm management, and to guide council staff and gain acceptance from the various interest groups, development of the *Code* 'was based on a robust consultative process involving all known parties having an interest in the river and drain areas.'

As well as information and maps on the land managed by HBRC in relation to river control (Figure 32), the *Code* identifies specific locations for public access and environmental enhancement works for the rivers managed by HBRC. Maps are provided for whitebait spawning areas, public access points, river rules for surface craft on the Lower Ngaruroro and Clive rivers, and gravel extraction.

The HBRC engineering team has a draft report describing flood protection and other river management activities for the Karamū catchment, and may have reports for other catchments as well.

Territorial authorities hold additional information on drainage networks and other infrastructure for stormwater.

HBRC also manages 470 km of drains on the Heretaunga Plains—some of these were mapped during the TANK value mapping exercise and are shown in the next section.

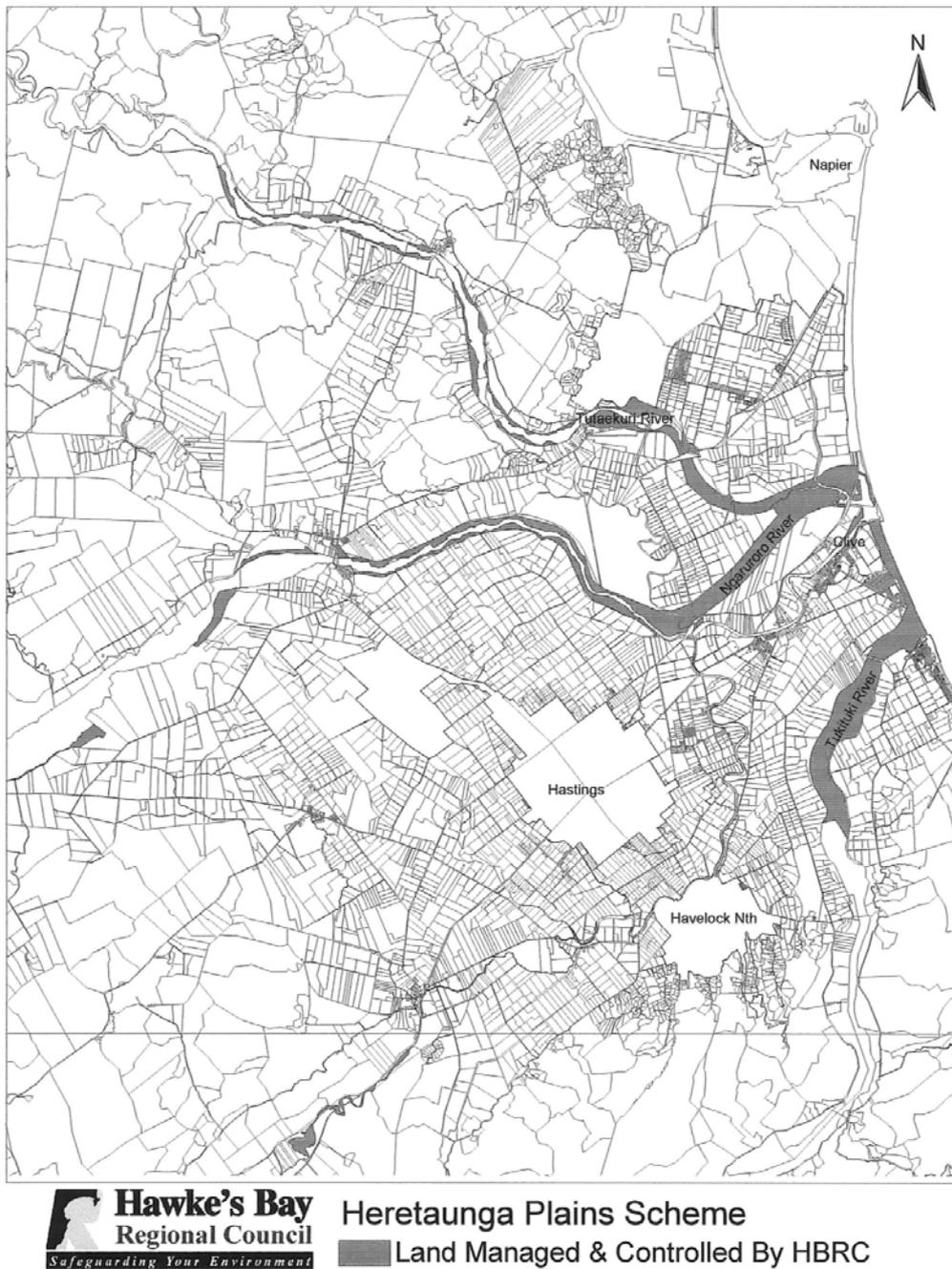


Figure 32. Shaded areas along major rivers showing land managed and controlled by Hawke's Bay Regional Council.

8.2. Stormwater and other values mapped by TANK Group members

TANK Group members used an online mapping tool (refer Section 2.3) to show the location of some of the flood protection and related values reported in the previous section. Values categorised as Stormwater Management are shown in Figure 33. Further detail on each of the features mapped can be found in the Appendix to this report.

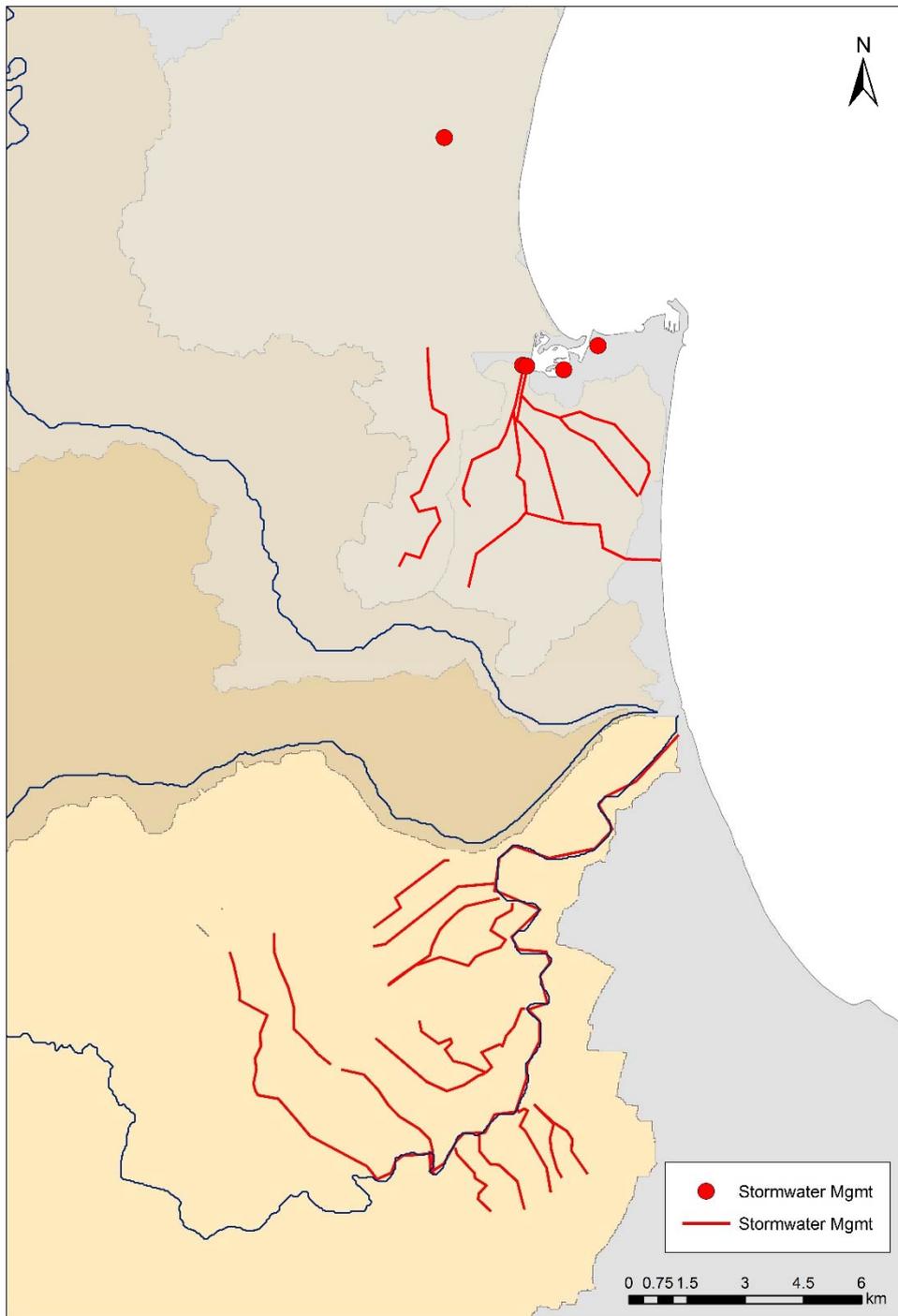


Figure 33. Stormwater management values mapped by TANK Group members using an online mapping tool.

9. CONCLUSIONS

This document compiles available information on the uses and values of freshwater in the Greater Heretaunga and Ahuriri area in Hawke's Bay, consisting of the Tūtaekuri, Ahuriri, Ngaruroro and Karamū catchments. It is intended to assist the TANK Group in its task of making recommendations to the Hawke's Bay Regional Council on objectives, policies and methods for freshwater management in these catchments to give effect to the National Policy Statement on Freshwater Management.

This report is not an exhaustive inventory of values of freshwater in the TANK catchments. There are many other values that have been mentioned by the TANK Group but for which no documented spatial information has been located. The members of the TANK Group will continue to draw upon their own local knowledge of these values during their consideration of objectives, policies and planning methods for freshwater management.

With the exception of some more specific values of Ngāti Hori related to Kohupātiki marae, this report describes the values of tangata whenua only in their broadest context. Further timely work on tangata whenua values could be useful to identify and map the specific areas that are culturally important to tangata whenua of the greater Heretaunga and Ahuriri area, so that the TANK Group and HBRC are aware of these as they make recommendations and decisions through the planning process about an appropriate level of protection for these and other values.

10. ACKNOWLEDGEMENTS

The Hawke's Bay Regional Council provided funding for this report and most of the data. Members of the TANK Group provided information on values at TANK meetings and via an online mapping tool provided by HBRC in May 2015.

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APPENDIX. VALUES IDENTIFIED USING THE ONLINE MAPPING TOOL PROVIDED BY HBRC

As explained in Section 2.3 of this report, members of the TANK Group used an online mapping tool to provide information on the location of a range of values in the TANK catchments. The resulting information is shown in several figures included in the main body of this report. Tables A1, A2 and A3 below further detail on these values, including who identified them.

The following abbreviations are used in Tables A1, A2 and A3.

STMWATERMGMT	Stormwater management
FOODFIBRE	Food and fibre production and processing
SECREC	Secondary contact recreation
PRIMREC	Primary contact recreation
TRTFISH	Trout fishing
BIODIV	Biodiversity
MANA	Mana and Kaitiakitanga
TOUR	Tourism
COMMINDUST	Commercial and Industrial
URBWATER	Urban water supply
FOOD	Food for customary use
TW	Tangata whenua
OTHER	Other – more detail in Description column
TW-ALL	Tangata whenua – all of the TANK area
PERSKNOW	Personal knowledge
PRINTED	Printed information
MATMAORI	Mātauranga Māori

Table A1. Values mapped as line features using the online mapping tool

ID	UserName	Basic Value Type	Description of Value	Source Type	Other Source	Relative Value	AddNotes	PM1	PM2
1	Mark Clews	STMWATERMGMT	Southland Drain	PRINTED	HDC drainage maps	HIGH		cost of flood damage	stormwater capacity
2	Mark Clews	STMWATERMGMT	Irongate Stream	PRINTED	HDC Drainage maps	HIGH	industrial development area	cost of flood damage	flood capacity
3	Johan Ehlers	STMWATERMGMT	Taipo Stream - stormwater quality and quantity management (largely unmodified stream)	PERSKNOW		HIGH			
4	Mark Clews	STMWATERMGMT	Upper Southland Drain	PRINTED	HDC Drainage maps	MED	Kaiapo Road residential	cost of flood damage	flood capacity
5	Johan Ehlers	STMWATERMGMT	Old Tūtaekuri Riverbed open drain for stormwater management	PERSKNOW		MED			
6	Johan Ehlers	STMWATERMGMT	Georges Drive open drain for stormwater management			MED			
7	Johan Ehlers	STMWATERMGMT	Cross country drain for stormwater management	PERSKNOW		MED			
8	Mark Clews	STMWATERMGMT	Awahou Stream	PRINTED	HDC Drainage maps	HIGH	central Hastings	cost of flood damage	flood capacity
9	Johan Ehlers	STMWATERMGMT	Plantation Drain (open drain) for stormwater management	PERSKNOW		MED			
10	Mark Clews	STMWATERMGMT	Awahou south	PRINTED	HDC drainage maps	HIGH	central Hastings	cost of flood damage	flood capacity
11	Johan Ehlers	STMWATERMGMT	Saltwater Creek (open drain) for stormwater management	PERSKNOW		MED			
12	Johan Ehlers	STMWATERMGMT	County Drain (open drain) for stormwater management	PERSKNOW		MED			
13	Mark Clews	STMWATERMGMT	Ruahapia	PRINTED	HDC drainage maps	HIGH	central Hastings	cost of flood damage	flood capacity
14	Mark Clews	STMWATERMGMT	Tomoana Drain	PRINTED	HDC drainage maps	HIGH	central Hastings	cost of flood damage	flood capacity
15	Mark Clews	STMWATERMGMT	Karamū Stream	PRINTED	HDC drainage maps	HIGH		cost of flood damage	flood capacity

ID	UserName	Basic Value Type	Description of Value	Source Type	Other Source	Relative Value	AddNotes	PM1	PM2
16	Mark Clews	STMWATERMGMT							
17	Mike Glazebrook	FOODFIBRE	Irrigation for primary production	PERSKNOW		HIGH		Cost of alternative water supply - cost of constructed water storage infrastructure	
18	Mark Clews	STMWATERMGMT	Pakowhai Drain	PRINTED	HDC Drainage Maps	HIGH		Flood Protection	
19	Mike Glazebrook	FOODFIBRE	Irrigation for primary production	PERSKNOW					
20	Mark Clews	STMWATERMGMT	Karitawhenua Stream	PRINTED	HDC Drainage Maps	HIGH		Flood Protection	
21	Mark Clews	STMWATERMGMT	Te Kahika Stream	PRINTED	HDC Drainage Maps	HIGH		Flood Protection	
22	Nick Jones	SECREC	Rowing on Clive	HBRCREP	RMP Schedule 2	HIGH	some competition with other values; N Jones has photo Clive Rowing Club	Lack of weeds	suitability for contact recreation
23	Mark Clews	STMWATERMGMT	Here Here Stream	PRINTED	HDC Drainage Maps	HIGH		Flood Protection	
24	Mark Clews	STMWATERMGMT	Mangahururu Stream	PRINTED	HDC Drainage Maps	HIGH		Flood Protection	
25	Nick Jones	SECREC	Waterskiing & jetski	PERSKNOW		HIGH		Lack of weeds	suitability for primary contact recreation
26	Nick Jones & Christine Scott	SECREC	Waka taua	PRINTED	http://www.teara.govt.nz/en/photograph/584/ngati-kahungunu-canoe	HIGH	HBRC Resource Mgmt Plan Schedule 2	Lack of weeds	check with NKII
27	Tim Herman	FOODFIBRE	Irrigation for hort production	PERSKNOW		HIGH			
28	Aki (2014)	PRIMREC	'aspirational' for all of Karamu Stream	PERSKNOW					
29	Nataasha Berkett (2014)	PRIMREC	Puketapu downstream to Taradale. Swimming, picnicking & inner tubing	PERSKNOW					

ID	UserName	Basic Value Type	Description of Value	Source Type	Other Source	Relative Value	AddNotes	PM1	PM2
30	Ngaio (2014)	FOOD	eeling (drains) Awahou Stream	PERSKNOW					
31	Morry Black (2014)	SECREC		PERSKNOW					
32	Nick Jones (2014)	SECREC		PERSKNOW					
33	Tim Hopley (2014)	TRTFISH	lower parts of Maraekakaho Stream	PERSKNOW					
34	Tim Hopley (2014)	TRTFISH	lower parts get fished	PERSKNOW					
35	Tim Hopley (2014)	TRTFISH		PERSKNOW					
36	Matt Brady	BIODIV	Bird species	PRINTED					

Table A2. Values mapped as point features using the online mapping tool

ID	UserName	Basic Value Type	Description of Value	Source Type	OtherSource	Relative Value	AddNotes1	PM1	PM2
0	Gavin (2014)	PRIMREC		PERSKNOW					
1	Gavin (2014)	PRIMREC		PERSKNOW					
2	Johan Ehlers	STMWATERMGMT	Floodgates	PERSKNOW			volume of SW discharge		
3	Johan Ehlers	STMWATERMGMT	Floodgate	PERSKNOW					
4	Johan Ehlers	STMWATERMGMT	Thames/Tyne drain discharge	PERSKNOW					
5	Johan Ehlers	STMWATERMGMT	stormwater discharge	PERSKNOW					
6	Johan Ehlers	STMWATERMGMT	Bay View drainage area pumping station	PERSKNOW					
7	Hira (2014)	PRIMREC		PERSKNOW					
8	Hira (2014)	PRIMREC		PERSKNOW					
9	Hira (2014)	PRIMREC		PERSKNOW					
10	Hira (2014)	PRIMREC		PERSKNOW					
11	John Cheyne (2014)	PRIMREC	Rissington Guide Camp	PERSKNOW					
12	Ngaio (2014)	PRIMREC		PERSKNOW					
13	Ngaio (2014)	FOOD	Kai, e.g. tuna	PERSKNOW					
14	Ngaio (2014)	FOOD	Kai e.g. tuna	PERSKNOW					
15	Ngaio (2014)	FOOD	Kai, e.g. tuna	PERSKNOW					
16	Ngaio (2014)	PRIMREC		PERSKNOW					
17	Ngaio (2014)	PRIMREC		PERSKNOW					
18	Hira (2014)	PRIMREC		PERSKNOW					
19	John Cheyne (2014)	PRIMREC	@Lawrence Shelter	PERSKNOW					
20	Kahu (2014)	PRIMREC	@Ngaruroro Rivermouth	PERSKNOW					
21	Jenny Mauger (2014)	PRIMREC	@Town Reef	PERSKNOW					

ID	UserName	Basic Value Type	Description of Value	Source Type	OtherSource	Relative Value	AddNotes1	PM1	PM2
22	Jenny Mauger (2014)	MANA	Mana (Hardinge Road)	PERSKNOW					
23	Jenny Mauger (2014)	PRIMREC	@Hardinge Road						
24	Jenny Mauger (2014)	PRIMREC	@Rangitira Reef	PERSKNOW					
25	Jenny Mauger (2014)	PRIMREC	@'The Wreck'	PERSKNOW					
26	Jenny Mauger (2014)	PRIMREC	@Keteketerau	PERSKNOW					
27	Jenny Mauger (2014)	PRIMREC	@Tangoio Reef	PERSKNOW					
28	Jenny Mauger (2014)	PRIMREC	@Pania Reef	PERSKNOW					
29	Brett Gilmore	TOUR	Kayaking, fishing, wilderness experience						
30	Brett Gilmore	COMMINDUST	river gravel extraction				Placeholder location. Gravel is an important resource we all use and is often forgotten about.		
31	Brett Gilmore	COMMINDUST	gravel extraction				Placeholder location. Gravel is an important resource we all use and is often forgotten about		
32		URBWATER	Municipal water take - TBC				For audit cross check against consents DB for municipal water take		

Table A3. Values mapped as shape features (polygons) using the online mapping tool

ID	UserName	Basic Value Type	Description of Value	Source Type	Other Source	Relative Value	AddNotes	PM1	PM2
0	Johan Ehlers	STMWATERMGMT		PRINTED	NCC & HBRC reports on stormwater into Ahuriri Estuary	HIGH		juvenile populations of marine species in Ahuriri Estuary are healthy	
1	Vaughan (2014)	BIODIV	Whio	PERSKNOW					
2	Vaughan (2014)	BIODIV	Whio	PERSKNOW					
3	Vaughan (2014)	BIODIV	Ngaruroro Estuary	PERSKNOW					
4	Vaughan (2014)	BIODIV	Ahuriri Estuary	PERSKNOW					
5	Tim Herman	FOODFIBRE	Irrigation for horticulture	PERSKNOW		HIGH			
6	Tim Herman	FOODFIBRE	Irrigation for horticulture	PERSKNOW					
7	Tim Herman	FOODFIBRE	Irrigation for horticulture	PERSKNOW		HIGH			
8	John Cheyne (2014)	PRIMREC	Swimming, canoeing etc.	PERSKNOW					
9	Christine Scott (2014)	OTHER	Natural character	PERSKNOW					
10	Aki (2014)	TW	historic sites, flows, wahi tapu, sacred pools	MATMAORI					
11	Natasha Berkett (2014)	OTHER	Natural character @Kuripapango	PERSKNOW					
12	Matt Brady	BIODIV		PERSKNOW					
13	Matt Brady	BIODIV	birds	PERSKNOW					
14	Matt Brady	BIODIV		PRINTED					
15	Matt Brady	BIODIV	waterfowl	PRINTED					
16	Matt Brady	BIODIV	waterfowl	PRINTED					
17	Matt Brady	BIODIV	bird life	PRINTED					

ID	UserName	Basic Value Type	Description of Value	Source Type	Other Source	Relative Value	AddNotes	PM1	PM2
18	Matt Brady	BIODIV	vegetation type	PRINTED					
19	Matt Brady	BIODIV	bird	PRINTED					
20	Matt Brady	BIODIV	tree cape	PRINTED					
21	Matt Brady	BIODIV	waterfowl	PRINTED					
22	Tangata whenua	TW-ALL							