

Natural Character in the Gisborne District: Application of the River Values Assessment System (RiVAS)



Prepared by:
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Land Environment & People



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Executive Summary

The River Values Assessment System (RiVAS) was applied by a River Expert Panel to eight resource attributes to assess 61 river units in the Gisborne District for their natural character. The method was applied to differentiate rivers of high natural character (n=36), moderate natural character (n=17), and low natural character (n=8) – see Table 1. Few data were available, so the Expert Panel relied on their own assessments for most attributes.

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Chapter 1

Introduction

1.1 Purpose

This report presents the results from an application of the River Values Assessment System (RiVAS) for natural character in the Gisborne District.

A River Expert Panel (see Appendix 1) met on 2 November 2011 to apply the method to Gisborne rivers. Owing to time restrictions, the Expert Panel discussed the method and collectively assessed selected rivers while together, then subsequent assessment was undertaken by individual members, collated, and then distributed to members for comment. Council staff moderated the final results to resolve some small differences in ratings. This approach was feasible because Panel members were in accord over the attributes and were uniform in their assessments (evident during the workshop). However, it was challenging to implement and is not recommended as best practice.

1.2 River Values Assessment System (RiVAS)

Hughey and Baker (2010) describe the RiVAS method including its application to natural character. Table 1 provides a summary of the method.

Table 1
Summary of the River Values Assessment System method

| Step | | Purpose |
|------|--|--|
| 1 | Define river value categories and river segments | The river value may be subdivided into categories to ensure the method is applied at a meaningful level of detail. Rivers are listed and may be subdivided into segments or aggregated into clusters to ensure that the rivers/segments being scored and ranked are appropriate for the value being assessed. A preliminary scan of rivers in the region is undertaken to remove those rivers considered to be of 'no' or less-than-local level significance for the value being considered. |
| 2 | Identify attributes | All attributes are listed to ensure that decision-makers are cognisant of the various aspects that characterise the river value. |
| 3 | Select and describe the primary attributes | A subset of attributes (called primary attributes) is selected and described. |
| 4 | Identify indicators | An indicator is identified for each primary attribute using SMARTA criteria. Quantitative criteria are used where possible. |
| 5 | Determine indicator thresholds | Thresholds are identified for each indicator to convert indicator raw data to 'not present', 'low', 'moderate', 'high' (scores 0-3). |
| 6 | Apply indicators and | Indicators are populated with data (or data estimates from an expert panel) for each river. |

| Step | | Purpose |
|---------|--|--|
| | indicator thresholds | A threshold score is assigned for each indicator for each river. |
| 7 | Weight the primary attributes | Primary attributes are weighted. Weights reflect the relative contribution of each primary attribute to the river value. The default is that all primary attributes are weighted equally. |
| 8 | Determine river significance | Indicator threshold scores are summed to give a significance score (weightings applied where relevant). Rivers are ordered by their significance scores to provide a list of rivers ranked by their significance for the river value under examination. Significance (national, regional, local) is assigned based on a set of criteria or cut off points. |
| 9 | Outline other relevant factors | Factors which cannot be quantified but influence significance are recorded to inform decision-making. |
| 10 - 13 | Apply to potential river scenarios (called RiVAS+) | Optional stage (RiVAS+). Relevant steps are repeated for potential future river conditions. |
| 14 | Identify information requirements | Data desirable for assessment purposes (but not currently available) are listed to inform a river value research strategy. |

Chapter 2

Application of the RiVAS method

Step 1: Define the river value, river sites and levels of significance

It was accepted that natural character is a term used to describe the naturalness of river environments, that it has both ecological and landscape connotations, and that the following definition is useful (Hughey and Baker, 2010, chapter 11, p1):

Natural character is a term used to describe the naturalness of river environments. The degree or level of natural character within an area depends on:

- 1. The extent to which natural elements, patterns and processes occur; and*
- 2. The nature and extent of modifications to the ecosystems and landscape/ riverscape.*

The highest degree of natural character (the greatest naturalness) occurs where there is least modification. The effect of different types of modification upon the natural character of an area varies with the context and may be perceived differently by different parts of the community.

The nature of the rivers in the Gisborne District was discussed and it was noted that the District receives high rainfall and its rivers carry very high sediment loads.

Rivers were clumped as appropriate (typically smaller catchments flowing directly to the sea) and split where appropriate, especially in large catchments with multiple land uses and land tenures, and major geographical differences. This resulted in a list of 61 river units (sites are mapped in Appendix 2 and listed in Appendix 3).

Because the natural character method had previously been applied with a 5-point scale of significance (very high, high, moderate, low, very low), and all other RiVAS river values were based on a 3-point significance scale (high, moderate, low), this led to difficulty when Council considered the results for the various river values. For this reason, the natural character 5-point scale was adjusted to a 3-point scale. See Step 8.

Step 2: Identify attributes

The attributes to describe natural character are presented in Appendix 4. These were adopted from the most recent application of RiVAS for natural character (Tasman District – Martin et al. 2010).

Step 3: Select and describe primary attributes

Primary attributes are those attributes selected to represent natural character within the RiVAS method. These were adopted from the most recent application of RiVAS for natural character (Tasman District – Martin et al. 2010). Appendix 4 describes the eight primary attributes (in bold).

Steps 4 & 5: Identify indicators and determine indicator thresholds

The indicators adopted to measure each primary attribute are presented in Appendix 4, together with their thresholds, and indicators are assessed against SMARTA¹ criteria in Appendix 5. Indicators and thresholds were adopted from the most recent application of RiVAS for natural character (Tasman District – Martin et al. 2010).

With respect to the ‘water quality’ attribute, the Expert Panel assessed sediment as a natural feature (i.e., it did not reduce the score) except where the sediment was judged to be caused by human-induced change, in which case the score was reduced.

Step 6: Apply indicators and indicator thresholds

Expert Panel estimates were required for all indicators (Appendix 3).

Step 7: Weight the primary attributes

The decision was made to keep weights equal (Appendix 3).

Step 8: Determine river site significance

The spreadsheet was used to sum the indicator threshold scores for each river unit (Appendix 3). The significance thresholds from the most recent application of RiVAS for natural character (Tasman District – Martin et al. 2010) were applied (Appendix 3). As already discussed, the 5-point significance scale was then adjusted to a 3-point scale. Both the 5-point and 3-point scale results are shown in Appendix 3, together with the adjustment method.

Based on the 3-point significance scale, river units were identified as having high natural character (n=36), moderate natural character (n=17), or low natural character (n=8).

Step 9: Outline other factors relevant to the assessment of significance

No discussion took place on other factors.

Step 10: Review assessment process and identify future information requirements

Few data were available to inform this case study.

It is recommended that the 3-point scale be used for future applications of the RiVAS method for natural character. This will align natural character with the other RiVAS river values.

1 Specific, measurable, achievable, relevant, timely, and may be already in use

References

- Hughey, K.F.D., Baker, M-A. (eds). (2010). [*The River Values Assessment System: Volume 1: Overview of the Method, Guidelines for Use and Application to Recreational Values.*](#) LEaP Report No.24A, Lincoln University, New Zealand.
- Martin, D., Deans, N., Brown, S., Stuart, B., Doyle, M. and Hughey, K. (2010). Part B: Natural Character in Tasman District: Application of the River Values Assessment System (RiVAS), in Hughey, K.F.D., Baker, M-A. (eds). (2010). [*The River Values Assessment System: Volume 2: Application to cultural, production and environmental values.*](#) LEaP Report No.24B, Lincoln University, New Zealand. Chapter 11: p20-32.

Appendix 1

Credentials of the River Expert Panel members and advisor

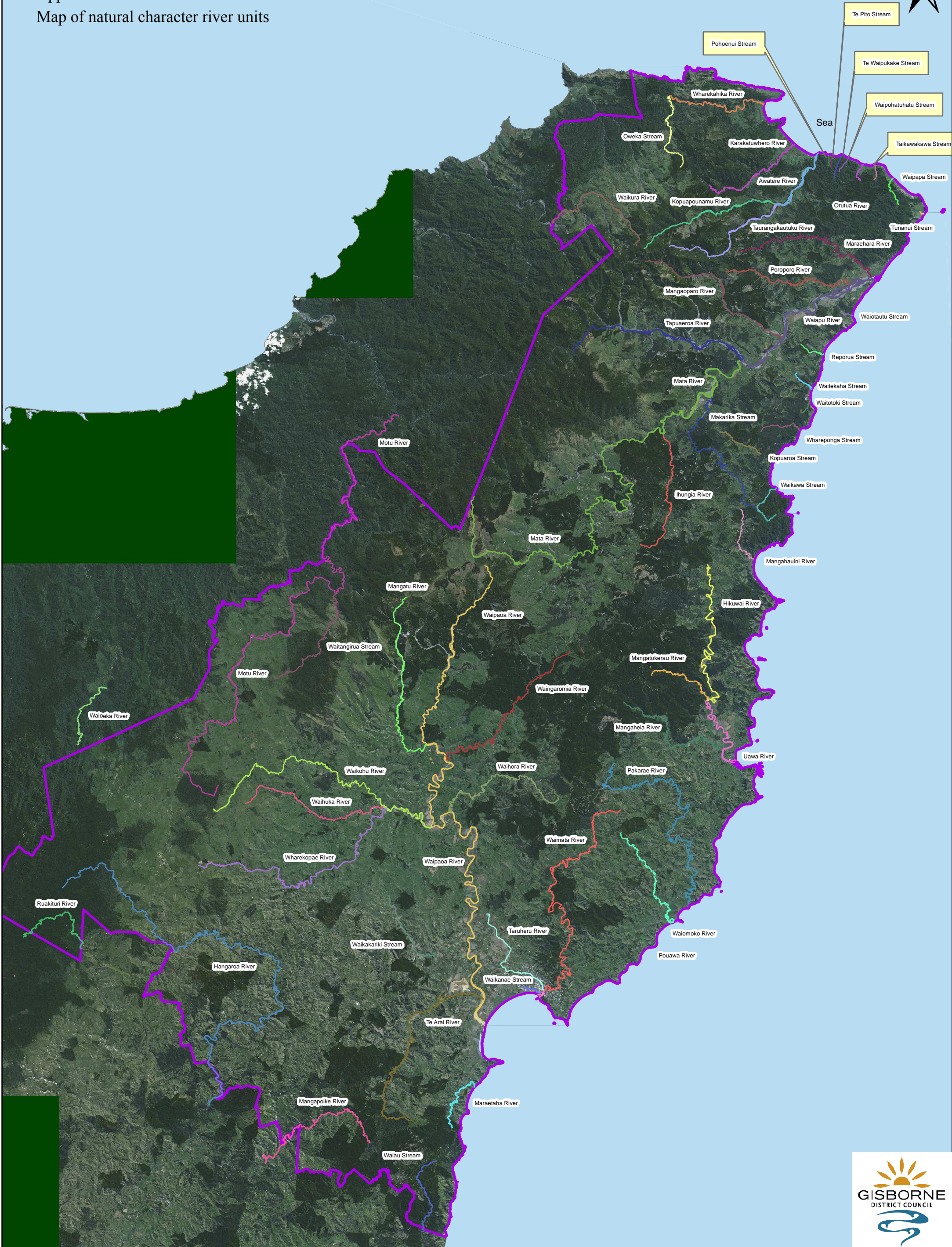
The River Expert Panel comprised six members. Their credentials are:

1. **Meg Gaddum** is from the QEII National Trust.
2. **Hamish Cave** is from Federated Farmers of New Zealand. Hamish is a member of the Fresh Water Advisory Group.
3. **Tui Warmenhoven**, also from the Fresh Water Advisory Group, is knowledgeable about tangata whenua matters.
4. **Kerry Hudson** is the Soil Conservation Team Leader with the Gisborne District Council.
5. **Sally Fogle** is a Planner with the Gisborne District Council.
6. **Hal Hovell** is a Department of Conservation ranger in the East Cape area.

Advisors:

1. **Kay Booth** of Lindis Consulting was the facilitator. Kay has been involved in developing the RiVAS tool since its inception in 2007, and has applied RiVAS to various river values for several regional councils.
2. **Jo Callis** is a Planner with the Gisborne District Council.

Appendix 2
Map of natural character river units



Appendix 3 Significance assessment calculations for natural character, Gisborne (Steps 1 and 5-8)

| River unit | Assessor | River name | Scores on 5-point scale as used by Expert Panel | | | | | | | | | Converted scores from 5-point scale to 3-point scale: see bottom for conversion system | | | | | | | | | | |
|--------------------|----------|---|---|-------------|---------------|-------------------------------|-------------------------------|------------------------|-------------------------------|---------------------|---------------------|--|---------------|-------------|---------------|-------------------------------|-------------------------------|------------------------|-------------------------------|---------------------|---------------------|---------------------|
| | | | River channel | | | | | Riparian edge | | Wider Landscape | 5-point scale (OLD) | 5-point scale (OLD) | River channel | | | | | Riparian edge | | Wider Landscape | 3-point scale (NEW) | 3-point scale (NEW) |
| | | | River shape | Flow regime | Water quality | Absence of exotic flora/fauna | Structures/human modification | Extent of native flora | Structures/human modification | Landscape character | | | River shape | Flow regime | Water quality | Absence of exotic flora/fauna | Structures/human modification | Extent of native flora | Structures/human modification | Landscape character | | |
| | group | Wharekahika River (SH35 bridge to Hicks Bay) | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 34 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| | group | Orutua | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 35 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| | group | Waipapa (East Cape) | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 38 | Very high | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| | HH | Taikawakawa, Waiawa, Te Pito, Pohoenui, Waipohatuhatu Streams | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 37 | Very high | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| Coastal | TW | Waiotautu Stream | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 36 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| Coastal | TW | Waitotoki | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 37 | Very high | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| Coastal | TW | Whareponga | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 34 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| Uawa | KNH | Mangatokerau | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 33 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| | group | Motu (below falls) to GDC boundary | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 39 | Very high | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| Motu | KNH | Waitangirua | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 34 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | High |
| | HH | Te Waipuhake Stream | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 33 | High | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 23 | High |
| Waiapu | TW | Tapuaeroa | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 4 | 33 | High | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 23 | High |
| Waiapu | TW | Maraehara | 4 | 5 | 4 | 5 | 4 | 3 | 4 | 4 | 33 | High | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 23 | High |
| Waiapu | TW | Lower Tapuaeroa (below Mokoikiwi, braided section) | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 33 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 23 | High |
| Uawa | KNH | Waiau | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 32 | High | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 23 | High |
| | group | Oweka | 2 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 32 | High | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 22 | High |
| | KNH | Tunanui | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 31 | High | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 22 | High |
| Coastal | TW | Waitekaha | 3 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 32 | High | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 22 | High |
| Waipaoa | MG | Waikohu (above Mahaki settlement road) | 5 | 5 | 4 | 5 | 3 | 4 | 3 | 4 | 33 | High | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 22 | High |
| | KNH | Upper Waioeka | 5 | 5 | 4 | 4 | 5 | 3 | 4 | 3 | 33 | High | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 22 | High |
| Wairoa | KNH | Mangapoike | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 33 | High | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 22 | High |
| | KNH | Ruakituri | 2 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 31 | High | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 22 | High |
| Waiapu | TW | Poroporo | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 3 | 31 | High | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 21 | High |
| Coastal Lower Mata | TW | Reporua | 3 | 5 | 4 | 5 | 3 | 4 | 4 | 3 | 31 | High | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 21 | High |
| Coastal Lower Mata | TW | Kopuaroa | 4 | 5 | 4 | 5 | 3 | 4 | 3 | 3 | 31 | High | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 21 | High |
| Coastal Lower Mata | TW | Ihungia | 4 | 5 | 3 | 5 | 4 | 3 | 4 | 3 | 31 | High | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 21 | High |
| Waipaoa | MG | Waihuka | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 29 | High | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 21 | High |

| | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-------|---------------------------------------|---|---|---|---|---|---|---|---|----|----------|---|---|---|---|---|---|---|---|----|----------|
| Waipaoa | KNH | Wairongomia | 4 | 5 | 3 | 4 | 4 | 3 | 4 | 3 | 30 | High | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 21 | High |
| "Coastal" | KNH | Maraetaha River | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 29 | High | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 21 | High |
| Motu | group | Motu (above falls) | 4 | 5 | 4 | 3 | 5 | 3 | 4 | 3 | 31 | High | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 21 | High |
| Waiapu | TW | Upper Mata River (Incl. Waitahaia) | 4 | 4 | 3 | 5 | 3 | 4 | 3 | 3 | 29 | High | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 20 | High |
| Waiapu Lower Mata | TW | Mangaoporo River | 4 | 5 | 3 | 5 | 4 | 3 | 3 | 3 | 30 | High | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 20 | High |
| "Coastal" | TW | Makarika | 4 | 4 | 3 | 5 | 4 | 3 | 3 | 3 | 29 | High | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 20 | High |
| "Coastal" | TW | Mangahauinui River | 4 | 4 | 3 | 5 | 4 | 3 | 3 | 3 | 29 | High | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 20 | High |
| Waipaoa | group | Wharekopae | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 28 | Moderate | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 20 | High |
| Wairoa | group | Hangaroa (incl. Mutuera) | 5 | 5 | 4 | 3 | 5 | 3 | 3 | 3 | 31 | High | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 20 | High |
| "Coastal" | HH | Karakatuwhero River | 2 | 3 | 5 | 3 | 5 | 3 | 4 | 4 | 29 | High | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 19 | Moderate |
| Waiapu | TW | Lower Mata | 3 | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 28 | Moderate | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 19 | Moderate |
| Waipaoa | KNH | Waihora | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 27 | Moderate | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 19 | Moderate |
| Awatere | group | Kopuapounamu | 2 | 3 | 4 | 3 | 5 | 3 | 5 | 3 | 28 | Moderate | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 18 | Moderate |
| Waipaoa | MG | Waikohu (from Mahaki settlement road) | 5 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 27 | Moderate | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 18 | Moderate |
| | group | Waikura, Whangaparaoa | 2 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 26 | Moderate | 1 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 17 | Moderate |
| Awatere | HH | Awatere River | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 25 | Moderate | 1 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 17 | Moderate |
| Waiapu | TW | Waiapu River | 3 | 4 | 2 | 5 | 1 | 3 | 3 | 3 | 24 | Moderate | 2 | 3 | 1 | 3 | 1 | 2 | 2 | 2 | 16 | Moderate |
| Uawa | KNH | Hikuwai | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 24 | Moderate | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 16 | Moderate |
| Uawa | group | Mangaheia | 3 | 4 | 3 | 4 | 3 | 2 | 3 | 2 | 24 | Moderate | 2 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | 16 | Moderate |
| "Coastal" | KNH | Pakarae River | 3 | 4 | 3 | 4 | 2 | 3 | 2 | 3 | 24 | Moderate | 2 | 3 | 2 | 3 | 1 | 2 | 1 | 2 | 16 | Moderate |
| | cons | Te Arai River (upper) | 4 | 1 | 2 | 4 | 4 | 2 | 2 | 4 | 23 | Moderate | 3 | 1 | 1 | 3 | 3 | 1 | 1 | 3 | 16 | Moderate |
| Waipaoa | group | Mangatu | 1 | 4 | 2 | 4 | 5 | 2 | 4 | 2 | 24 | Moderate | 1 | 3 | 1 | 3 | 3 | 1 | 3 | 1 | 16 | Moderate |
| Awatere | group | Taurangakautuku | 2 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 23 | Moderate | 1 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 15 | Moderate |
| "Coastal" | KNH | Waiomoko River | 3 | 4 | 3 | 4 | 2 | 3 | 2 | 2 | 23 | Moderate | 2 | 3 | 2 | 3 | 1 | 2 | 1 | 1 | 15 | Moderate |
| | KNH | Pouawa River | 3 | 4 | 3 | 4 | 2 | 3 | 2 | 2 | 23 | Moderate | 2 | 3 | 2 | 3 | 1 | 2 | 1 | 1 | 15 | Moderate |
| Waimata | KNH | Waimata | 3 | 4 | 3 | 3 | 2 | 3 | 2 | 3 | 23 | Moderate | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 15 | Moderate |
| | group | Waipaoa River (below Te Karaka) | 1 | 3 | 3 | 4 | 4 | 1 | 1 | 2 | 19 | Low | 1 | 2 | 2 | 3 | 3 | 1 | 1 | 1 | 14 | Low |
| | KNH | Waikakariki | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 22 | Moderate | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 14 | Low |
| Uawa | KNH | Uawa River | 2 | 4 | 2 | 3 | 3 | 3 | 2 | 2 | 21 | Moderate | 1 | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 13 | Low |
| | group | Turanganui River | 1 | 5 | 3 | 4 | 2 | 1 | 1 | 1 | 18 | Low | 1 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 13 | Low |
| Waipaoa | group | Te Arai River (lower) | 2 | 1 | 3 | 4 | 4 | 2 | 2 | 2 | 20 | Moderate | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 1 | 13 | Low |
| Uawa | KNH | Lower Uawa | 2 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 19 | Low | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 12 | Low |
| Taruheru | KNH | Taruheru River | 1 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 16 | Low | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 10 | Low |
| | group | Waikanae Stream | 1 | 4 | 2 | 2 | 1 | 2 | 1 | 1 | 14 | Low | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | Low |

Colour Code Key

Significance thresholds (highlighted columns)

| | |
|--------|---------------------|
| Green | High = National |
| Blue | Moderate = Regional |
| Yellow | Low = Local |

Key to signif rankings:

(old 5-point scale)

| | | |
|--------------|-----------|-------------|
| 37-40 | Very high | n=4 |
| 29-36 | High | n=32 |
| 20-28 | Moderate | n=20 |
| 12-19 | Low | n=5 |
| 8-11 | Very low | n=0 |
| TOTAL | | n=61 |

Score conversion:

4 & 5 = 3
3 = 2
1 & 2 = 1

Key to signif rankings:

(new 3-point scale)

| | | |
|--------------|----------|-------------|
| 20-24 | High | n=36 |
| 15-19 | Moderate | n=17 |
| <15 | Low | n=8 |
| TOTAL | | n=61 |

Misc (highlighted rivers)

Pink Rivers overlap with neighbouring council

Data reliability (font colour)

Blue/Purple Less reliable data

Red Data checked by Expert Panel and has been adjusted

Appendix 4

Assessment criteria for natural character (Steps 2-4)

| ATTRIBUTE CLUSTERS | ATTRIBUTE (primary attributes in bold) | DESCRIPTION OF PRIMARY ATTRIBUTES | INDICATORS | INDICATOR SIGNIFICANCE THRESHOLDS | DATA SOURCES (AND RELIABILITY) |
|--|--|---|---|--|--|
| Step 2: Identify attributes Step 3: <u>Select</u> and describe primary attributes | | Step 3: Select and <u>describe</u> primary attributes | Step 4: Identify indicators | Step 5: Determine significance thresholds | |
| River channel | Channel shape | Modification to cross section (e.g., slope-banks) and long section (e.g., cut through meanders) .This also includes changes to a river bed width (e.g., narrowing of the channel), which is commonly undertaken in modified rivers with valuable land adjacent. Changes to the bed sediment should also be taken account of in this attribute. | Aerial photographs, river cross sections, changes in river width/ length and water allocation resource consents (where available). Judgement from Expert Panel was also required due to limited available data for all rivers. | Judgement made on a five-point scale: 1= Very Highly modified river, (i.e., straightened and channelised, often with concrete or rock fill banks) often within an urban context; 2= A highly modified channel shape or width but with semi natural reaches or channel shapes in some areas; 3= A river displaying a patchwork with moderate natural channel shape in places together with many human influences such as long stretches of stopbanks, groynes; 4= A highly natural river displaying occasional pockets or individual minor modifications to its channel shape (i.e., small stopbanks or groynes); 5= A very highly natural river with no modifications to its channel shape. | Regional council, NIWA or other water quality data [i.e., GIS data]. Aerial photography. (Very good) |
| | Degree of modification of flow regime | Hydrological information on a river's low, median and mean flows assist in determining natural character. Substantial flow that appears to fit the | Change to natural flow regime. % Flow rate modification (would show low flows). Would need to | Judgement made on a five-point scale: 1= Very highly modified or diverted flow/ water-take (e.g., large-scale dams; take averaging 50% or more of median flow) | Regional council, NIWA or other water quality data. (Very good) |

| ATTRIBUTE CLUSTERS | ATTRIBUTE (primary attributes in bold) | DESCRIPTION OF PRIMARY ATTRIBUTES | INDICATORS | INDICATOR SIGNIFICANCE THRESHOLDS | DATA SOURCES (AND RELIABILITY) |
|--------------------|---|--|---|--|---|
| | | nature and scale of the channel may suggest a higher degree of natural character. Dewatered bed or 'misfit' flows suggest upstream diversions, which reduce natural character. | know the flow data for each river. Expert Panel judgement based on quantitative data available. | 2= Highly modified or diverted flow (e.g., small-scale dams, irrigation or flood channels); 3= Moderately modified or diverted flow (e.g., several irrigation takes taking a moderate proportion of MALF); 4= Relatively low levels of modified or diverted flow (e.g., few irrigation takes taking minor proportion (<5%) of low flow); 5= Highly natural flow regime with no modifications to the flow pattern. | |
| | Water quality | Perception of the water quality, especially its clarity, colour, etc. | Information from council or other parties. Also judgement from Expert Panel taking account of visual and biological aspects where they apply, particularly water clarity, nutrient content, temperature, salinity and faecal coliforms. | Judgement made on a five point scale: 1= Very highly contaminated or permanently discoloured water displaying very high levels of human-induced changes to the water quality with limited life supporting capacity (e.g., within polluted urban/ industrialised areas or intensive farming); 2= Water usually displaying high levels of contamination mainly from adjacent diffuse sources from land use activities (agricultural leaching, etc.); 3= Water displaying reasonable levels of naturalness although contains occasional high-moderate levels of human induced changes to part of the waterway or at some times; 4= Water displaying relatively high levels of water quality with small or rare amounts of impurities caused further upstream (e.g., by occasional stock crossing or forest harvesting); 5= Highly natural water quality displaying no human induced changes. | Regional council, NIWA or other water quality data. (Very good) |

| ATTRIBUTE CLUSTERS | ATTRIBUTE (primary attributes in bold) | DESCRIPTION OF PRIMARY ATTRIBUTES | INDICATORS | INDICATOR SIGNIFICANCE THRESHOLDS | DATA SOURCES (AND RELIABILITY) |
|--------------------|--|---|---|---|---|
| | Exposed riverbed | Extent of the exposed bed appropriate for river type (and flows) would assume higher natural character than one with unexpected areas of exposed bed not relating to flows. | Not all river types have exposed areas; depends on flow regime and nature of the channel. Also, difficult to judge for a braided river. | | |
| | Bed material substrate | Exposed bed material appropriate for river type (i.e., size, geology for type of flow). | Visible geological make-up of the river substrate/ bed. Expert Panel judgement. | | |
| | Exotic 'aquatic' flora and fauna within the river channel | <p>Presence of aquatic flora and fauna within the river channel (including waterweeds, pest fish (which include trout and salmon), the eggs and fry of pest fish, and the invasive alga, e.g. didymo) can reduce the natural character of the river.</p> <p>This does not include vegetation on 'islands' within the river channel. This is contained under 'riparian vegetation'.</p> <p>Algal bloom may be evident in some rivers due to seasonal low flows. Expert ecological judgement will be required to assess extent and may have a bearing on the degree of naturalness of this primary attribute.</p> | Expert Panel judgement, looking at volume, variety. | <p>Judgement based on a five-point scale:</p> <p>1= River system choked with exotic aquatic flora and fauna;</p> <p>2= Large areas of introduced flora and fauna (including pest fish) evident (in approximately 75% of river);</p> <p>3= Occasional stretches (some quite long) of introduced flora and fauna evident within waterway (approx. 50% of river);</p> <p>4= Small, often isolated pockets of introduced flora and fauna evident (less than 20% of total river), however river displaying very high levels of naturalness;</p> <p>5= No evidence of introduced flora or fauna within the water channel.</p> | Regional council, NIWA or other water quality data. (Very good) |
| | Structures and human modifications within the river channel | Including dams, groynes, stopbanks, diversions, gravel extractions which may affect the level of natural character of the river channel. | Expert Panel judgement based on knowledge of river, assisted by aerial photos, council GIS, REC and LCDB. Linear measurement/ % proportion of human | <p>Judgement based on a five-point scale:</p> <p>1= River channel completely modified or artificial (i.e., dam/ weir/ flood defence structure);</p> <p>2= Significant parts of the river channel have been affected or encroached upon by human intervention (i.e., a suburban/ highly managed</p> | Regional council, NIWA or other water quality data. (Very good) |

| ATTRIBUTE CLUSTERS | ATTRIBUTE (primary attributes in bold) | DESCRIPTION OF PRIMARY ATTRIBUTES | INDICATORS | INDICATOR SIGNIFICANCE THRESHOLDS | DATA SOURCES (AND RELIABILITY) |
|--------------------|--|--|--|---|--|
| | | | modification. | agricultural land, including: gravel workings, part-channelisation); 3= Occasional 'reaches' of human modifications (i.e., a settled rural landscape with bridge/ aqueduct supports, pylon footing); 4= Limited human intervention (i.e., occasional bridge abutments/ power pole within the river channel); 5= Overwhelmingly natural with no/ very limited evidence of human interference. | |
| Riparian Edge | Vegetation cover in the riparian edge | Dominance of native communities in natural patterns (the presence of exotic species in natural patterns will reduce natural character but is of higher naturalness than the absence of such vegetation (unless this is natural) or the presence of planted vegetation). This includes all bankside vegetation as well as vegetation within 'islands', such as those within braided river systems. Vegetation comprises all types, including grasses, remnant scrub, shrubs and trees. In some instances, the natural elements and patterns indicate limited vegetation (i.e., high country rivers), where native grasses or herbs are the only form of vegetation in the area. | Proportion of native vegetation against other vegetation. Extent to which river processes have generated natural vegetation patterns. Expert Panel judgement based on REC (LCDB) and aerial photographs to assist in determining vegetation cover. | Judgement based on a five point scale: 1= Complete absence of vegetation due to human-induced changes (or limited presence (in pockets) of exotic vegetation such as occasional willow, gorse or buddleia); 2= Exotic vegetation with complete absence of native species within a pastoral/ semi urban setting; 3= Predominantly exotic vegetation in natural patterns (i.e., willows/ gorse) and/ or patches of remnant indigenous vegetation; 4= Fragmented areas of native and exotic vegetation in natural patterns. Predominance of native vegetation; 5= Overwhelmingly indigenous vegetation with no or few introduced species. | River Environment Classification system (REC), developed by NIWA. (Good) |
| | Extent of exotic flora | Proliferation of exotic flora. | % of exotic vegetation on REC (LCDB). | | |

| ATTRIBUTE CLUSTERS | ATTRIBUTE (primary attributes in bold) | DESCRIPTION OF PRIMARY ATTRIBUTES | INDICATORS | INDICATOR SIGNIFICANCE THRESHOLDS | DATA SOURCES (AND RELIABILITY) |
|---------------------------|--|---|---|--|---|
| | Structures and human modifications in the riparian edge | Include bridges, roads. All potentially impact on the naturalness of a river. An absence of human modifications. However minor, structures particularly if constructed from natural or local materials may not influence natural character greatly, but will have a localised effect. The scale and nature of modifications will influence the effect on natural character. | Expert Panel judgement with potential to base it on LCDP and REC GIS layers. Linear measurement/ Number of structures. | Judgement based on a five-point scale: 1= Major modification to the riparian edge (i.e., dam/ weir/ flood defence structure); 2= Significant parts of the riparian edge have been affected by human intervention (i.e., a suburban/ highly managed agricultural land, including: gravel workings, part-channelisation, marinas); 3= Occasional 'pockets' of human modifications (i.e., a settled rural landscape with bridge/ aqueduct supports, boathouses); 4= Limited human intervention (i.e., occasional bridge/ power pole/ jetty); 5= Overwhelmingly natural with no/ very limited evidence of human interference. | River Environment Classification system (REC), developed by NIWA (good); Aerial photos LCDP. (Good) |
| Wider landscape character | Character modifications | Broader scale landscape modification beyond the immediate river margin, leaching from agricultural land, intensification of land use all impact on natural character. Protected natural areas such as reserves, parks and estates managed by DoC indicate a higher natural character. Catchment modifications if ecologically or visually linked to the waterway. | Expert Panel judgement based on intensification of land use adjacent to river (includes more distant views beyond the river banks). Expert Panel to rank from indigenous bush to urban scenarios. Use of LCDB and Landscape Assessments to inform decision. | Judgement based on a five-point scale: 1= Heavily modified landscape (urban or highly intensive setting) with limited vegetation; 2= Suburban/ highly managed agricultural landscape; 3= Settled pastoral landscape with areas of commercial forestry and pockets of indigenous vegetation; 4= Fragmented indigenous and rural landscape including a few areas of commercial exotic forestry; 5= Overwhelmingly indigenous landscape with no or very little human modification. | District or regional wide Landscape Assessments. (Good) |

Appendix 5

Assessment of indicators by SMARTA criteria

| Indicator | Specific | Measurable | Achievable | Relevant | Timely | Already in use |
|---|----------|--|---|---|--------------------------------|----------------|
| Channel shape | Yes | Expert judgement. Overlay of aerial photos or earlier maps, where available | Potential data available | Known to influence river's naturalness | Potential data available | Not known |
| Degree of modification of flow regime | Yes | Current minimum flow/ natural MALF-would show low flows | Data available for most rivers in proportion to river's use | Known to influence river's naturalness | Data usually already available | Not known |
| Water quality | Yes | Information from councils or others | Potential data available | Known to influence river's naturalness | Data already available | Not known |
| Exotic 'aquatic' flora and fauna within the river channel | Yes | % of native vegetation within 50m buffer from waterway – LCDB | Data available | Known to influence river's naturalness | Data available | Not known |
| Structures and human modifications within the river channel | Yes | Number of structures within waterway (dams) including dams, bridge abutments etc – water allocation resource consents and regional council GIS database available where possible | Councils often hold such data | One main indicator of natural character | Data available | Not known |
| Vegetation cover within the riparian margin | Yes | % of native vegetation within 50m buffer from waterway – LCDB | Data available | One main indicator of natural character | Data available | Not known |
| Structures and human modifications within the riparian margin | Yes | Number of structures along the waterway edges or % of modified banks, e.g., stopbanks – regional council GIS database available? | Councils often hold such data | One main indicator of natural character | Data available | Not known |
| Character modifications | Yes | % of native vegetation in LCDB or REC* | Data available | Known to influence rivers naturalness | Data available | Not known |