



The Natural Character of selected
Marlborough Rivers
and their margins

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This report draws on the findings of the following report:
*'Natural Character: Application of the River Significance Assessment Method to
Marlborough District', part of the River Values Assessment System: Volume 2:
Application to cultural, production and environment values. LEaP Report No. 24B,
Lincoln University, New Zealand:*

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The winding nature of the Wairau River channel and its broad semi-braided river bed. Much of the lower banks of the river are lined by willows and gorse.



The ox-bow lake of Grove Arm in the Wairau Plain

Contents

A	Section A: INTRODUCTION AND STUDY PROCESS	5
	Introduction	6
	Study Process	7
B	Section B: APPLICATION OF THE METHODOLOGY	9
	Definition of Natural Character	10
	Naturalness	10
	Natural Character Values of Rivers and their margins	14
	The River Environment Classification System (REC)	14
	Assessment Criteria	16
C	Section C SELECTED RIVERS & THEIR MARGINS IN THE MARLBOROUGH REGION	23
	Marlborough's Rivers	24
	Wairau River	26
	Awatere River	28
	Rai and Pelorus Rivers	29
	Clarence River	30
	Other Rivers within Marlborough	30
D	Section D: EVALUATION OF SELECTED RIVERS AND THEIR MARGINS	33
	Inventory of Selected Marlborough Rivers	34
E	Section E REFERENCES	47
	References	48
	Websites	48



A landscape photograph showing a wide, flat valley floor with a river winding through it. In the background, a large, rugged mountain range rises under a clear blue sky. The foreground is dominated by a dense thicket of bare, brownish-grey shrubs. A dark grey rectangular box is overlaid on the lower right portion of the image, containing white text.

Section A: INTRODUCTION AND STUDY PROCESS

Introduction

Marlborough District Council (MDC) engaged Boffa Miskell Ltd (BML) to assess selected rivers and their margins in the Marlborough Region under Section 6(a) of the Resource Management Act 1991 (RMA) as part of their review of the natural character aspects of the Regional Policy Statement (RPS), the Marlborough Sounds Resource Management Plan (MSRMP) and the Wairau Awatere Resource Management Plan (WARMP). Section 6 under the RMA concerns 'Matters of National Importance' and Section 6(a) states: *'the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development'*.

Separate to this study, Boffa Miskell led a team of experts from the Department of Conservation (DOC), Landcare Research and Lucas Associates to define and map the Coastal Environment and to undertake a natural character study of that coastal environment. This separate, yet complementary report is entitled 'Natural Character of the Marlborough Coast: Defining

and Mapping the Marlborough Coastal Environment, (2014), Boffa Miskell et al'. Furthermore, MDC have undertaken a further study in relation to wetlands and lakes within the region. Therefore, the natural character relating to the coastal environment, wetlands and lakes within the Marlborough Region do not form part of this study.

There is no statutory requirement for territorial authorities to determine the natural character of a region's or district's rivers (such as the 2010 New Zealand Coastal Policy Statement for the coastal environment). However, MDC was involved in a study in 2009 co-funded by the Foundation for Research Science and Technology (FRST), headed by Ken Hughey of Lincoln University. The FRST study is a nationwide research programme analysing different aspects of river values. The river assessment and FRST study were integrated into the Marlborough Landscape Study 2009, prepared by, BML. As part of this review process the rivers study is now a stand-alone document. The results of this study have not been updated since 2009.

The Emerald Pool, Pelorus River



Study Process

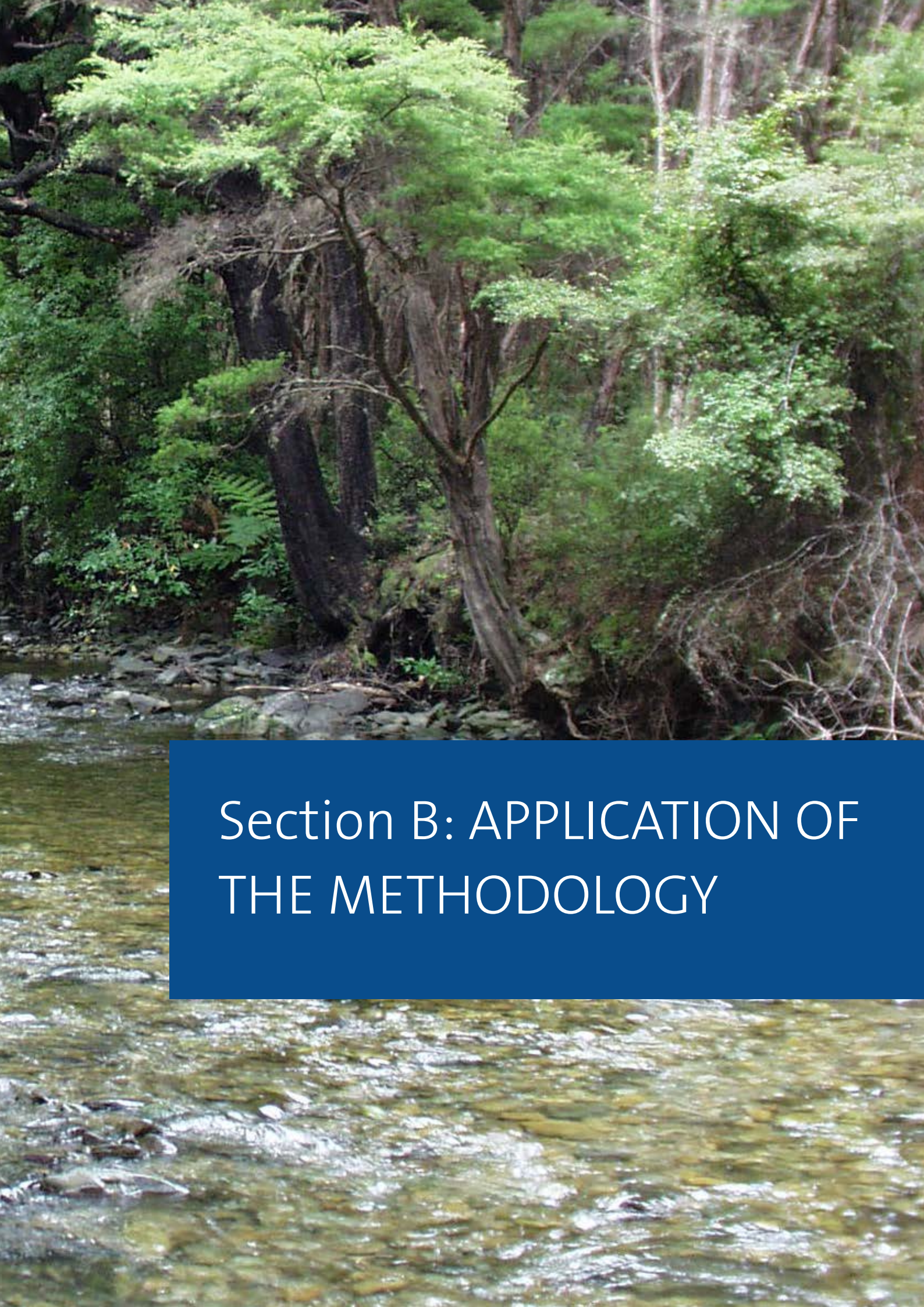
This study was undertaken by an expert panel of people familiar with Marlborough's Rivers. They comprised Neil Deans (Fish and Game Nelson Marlborough Region), Val Wadsworth (MDC's Surface Water Hydrologist), Brin Williman (MDC's Engineer Hydrologist), Pere Hawes (Environmental Policy Team Leader at MDC) and Allan Rackham and James Bentley (Landscape Architects from Boffa Miskell Ltd). This study was peer reviewed by Peter Hamill (MDC Freshwater Ecologist) and Dr. Michael Stevens (Landscape Architect).

The purpose of the study is to provide a case study of how to apply the method for significance assessment of rivers using natural character values in the Marlborough District.

Castle River in the upper Awatere basin





A photograph of a lush green forest with a rocky stream flowing through it. The water is clear and turbulent, splashing over rocks. The trees are dense and vibrant green, with some larger trees in the foreground. The overall scene is a natural, serene landscape.

Section B: APPLICATION OF THE METHODOLOGY

Definition of Natural Character

The environments with the greatest natural character are those with comparatively low levels of human modification and are therefore composed of natural elements appearing in natural patterns and underpinned by natural processes.

Natural character is not defined in the RMA or within other statutory documents, such as the New Zealand Coastal Policy Statement (NZCPS) 2010. There are various working definitions of the concept which are broadly similar and have been used in a number of Environment Court cases. Building on a previous definition from the Ministry for the Environment (MfE), a workshop held by the Department of Conservation confirmed acceptance of the following definition, which is both useful and workable:

Natural Character is the term used to describe the natural elements of all coastal environments. The degree or level of natural character within an environment depends on:

1. *The extent to which the natural elements, patterns and processes occur;*
2. *The nature and extent of modification to the ecosystems and landscape/seascape;*
3. *The degree of natural character is highest where there is least modification;*
4. *The effect of different types of modification upon natural character varies with context and may be perceived differently by different parts of the community'*

Naturalness

The term naturalness has been discussed in numerous Environment Court decisions, including the Long Bay decision, which stated the following definition of 'natural':

The list of criteria of naturalness under section 6(b) of the RMA includes:

- *'relatively unmodified and legible physical landform and relief;*
- *the landscape being uncluttered by structures and/or obvious human influence;*
- *the presence of water (lake, river, sea);*

- *the presence of vegetation (especially native vegetation) and other ecological patterns.'*

'The absence or compromised presence of one or more of these criteria does not mean that the landscape or coastal environment is non-natural, just that it is less natural. There is a spectrum of naturalness from a pristine natural landscape to a cityscape, and a 'cultured nature' landscape may still be an outstanding natural landscape.'

Since the development of the MfE definition, and the 'Long Bay' decision, the NZCPS 2010 has come into effect which states (Policy 13) that natural character may include:

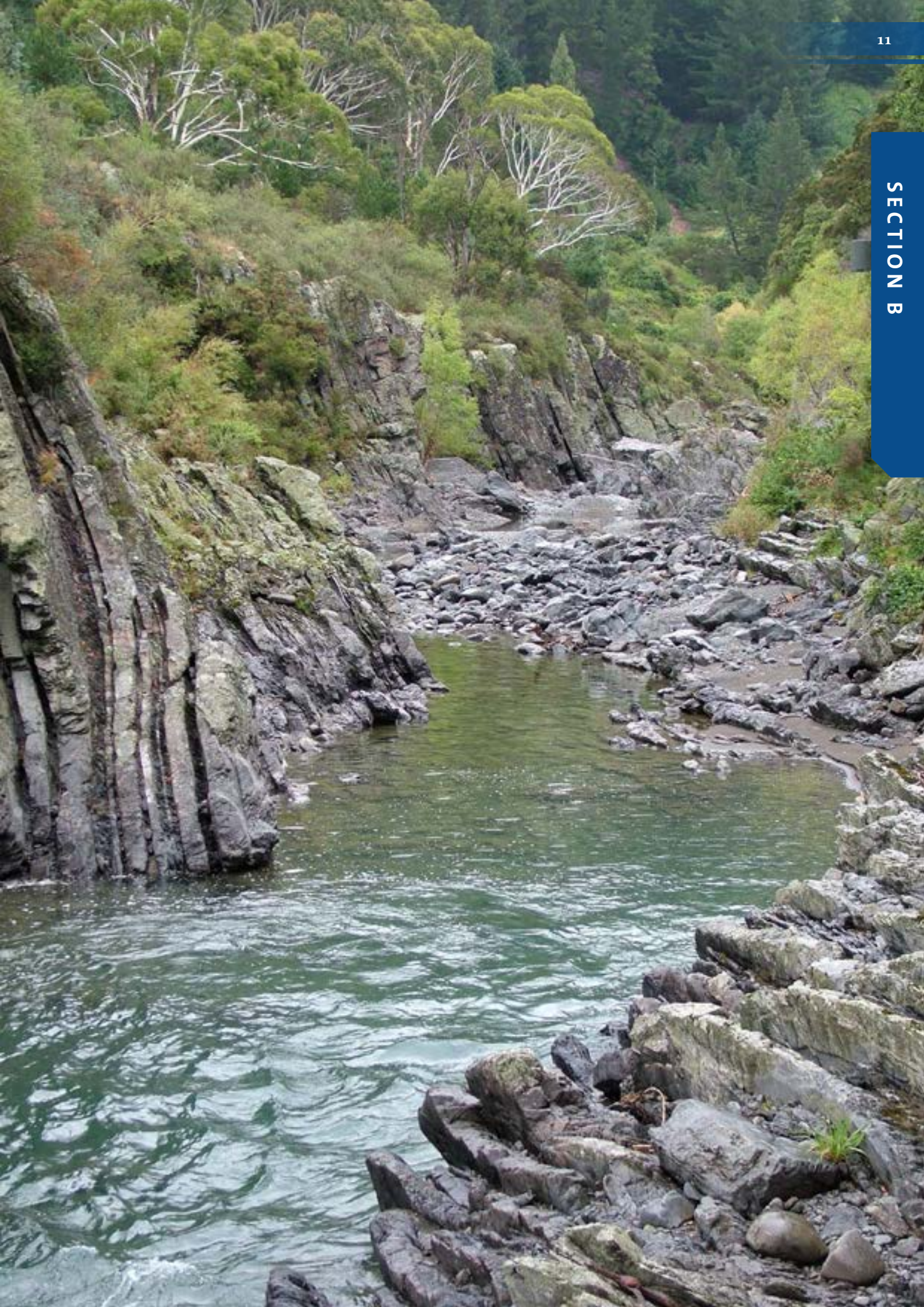
- (a) *natural elements, processes and patterns;*
- (b) *biophysical, ecological, geological and geomorphological aspects;*
- (c) *natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;*
- (d) *the natural movement of water and sediment;*
- (e) *the natural darkness of the night sky;*
- (f) *places or areas that are wild or scenic;*
- (g) *a range of natural character from pristine to modified; and*
- (h) *experiential attributes, including the sounds and smell of the sea; and their context or setting.*

Ecologists often interpret natural character in terms of indigenous attributes, whereas landscape architects take a broader view that can encompass both indigenous and exotic natural attributes. Accordingly, the thresholds may differ and the definition of 'naturalness' may also include:

'A measure of the degree of human modification of a landscape/ seascape or ecosystem expressed in terms of:

- i) *Ecological naturalness (indigenous nature); and*
- ii) *Landscape naturalness (perceptions of nature).'*

Waihopai River (right)



The naturalness concept was recently discussed within the Mackenzie District Plan Change 13 Appeal Decision, where the court restated the principle that perceptions of naturalness under the RMA is a 'cultural construct' and 'vary with the beholder'. Whilst natural science factors are important in the underpinning of the term, they should not be given undue weight at the expense of perceptual and other associative factors. A scale of very high to very low was also provisionally adopted by the court for measuring naturalness.

This construct was also reiterated within the release of the Port Gore mussel farm decision. Here the Judge considered that naturalness 'is an anthropomorphic concept'. The court noted that 'a scale of naturalness of habitats is not (their emphasis) the same as a scale of naturalness of landscapes or natural character of the coastal environment'. This comment was

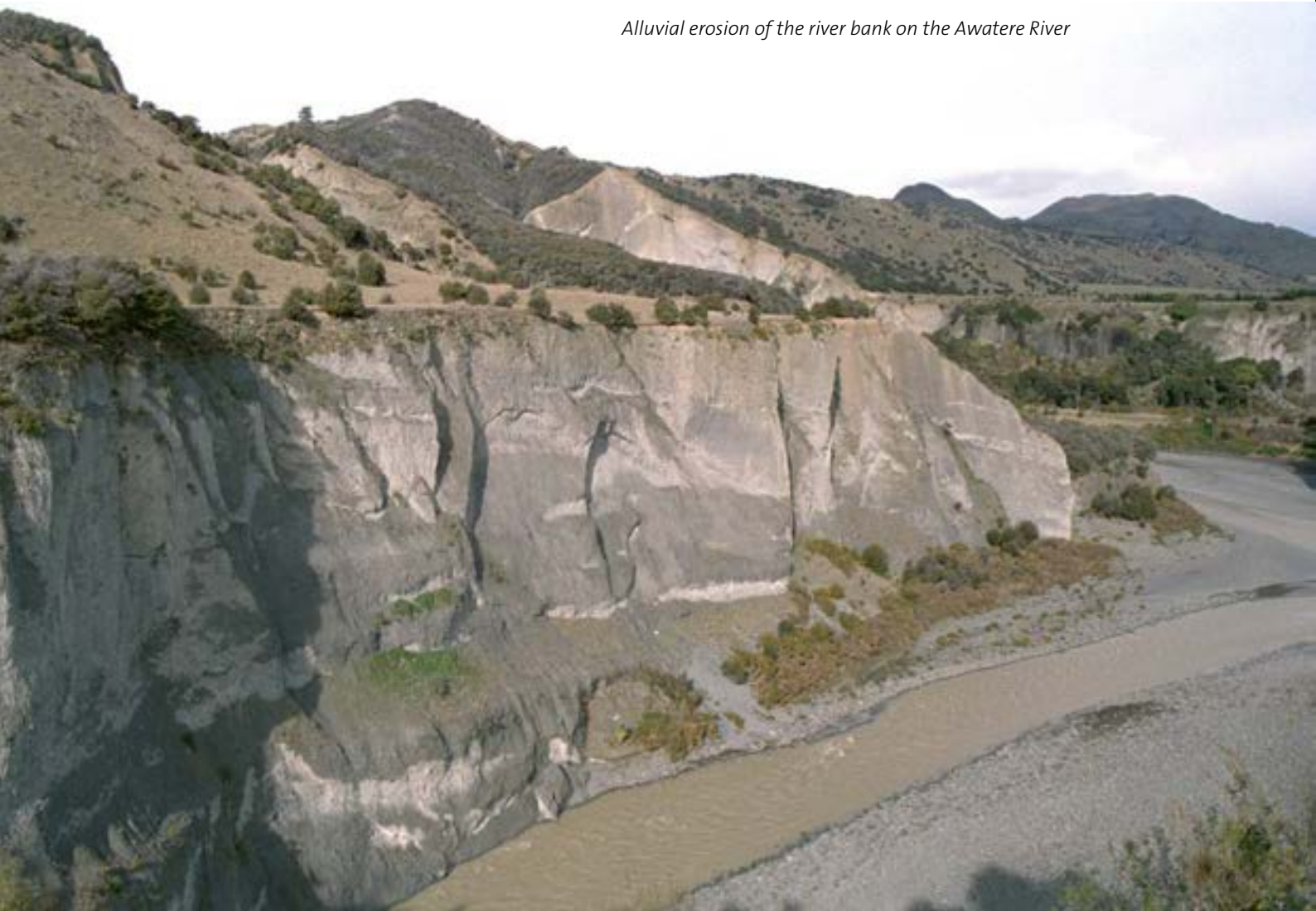
made in relation to a five-point scale used to assess the indigenous naturalness of an area and broadly supports the view that there is a difference between ecological [indigenous] naturalness and landscape [perceived] naturalness. As stated above, the study team consider these to be related and complementary.

Through the series of workshops, participants were able to develop a consistent assessment approach that incorporates landscape and ecological expertise as well as taking into consideration the 'MfE definition', relevant recent case law, and those definitions developed in the NZILA Best Practice Note 2010.

The assessment approach is based upon an agreed interpretation of key terminology, as well as an assessment matrix and evaluation methodology for identifying a range of natural character.

Importantly, the methodology can be adapted to suit different types and scales of rivers and their margins.

Alluvial erosion of the river bank on the Awatere River





Rai Falls on the Rai River

For the purposes of this project, the following key points are noted:

- An understanding of natural character does require the views of terrestrial and freshwater ecologists including other natural scientists, as well as the views of landscape architects and planners;
- That natural character occurs on a modification continuum and describes the expression of natural elements, patterns and processes (or the 'naturalness') in a landscape where the degree of 'naturalness' depends on:
 - The extent to which natural elements, patterns and processes occur and are legible;
 - The nature and extent of human (or cultural) modifications to the landscape, seascape and ecosystems;
 - The fact that the highest degree of natural character (greatest naturalness) occurs where there is least modification/ uncluttered by obvious human influence; and
 - The fact that the degree of natural character is fluid and can change over time.

Natural Character Values of Rivers and their margins

As with the coast, the natural character values of the many rivers, wetlands and lakes in the region formed part of the Study Team's brief for this project. The study team addressed the following:

- 1) the identification of the regions rivers, wetlands and lakes;
- 2) the degree of natural character present and
- 3) the spatial extent of any river, wetland or lake requiring specific preservation or protection.

Not all rivers in the Marlborough Region have been assessed. To narrow down the scope of the exercise, the study team assessed a representative amount of streams and rivers. This included all of Marlborough's highest network order rivers, i.e. those falling within Stream Order 5, 6 and 7 of the River Environment Classification system (REC) as well as a representative cross section of a number of smaller streams and rivers (i.e. orders 2, 3 and 4). This broad cross section ensured that the methodology employed was sound, and would pick up the potential diversity of smaller streams and rivers, for example in the Marlborough Sounds and within the drier mountainous environments in the south of the district.

Due to the length and natural diversity of some rivers (for example the Wairau, Awatere and Pelorus Rivers) these were sub-divided into individual river segments. A number of smaller rivers and streams were also subdivided, to capture the different degrees of natural character from source to river mouth. This meant that the Study Team had a total of 39 rivers and river segments to assess as part of this exercise. This study was undertaken in parallel to a separate study co-

funded by the Foundation for Research Science and Technology (FRST), headed by Ken Hughey of Lincoln University. The FRST study is a nationwide research programme analysing different aspects of river values. These studies (with natural character being attributed to the Marlborough District) has developed significance threshold criteria for comprehensively assessing New Zealand's river values.

Attributes which relate to the natural character of rivers were considered by the Study Team and were broadly clustered around three components of a river's morphology, namely the river channel, the riparian edge and the wider landscape context. All three contribute in determining a river's degree of natural character. This 'grouping' into 'attribute clusters' enabled the study team to focus on particular parts of a river: The following three attribute clusters make up the riverscape:

River Channel: This includes the wetted surface and exposed gravel bars within the active channel, which is regularly covered by freshes and floods.

Riparian Edge: This includes the river banks and floodplains often containing riparian vegetation. Attributes such as extent of exotic and native vegetation present will be considered, as will level of human modification.

Wider Landscape Context: This considered the river in its wider landscape setting and looked at land use and broader geomorphic qualities that contribute to the river's natural character. It is acknowledged that the wider landscape, particularly its land use may be influential to a river's degree of natural character.

The River Environment Classification System (REC)

The REC system essentially groups rivers into classes at a variety of classes and detail. Therefore, rivers of the same class have similar physical, biological and economic values. Specifically, the REC organises information about the physical characteristics of New Zealand's rivers (for example the source of flow for the river water, the geology and climate of the catchment and catchment land cover, e.g. forest, pasture, urban) and maps this information by river segment for New Zealand's river network – over 425 thousand kilometres of river [www.maf.govt.nz]. The consequence of using the REC system for higher order rivers (i.e. orders 5, 6 and 7) will mean that this will not include the rivers' headwaters and upper reaches, with some high order rivers appearing very short on the accompanying map, such as the Spray River for example.

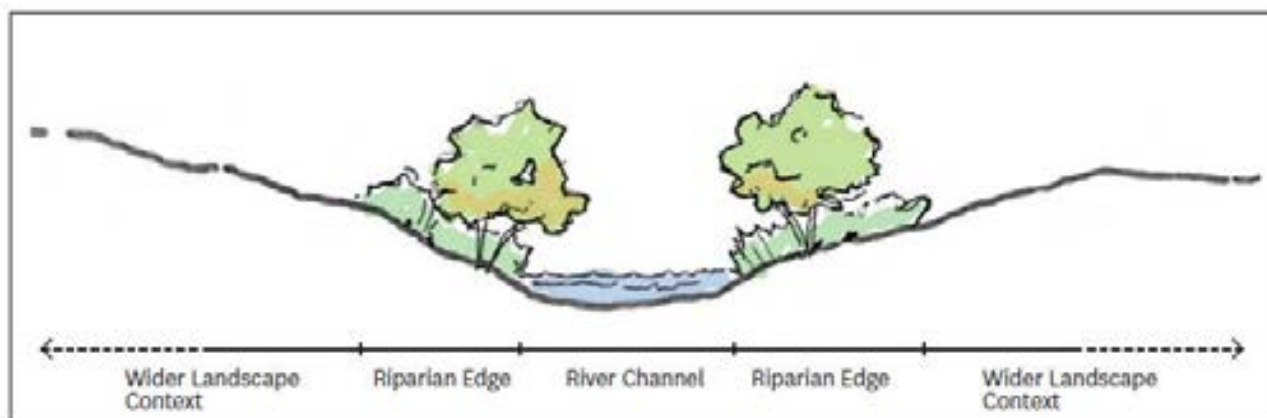


Diagram illustrating the 3 river attribute clusters

To assist the process, eight primary attributes from the above attribute clusters were identified. These are:

River attribute cluster	Primary attribute
River Channel	Channel Shape
	Degree of modification of flow regime
	Water Quality
	Exotic 'aquatic' flora and fauna
	Structures and human modifications
Riparian margin	Vegetation cover
	Structures and human modifications
Wider landscape character	Landscape Character modifications

The study team agreed on a single five-point scale ranking system for all primary attributes.

Scores 5	Scores 4	Scores 3	Scores 2	Scores 1
Very High levels of natural character due to Very Low or no levels of modification	High levels of natural character due to Low levels of modification	Moderate levels of natural character due to moderate levels of modification	Low levels of natural character due to High levels of modification	Very Low levels of natural character due to Very High levels of modification

The five-point scale ranks each primary attribute's degree of natural character on a continuum from (1) heavily modified to (5) overwhelmingly natural, based on natural elements, natural patterns and natural process described earlier. The higher the rating the greater the contribution that specific attribute makes to natural character. A detailed breakdown is contained within Section C of this report.

Due to the natural weighting of attributes within the three river cluster attributes, no further weighting was required. Once 'tallied' up, each river segment or individual river would receive a 'total score'. The highest score a river could receive would be 40, with the lowest being 5. For Marlborough the range extended from 16 and 17 through to 40 This would outline a rivers degree of natural character.

Very High levels of Natural Character = 35-40

High levels of Natural Character =29-34

Moderate levels of Natural Character =23-28

Low levels of Natural Character =17-22

Very Low levels of Natural Character = up to 16

Assessment Criteria

The following outlines the natural character attributes and their thresholds developed and used for this study.



Pelorus River mouth at the estuary with Pelorus Sound

Attribute clusters	Attribute (primary attributes in bold)	Description of Primary Attributes	Indicators	Indicator Significance Thresholds	Data Sources (and reliability)
River Channel	Channel shape	<p>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.</p> <p>Changes to the bed sediment should also be taken account of in this attribute.</p>	<p>Aerial photographs, river cross sections, changes in river width/ length and water allocation resource consents (where available).</p> <p>Judgement from Expert Panel was also required due to limited available data for all rivers.</p>	<p>Judgement made on a five-point scale:</p> <p>1= Very Highly modified river, (i.e. straightened and channelised, often with concrete or rock fill banks) often within an urban context;</p> <p>2= A highly modified channel shape or width but with semi natural reaches or channel shapes in some areas;</p> <p>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;</p> <p>4= A highly natural river displaying occasional pockets or individual minor modifications to its channel shape (i.e. small stopbanks or groynes);</p> <p>5= A very highly natural river with no or very few modifications to its channel shape.</p>	<p>Regional Council, NIWA or other water quality data [i.e. GIS data]. Aerial photography.</p>

Attribute clusters	Attribute (primary attributes in bold)	Description of Primary Attributes	Indicators	Indicator Significance Thresholds	Data Sources (and reliability)
	Degree of modification of flow regime	Hydrological information on a rivers' low, median and mean flows assist in determining natural character. Substantial flow that appears to fit the 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.	Change to natural flow regime. % Flow rate modification (would show low flows). Would need to know the flow data for each river. Expert Panel judgement based on quantitative data available.	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) 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.	Regional Council, NIWA or other water quality data
	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	<i>Table continues overleaf</i>

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. Furthermore, 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>	River Environment Classification system (REC), developed by NIWA,

Attribute clusters	Attribute (primary attributes in bold)	Description of Primary Attributes	Indicators	Indicator Significance Thresholds	Data Sources (and reliability)
	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 modification	<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 agricultural land, including: gravel workings, part-channelisation)</p> <p>3=Occasional 'reaches' of human modifications (i.e. a settled rural landscape with bridge/ aqueduct supports, pylon footing)</p> <p>4= Limited human intervention (i.e. occasional bridge abutments/ power pole within the river channel);</p> <p>5=Overwhelmingly natural with no/ very limited evidence of human interference</p>	Regional and local Council, River Environment Classification system (REC), developed by NIWA.



The boulder-strewn river channel of the Wairau rapids

Attribute clusters	Attribute (primary attributes in bold)	Description of Primary Attributes	Indicators	Indicator Significance Thresholds	Data Sources (and reliability)
Riparian Edge	Vegetation cover in the riparian edge	<p>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.</p> <p>Vegetation comprises all types, including grasses, remnant scrub, shrubs and trees.</p> <p>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.</p>	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.	<p>Judgement based on a five point scale:</p> <p>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);</p> <p>2= Exotic vegetation with complete absence of native species within a pastoral/ semi urban setting;</p> <p>3=Predominantly exotic vegetation in natural patterns (i.e. willows/ gorse) and/ or patches of remnant indigenous vegetation;</p> <p>4= Fragmented areas of native and exotic vegetation in natural patterns. Predominance of native vegetation;</p> <p>5= Overwhelmingly indigenous vegetation with no or few introduced species.</p>	River Environment Classification system (REC), developed by NIWA.
	Extent of exotic flora	Proliferation of exotic flora	% of exotic vegetation on REC (LCDB)		



The riparian edge of the Waihopai River

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/ No. 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/ powerpole/ jetty); 5=Overwhelmingly natural with no/ very limited evidence of human interference	River Environment Classification system (REC), developed by NIWA; Aerial photos
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; 5= Overwhelmingly indigenous landscape with no or very little human modification	District or regional wide Landscape Assessments





Section C: SELECTED RIVERS
& THEIR MARGINS IN THE
MARLBOROUGH REGION

Marlborough's Rivers

The Marlborough Region contains many rivers and streams that have assisted to mould and shape the landscape. The two principal rivers of the Region are the Wairau and Awatere rivers. Other rivers in the region include the Pelorus, Rai, Wakamarina and Kaituna rivers to the north of the Wairau. The Waihopai, Omaka and Leatham Rivers flow into the Wairau from the south. Within the southern high-country, the Acheron and part of the Clarence rivers wend their way through steep terrain, with their confluence north of Hanmer Springs. The Clarence occasionally follows the Region's south-eastern boundary, before it crosses through the Kaikoura District to the sea. The vast majority of the rivers and streams in Marlborough have their headwaters within mountains, namely the Richmond Range and the series of glaciated ranges south of the Wairau. These rivers often have extensive river catchments with their flow regime becoming affected during periods of heavy rain or drought.

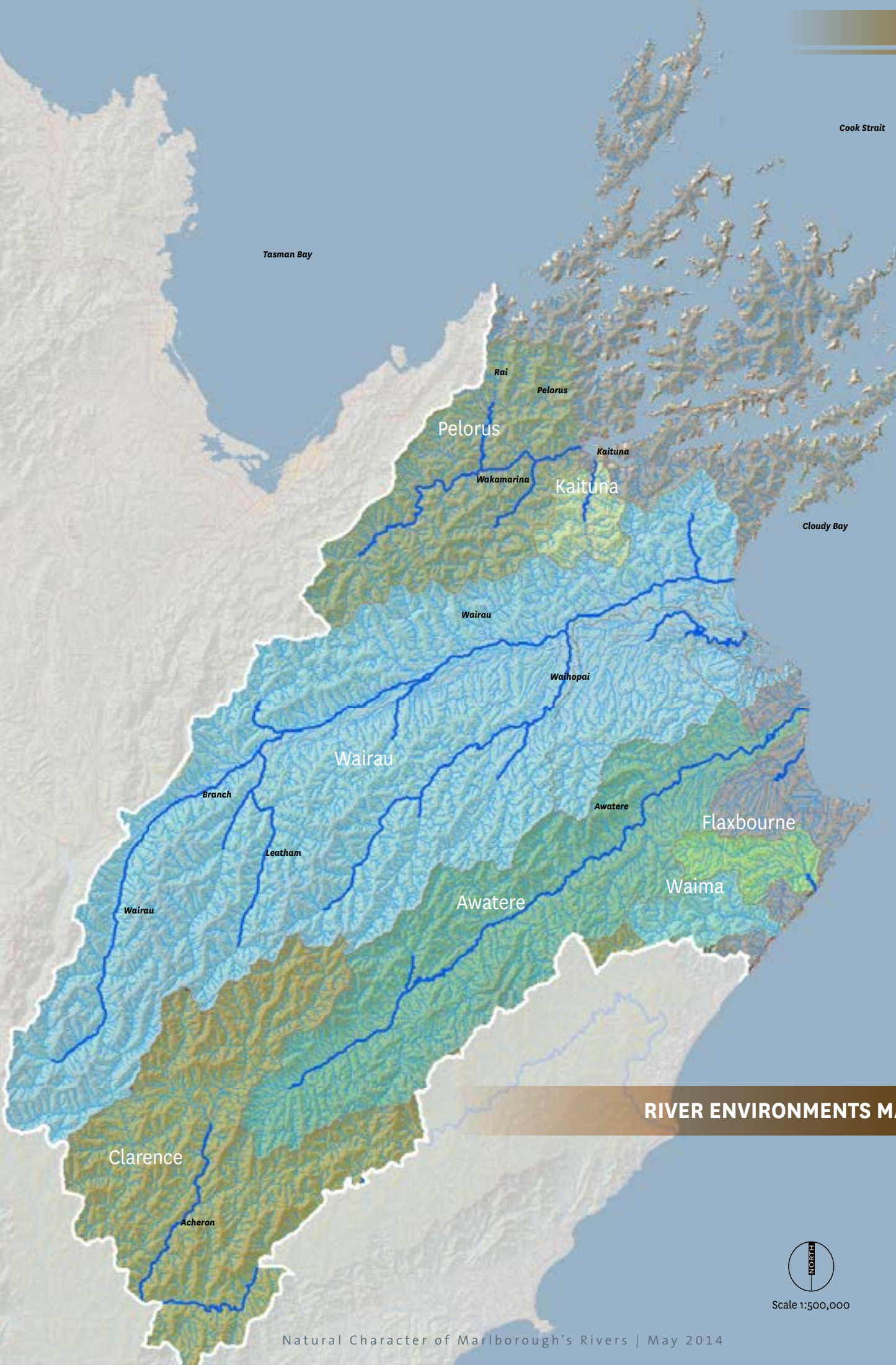
The Wairau, Awatere and parts of the Clarence are braided rivers and have shingle beds and flow bank to bank in high flood. These rivers are the result of glacial action, where the rivers carried sediment from the mountains towards the sea. Through tectonic activity, the rivers have continued to cut through the gravels, creating broad flat-topped river terraces flanking the river valleys. Braiding is a typical riverine feature for the eastern South Island and refers to more or less permanent gravel islands (which are usually covered and often modified in size and shape during severe floods).

There are a number of spring-fed streams and creeks located within Marlborough, such as Spring Creek north of Blenheim in the Wairau plain.

A number of the rivers mentioned above are described in the remainder of this section.



The Pelorus/ Totara Flat



Cook Strait

Tasman Bay

Cloudy Bay

RIVER ENVIRONMENTS MAP



Scale 1:500,000

Wairau River

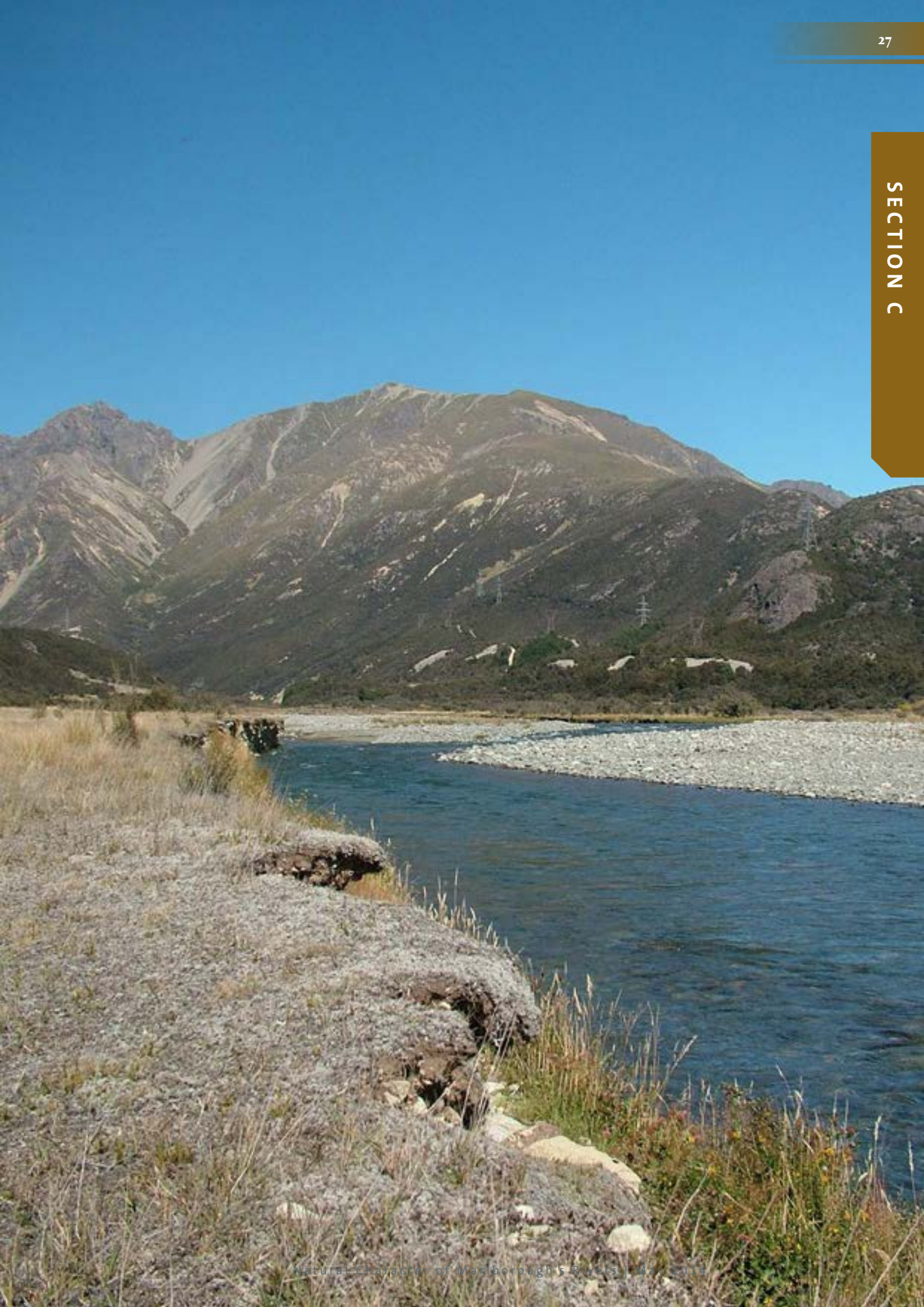
The Wairau, being the longest river within the Region, and the longest braided river in the north of the South Island, occupies for most of its length a broad valley centred along the Alpine Faultline. Several significant tributaries flow into the Wairau throughout its length towards its river mouth at Cloudy Bay, including the Branch and Waihopai Rivers. The Wairau traverses mainly terrace gravels up to within 2km of its mouth and the coast, where it becomes estuarine, with swamps, marshes and beach deposits evident.

Its source is immediately north of Lake Tennyson within the Spencer Mountains and the Molesworth high country, and wends its way northwards through steep and glaciated mountainous terrain, to connect with the Alpine Faultline, south of Tophouse. The vegetation cover in this area has been highly modified, although there are remnant stands of beech evident. From Tophouse, the river widens and turns in an easterly direction, becoming increasingly braided as it continues towards Cloudy Bay and the sea. From the Waihopai River confluence, the river valley broadens significantly into the Wairau plains, where the landscape and river margins have been highly modified. Close to its mouth, the Wairau becomes estuarine, where lagoons and a few isolated wetlands and unmodified watercourses are all that is left of the original mosaic of forest, wetland, shrub and tussockland. The Wairau enters the sea at the Wairau Bar.



Above: The braided nature of the Wairau River immediately west of the Branch River confluence.

Right: The upper Wairau catchment, close to the headwaters of the Wairau River. Numerous small, often ephemeral streams converge in this dry environment draining north, then eastwards towards Cloudy Bay.





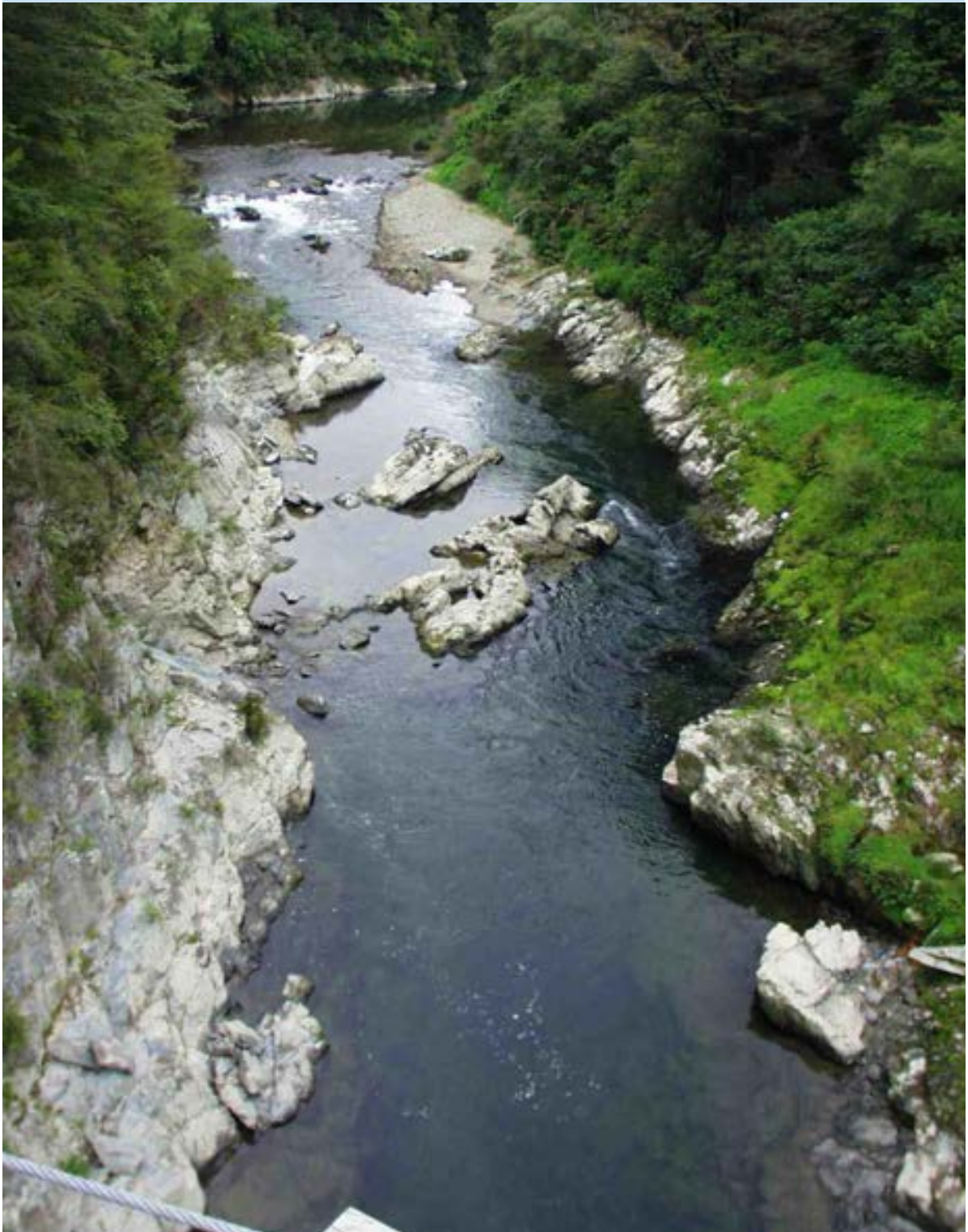
Awatere River mouth at Clifford Bay

Awatere River

Like its sister the Wairau, the Awatere River rises within the high country. The river flows in a north-easterly direction for most of its length parallel to the Inland Kaikoura mountain Range along a filled fault line, a splinter of the Alpine Fault [Marlborough online, Awatere River]. From the 'Jordon', the valley gradually broadens into a series of wide flat alluvial terraces bounded by hills. At the confluence of the Medway River/ Black Birch Stream area with the Awatere, the valley again broadens and the river channel gradually becomes braided. The landscape becomes dominated by farmland and the river increasingly appears more modified than further upstream due to adjacent landuse practices. Within the Seddon area, the Awatere Valley is broad, with the river continuing in its braided form towards Cloudy Bay. The lower river terrace is colonised by exotic vegetation and is highly modified by adjacent vineyard and agricultural landuse activities. The river mouth is affected by coastal processes and alluvial deposits, with the river following a route northwards, behind the beach, before flowing into the sea

Rai and Pelorus Rivers

The Pelorus and Rai Rivers both flow towards Havelock and the Marlborough Sounds. Extensive mudflats are evident around the mouth of the Pelorus River, resulting in an area significant for intertidal and subtidal habitats. The Pelorus River's source is high within the Richmond Ranges where the river flows in a northerly direction towards Pelorus Sound through predominantly indigenous bush. The Rai River flows southwards from the river catchments south of the Bryant Range and converges with the Pelorus River at Pelorus Bridge. At this convergence point, the river flows through predominantly agricultural land eastwards towards Havelock.



The Rai River

Clarence River

The Clarence River occupies a relatively large catchment, although only a small portion of its 125km length is contained within the Region. The Clarence River, located within the mountainous south of the Region, rises on the eastern slopes of the Spencer Mountains in the neighbouring Canterbury region and as it flows seawards it acts, for a short distance, as the Districts south-eastern boundary, most notably along Molesworth. Although the Clarence River only occupies approximately 29 linear kilometres within the Marlborough District, its catchment extends a significant distance northwards into the Region, where it joins with the Wairau and Awatere river catchments.



Above: The Waima River mouth

Right: The Clarence River close to the junction with Palmer Stream, on the Marlborough/ Canterbury border

Other Rivers within Marlborough

Due to their physical form, the Marlborough Sounds have limited drainage basins, with the majority being streams. The longest can be found radiating out from Mount Stokes with many containing very high levels of natural character due to the surrounding indigenous biodiversity values.

Of those rivers that flow into the Wairau, the Branch River has a peak flow of 1800 cumecs. Its lower reaches power Marlborough's largest power generation plant, the Branch Hydro Scheme. The Goulter River, another river that flows into the Wairau is distinctly different to the Branch River, where its flows are moderated by the landslide filled Lake Challice within the Richmond Ranges.

Further south and located a few kilometres south of Ward, the Waima or Ure River traverses predominantly through limestone country, where the river has carved out dramatic and interesting cliffs, gorges and features. A small tributary to the Waima, Isolation Creek has formed Sawcut Gorge, a dramatic limestone narrow cleft in the mountainside, only a few metres wide [Marlborough Online, Waima/Ure River]





An aerial photograph of a river delta system, showing a large river on the left that branches out into a complex network of smaller channels and distributaries. The landscape is a mix of green vegetation, brownish soil, and light-colored sandbars. A large, semi-transparent white text box is overlaid on the lower right portion of the image.

Section D: EVALUATION OF
SELECTED RIVERS AND THEIR
MARGINS

Inventory of Selected Marlborough Rivers

Each of the selected 39 river's analysis and evaluation is presented over the next few pages:

No. 1: UPPER PELORUS		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	5
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		38

No. 2: LOWER PELORUS		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	4
	Water Quality	3
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	2
TOTAL		28

Legend

Natural Character Values

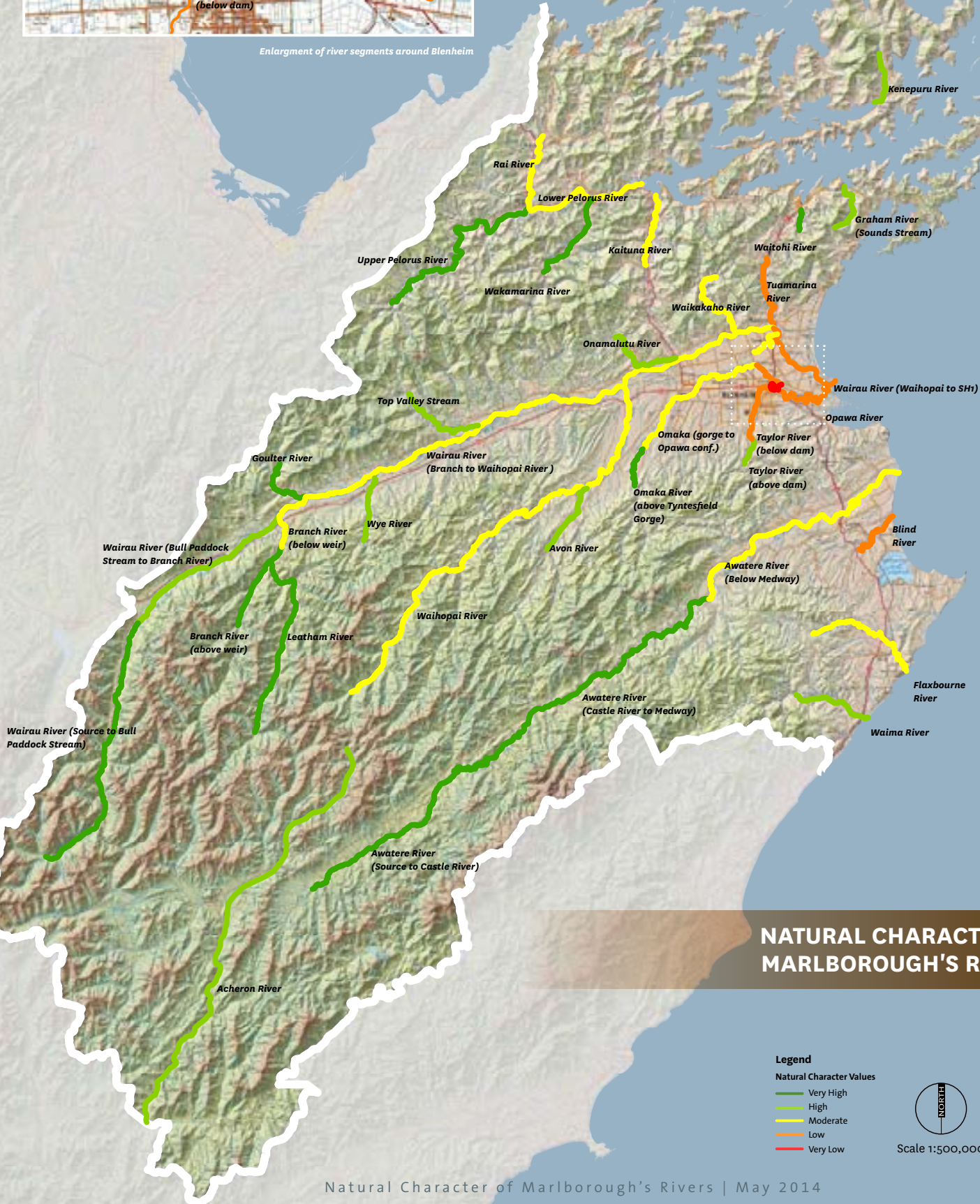
— Very High — Moderate — Very Low
— High — Low



The upper Pelorus River



Enlargement of river segments around Blenheim



NATURAL CHARACTER OF MARLBOROUGH'S RIVERS

- Legend**
Natural Character Values
- Very High
 - High
 - Moderate
 - Low
 - Very Low



Scale 1:500,000

No. 3: RAI		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	3
	Water Quality	2
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	2
TOTAL		24

No. 5: KAITUNA		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	4
	Water Quality	2
	Exotic 'aquatic' flora and fauna	3
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	2
TOTAL		23

No. 4: WAKAMARINA		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	4
Riparian margin	Vegetation cover	5
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		36

No. 6: KENEPURU		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		34



Rai Falls on the Rai River

No. 7: GRAHAMS RIVER (SOUNDS STREAM)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		33

No. 9: TUAMARINA		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	2
	Degree of modification of flow regime	3
	Water Quality	2
	Exotic 'aquatic' flora and fauna	2
	Structures and human modifications	2
Riparian margin	Vegetation cover	2
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		17

No. 8: WAITOHI (EXCL URBAN PICTON)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	3
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	3
Riparian margin	Vegetation cover	5
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	5
TOTAL		35

No. 10: WAIRAU (SOURCE TO BULL Paddock STREAM)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		37



The upper Wairau River

No. 11: WAIRAU (BULL PADDOCK STREAM TO BRANCH RIVER)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	4
	Water Quality	5
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		32

No. 13: WAIRAU (WAIHOPAI TO SH1)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	3
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	2
Riparian margin	Vegetation cover	3
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		23

No. 12: WAIRAU (BRANCH TO WAIHOPAI)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	3
	Water Quality	5
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		28

No. 14: WAIRAU (SH1 TO RIVER MOUTH)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	1
	Water Quality	3
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		22



No. 15: BRANCH (ABOVE WEIR)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	5
	Structures and human modifications	5
Wider landscape character	Landscape Character modifications	3
TOTAL		38

No. 17: WYE		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	4
TOTAL		34

No. 16: BRANCH (BELOW WEIR)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	1
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	3
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		28

No. 18: LEATHAM		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	5
	Structures and human modifications	5
Wider landscape character	Landscape Character modifications	4
TOTAL		39

Below: The north bank of the Wairau River



No. 19: WAIHOPAI		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	2
	Degree of modification of flow regime	2
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		25

No. 21: GOULTER		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	5
	Structures and human modifications	5
Wider landscape character	Landscape Character modifications	5
TOTAL		40

No. 20: AVON		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		34

No. 22: TOP VALLEY		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		33



The Waihopai River

No. 23: ONAMALUTU		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	3
TOTAL		32

No. 25: OMAKA (ABOVE TYNTESFIELD GORGE)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		36

No. 24: WAIKAKAHO		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	4
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	3
TOTAL		28

No. 26: OMAKA (GORGE TO OPAWA CONF)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	4
	Water Quality	4
	Exotic 'aquatic' flora and fauna	3
	Structures and human modifications	3
Riparian margin	Vegetation cover	2
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		23

No. 27: OPAWA (OMAKA CONFLUENCE TO ROSES OVERFLOW)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	1
	Water Quality	4
	Exotic 'aquatic' flora and fauna	3
	Structures and human modifications	4
Riparian margin	Vegetation cover	2
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		21

No. 29: OPAWA LOOP		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	1
	Water Quality	3
	Exotic 'aquatic' flora and fauna	1
	Structures and human modifications	2
Riparian margin	Vegetation cover	2
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		16

No. 28: OPAWA (LOWER, BELOW BLENHEIM)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	3
	Degree of modification of flow regime	2
	Water Quality	2
	Exotic 'aquatic' flora and fauna	1
	Structures and human modifications	4
Riparian margin	Vegetation cover	2
	Structures and human modifications	3
Wider landscape character	Landscape Character modifications	3
TOTAL		20

No. 30: SPRING CREEK		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	4
	Water Quality	4
	Exotic 'aquatic' flora and fauna	2
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	3
TOTAL		25



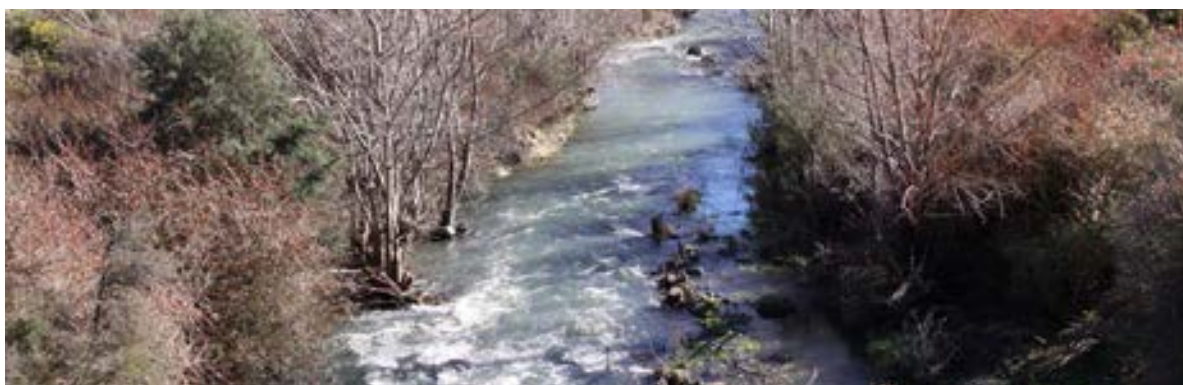
The Awatere River

No. 31: TAYLOR RIVER (ABOVE DAM)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	4
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		30

No. 33: AWATERE (SOURCE TO CASTLE RIVER)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	5
	Exotic 'aquatic' flora and fauna	5
	Structures and human modifications	5
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		37

No. 32: TAYLOR RIVER (DAM TO OPAWA CONFL)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	1
	Degree of modification of flow regime	4
	Water Quality	3
	Exotic 'aquatic' flora and fauna	2
	Structures and human modifications	2
Riparian margin	Vegetation cover	3
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		19

No. 34: AWATERE (CASTLE RIVER TO MEDWAY)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	5
Riparian margin	Vegetation cover	4
	Structures and human modifications	5
Wider landscape character	Landscape Character modifications	4
TOTAL		36



The Taylor River

No. 35: AWATERE (BELOW MEDWAY)		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	3
	Water Quality	4
	Exotic 'aquatic' flora and fauna	2
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		26

No. 37: BLIND RIVER		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	2
	Degree of modification of flow regime	2
	Water Quality	3
	Exotic 'aquatic' flora and fauna	3
	Structures and human modifications	3
Riparian margin	Vegetation cover	2
	Structures and human modifications	2
Wider landscape character	Landscape Character modifications	2
TOTAL		19

No. 36: FLAXBOURNE		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	3
	Water Quality	3
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	3
Riparian margin	Vegetation cover	3
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	3
TOTAL		27

No. 38: WAIMA RIVER		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	4
	Degree of modification of flow regime	4
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		32

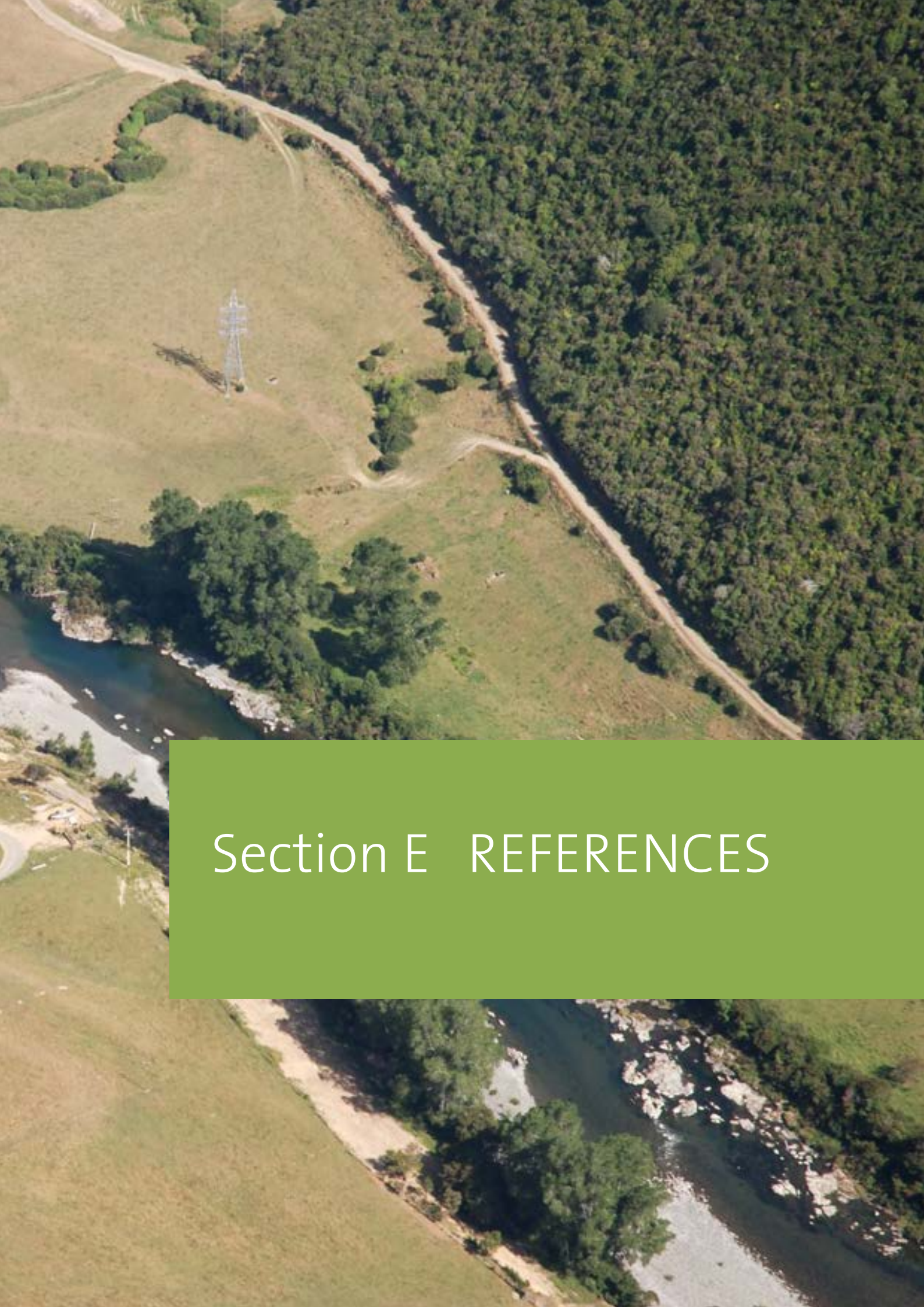


No. 39: ACHERON RIVER		
Attribute cluster	Primary attribute	Rating
River Channel	Channel Shape	5
	Degree of modification of flow regime	5
	Water Quality	4
	Exotic 'aquatic' flora and fauna	4
	Structures and human modifications	4
Riparian margin	Vegetation cover	4
	Structures and human modifications	4
Wider landscape character	Landscape Character modifications	4
TOTAL		34

Below: The Acheron River, Molesworth







Section E REFERENCES

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Below: Rapids of the Wairau River.