

An aerial photograph of a coastal landscape. In the foreground, there are rolling hills covered in dry, golden-brown grass. A winding road or path is visible on the slopes. In the middle ground, a small bay or inlet is filled with clear, turquoise water, bordered by a dense forest of evergreen trees. The background features a large, calm body of water, likely a bay or fjord, surrounded by more hills and mountains under a hazy, overcast sky.

Section B **STUDY APPROACH**

Study Approach

In this section, the key components of the study methodology are outlined. The NZCPS 2010 and RMA contexts and the interpretation of relevant policies for the purposes of this study are discussed. Technical aspects are explained, including the use of the land systems approach, the scales at which the study was undertaken, the approach to natural character evaluation, digital mapping and the use of the New Zealand landcover database.

Understanding the Coastal Environment

The extent of the coastal environment shown in this study is essentially to determine a management line for the Marlborough District Council to use in managing Marlborough's coasts. It should be noted that, in some places, the landward extent of the coastal environment may be different than that identified in this study, for example through evaluation at a finer scale or following natural coastline modification.

RMA/NZCPS Context

The RMA 1991 does not define 'coastal environment', however, its extent needs to be considered in order to respond to Policy 1 of the NZCPS 2010, which recognises that the extent and characteristics of the coastal environment will vary from location to location and identifies nine characteristics which are included in the coastal environment:

- "a) *the coastal marine area;*
- b) *islands within the coastal marine area;*
- c) *areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, salt marshes, coastal wetlands, and the margins of these;*
- d) *areas at risk from coastal hazards;*
- e) *coastal vegetation and the habitat of indigenous coastal species including migratory birds;*
- f) *elements and features that contribute to the natural character, landscape, visual qualities or amenity values;*
- g) *items of cultural and historic heritage in the coastal marine area or on the coast;*

- h) *inter-related coastal marine and terrestrial systems, including the intertidal zone; and*
- i) *physical resources and built facilities, including infrastructure, that have modified the coastal environment."*

(Study Team emphasis - refer to 'Method')

The above list of characteristics has assisted in some way in defining what is included within the coastal environment. However, the list is not absolute and does not provide an answer on how to define the landward extent of this environment, particularly as there are 'grey areas' in relation to many of the characteristics that make it difficult to draw a 'hard line'. DOC has provided guidance material (2012) on implementing NZCPS Policy 1, which reflects best practice. Environment Court decisions to date have also assisted the study team form an overall judgement as to the extent of the coastal environment within Marlborough.

The DOC guidance note on Policy 1 outlines under its 'origins of the policy' several influential Environment Court decisions that have guided practitioners and decision makers to determine the inland extent of the coastal environment. In the case *Mainpower NZ Ltd v Hurunui District Council* in 2011, the Environment Court found a number of factors that were important in defining the landward extent of the coastal environment:

"[320] ...where a dominant ridge maybe a useful means to identify a coastal environment boundary, such a boundary should be relevant to the coastline and coastal environment. There is no necessity to identify a dominant ridge in each case, particularly one that may be kilometres away from the coast.

[321] ...By contending that the coastal environment has an extreme reach, we are concerned that attention could be drawn from the importance of the coastline and derogate from the focus of section 6(a)."

Method

The methodology used for this study recognises that the coastal environment is a dynamic system where the inland influence of coastal elements and processes on the environment gradually decreases with distance.

In applying the methodology, the study team addressed all the characteristics of the coastal environment listed in NZCPS 2010 Policy 1(2) (see above) but gave particular consideration to “*where coastal processes, influences or qualities are significant*”.

The term ‘significant’ is not defined in the NZCPS 2010 but, in the context of its Policy 1(2)(c), the study team have interpreted the term ‘significant’ to mean “*sufficiently great or important to be worthy of attention; noteworthy*”, as outlined within the Oxford English Dictionary.

The seaward extent of the coastal environment extends 12 nautical miles from MHWS (Mean High Water Springs) and is easy to define.

Identifying a landward extent of Marlborough's coastal environment has relied on relevant and accessible data available to inform judgements. Future changes resulting from climate change are predicted to have significant consequences for Marlborough's coastal environment and its natural character but those potential changes are not covered in this report.

The study team also used, as an essential source of information, its own professional knowledge and judgement in relation to the characteristics outlined within Policy 1 of the NZCPS 2010 and the DOC guidance of 2012. The Marlborough Landscape Study (2009) also provided additional information, particularly relating to cultural and historic aspects. There has as yet been no direct cultural input for this study. All benthic/bathymetry and ecological/ physical data were recorded by DOC, Lucas Associates and Landcare Research.

The Coastal Environment - Zones of Significance

The Marlborough coastline is one of the longest in New Zealand and is geomorphologically diverse. The north and south are very different. The northern area is the drowned valley system of the **Marlborough Sounds**, where the intricate coastline of slender peninsulas, islands and indented waterways, with its diverse range of ecosystems, geology, climate and biota, is

wholly contained within the coastal environment. The southern area is the coastline of **South Marlborough**, which includes the large Wairau lagoons and old stone fields, white limestone cliffs and stacks, and extends from Rarangi in the north to the region's southern boundary on the Kekerengu coast.

Boffa Miskell, Lucas Associates and DOC have developed the following Zones of Significance framework to apply to the Marlborough coastline to determine the extent of the Coastal Environment, as interpreted under Policy 1 of the NZCPS 2010. As illustrated overleaf, the framework interprets the Coastal Environment to contain the following zones of significance that, collectively, are called the Coastal Landscape:

- Zones A and B (the coastal marine area and the coastal significance zone), which make up the Coastal Environment, and
- Zone C the Coastal Context.

Figure 1, overleaf, illustrates the extent of the zones and the Coastal Environment at the local scale in two very different types of coastal areas: one a steep coastal area and the second a flat coastal area. The diagram illustrates that the character and extent of the coastal environment is determined by a range of landform, land type, topography and other influencing factors. It is in a constant state of change. A description of this diagram is contained within Table 1 on page 8.

Representations of the range of coastal environments in Marlborough are illustrated in Figure 2 (pages 10 & 11). The steep and precipitous cliffs of the White Bluffs are in stark contrast to the low gravel ridges of Rarangi in the Wairau Plain. These different coastal environment settings hold a range of different values, determined by a host of abiotic, biotic and experiential/ cultural/ heritage factors.

Map 1 on page 12 illustrates the known extent of the coastal environment. The Marlborough Sounds is quite unlike any other landform in New Zealand, due to its extensive coastline and varied topography. The diverse range of biophysical and experiential characteristics in the Sounds all possess strong maritime influences. Consequently, it was agreed through workshop discussions, that the entire Marlborough Sounds should be contained within the coastal environment, which includes urban areas.

Table 1: Zones of significance within the coastal environment and coastal landscape.

COASTAL ENVIRONMENT	Zone A	This zone includes the Coastal Marine Area (CMA) . Within the statutory context the CMA means the foreshore, seabed and coastal water and the air above the water to twelve nautical miles (or the territorial sea boundary.) Inland, the CMA extends to the mean high water spring (MHWS). The CMA includes the rock beach, coastal lagoons and lakes below MHWS. The CMA extends approximately 1km upstream a river or to a point that is calculated by multiplying the width of the river mouth by five.	COASTAL LANDSCAPE
	Zone B	The Coastal Significance Zone includes the Active Coastal Interface (land above MHWS) and generally includes land up to the summit of the first coastal ridge/ crest or escarpment (with the width of this zone varying depending on the topographic environment). The Active Coastal Interface (ACI) is generally a slender component of the Coastal Significance Zone, where the sea is the dominant element and the primary or significant influence on landform, vegetation and peoples's perception. This zone is where coastal processes are significant and may include cliffs, modified dune lands, farm land, settlements and coastal forests. For the purposes of the natural character study this zone is known as the Coastal Terrestrial Area.	
	Zone C	Coastal Context. This area is where coastal elements, patterns and processes influence the coastal landscape. It would include old back developed dune ridges that no longer exhibit significant coastal processes, coastal plains, and hill-slopes. This zone generally extends inland from Zone B to where coastal influences are barely discernable. Some activities occurring within this zone can significantly affect the coastal environment (Zones A and B), either experientially or physically, to varying degrees. The inland extent of Zone C has not been mapped, as it currently falls outside of the Coastal Environment.	



Above: The Wairau River Diversion drains into Cloudy Bay shortly south of Tuamarina. The extent of the coastal environment in this flat landscape is often difficult to determine, so the significance of the coastal elements, patterns and processes within this modified coastal landscape are examined and an overall judgement reached. The extent crosses mid-way across the Wairau River Diversion, approximately 900 metres from the mean high water spring mark, as illustrated by the red line above.

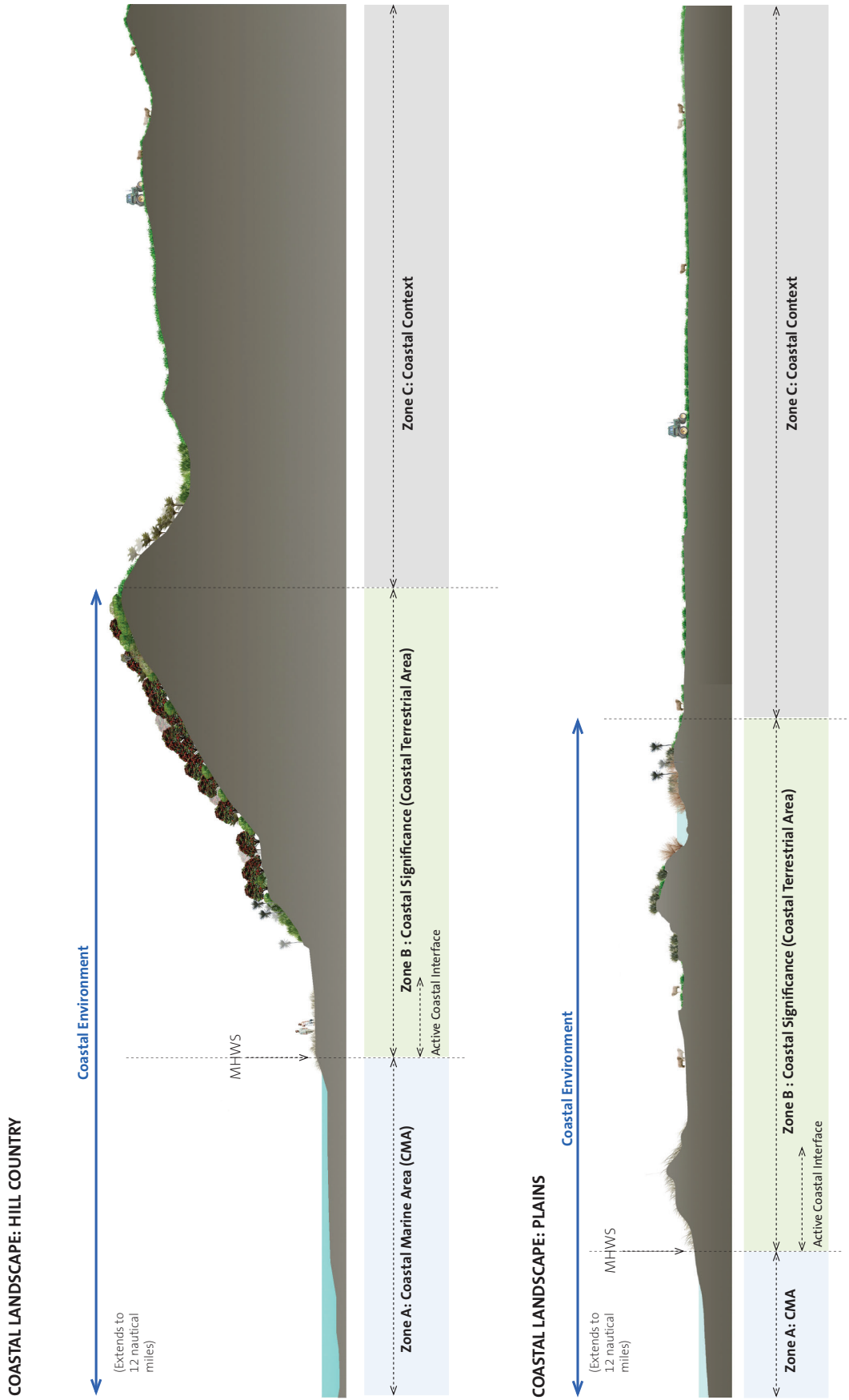
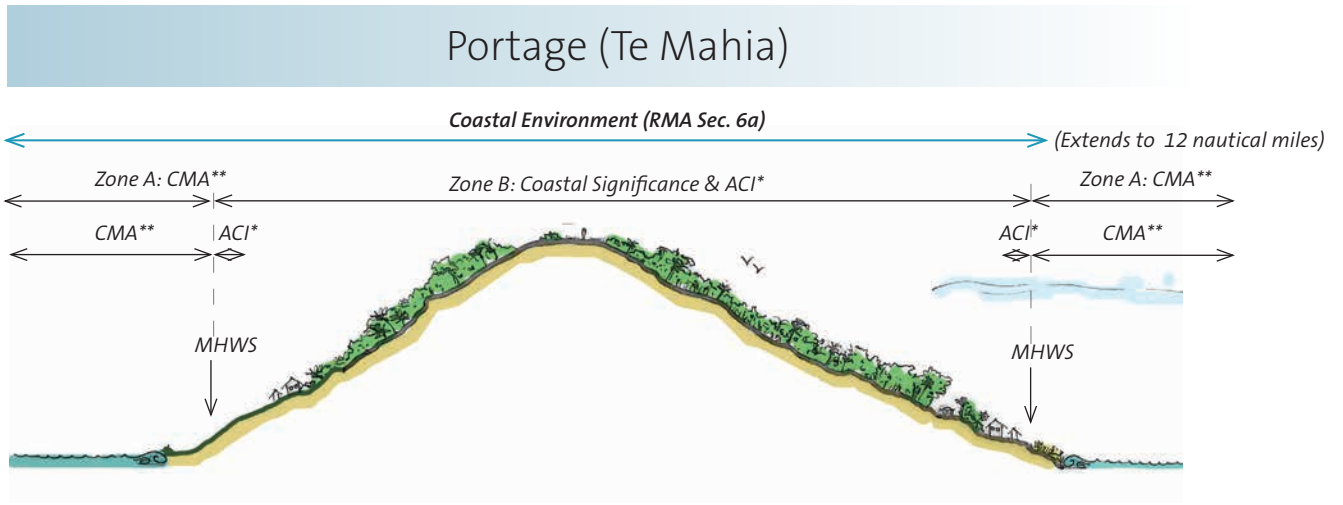
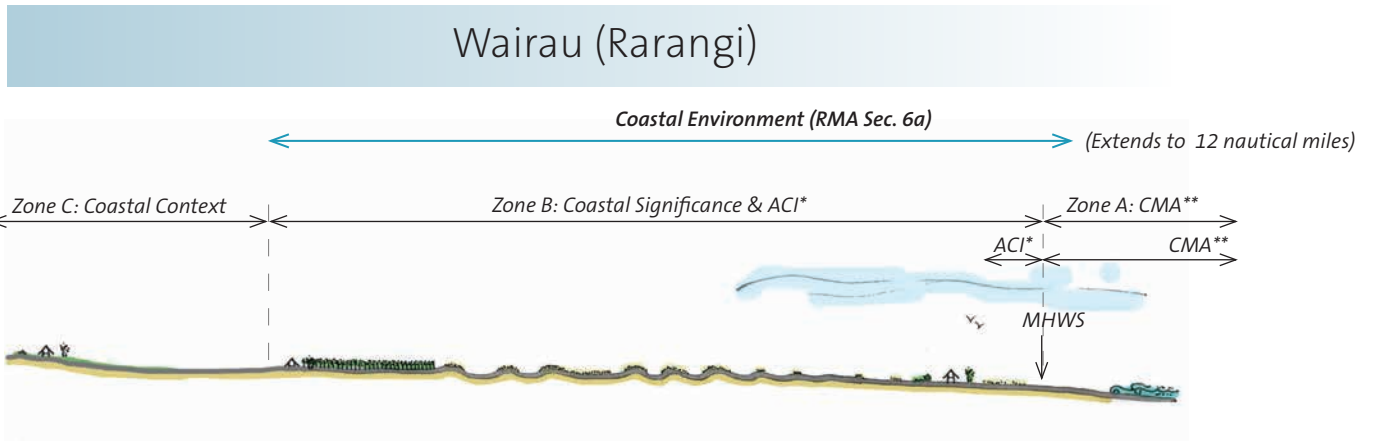


Figure 1: Diagram of the Coastal Environment

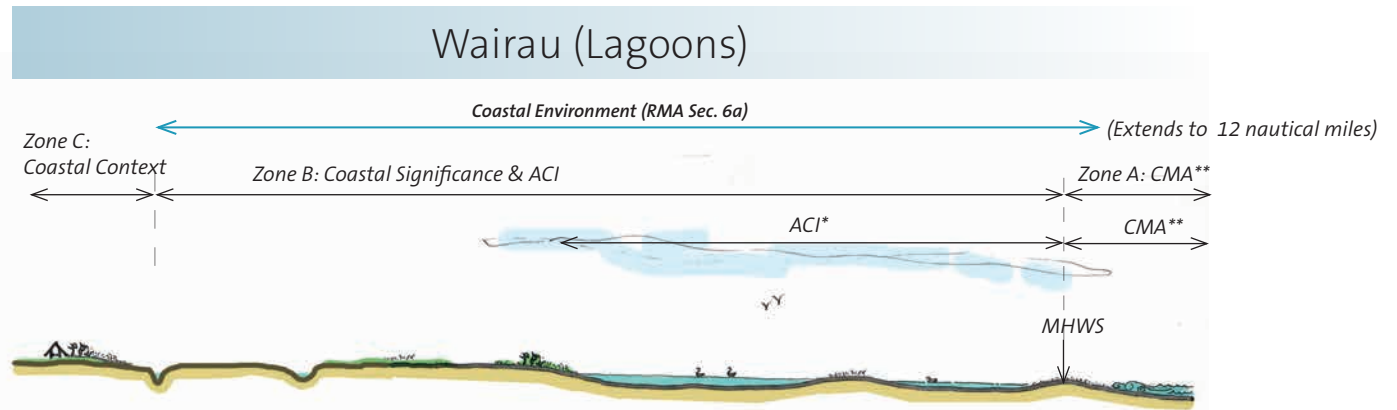
Figure 2: The Range of Coastal Environments in Marlborough



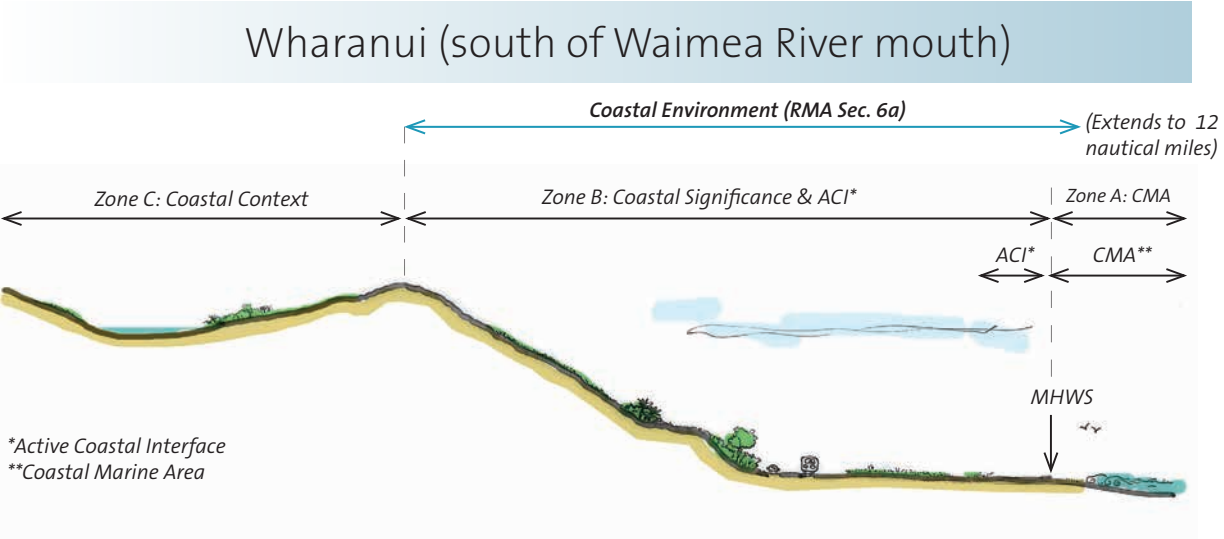
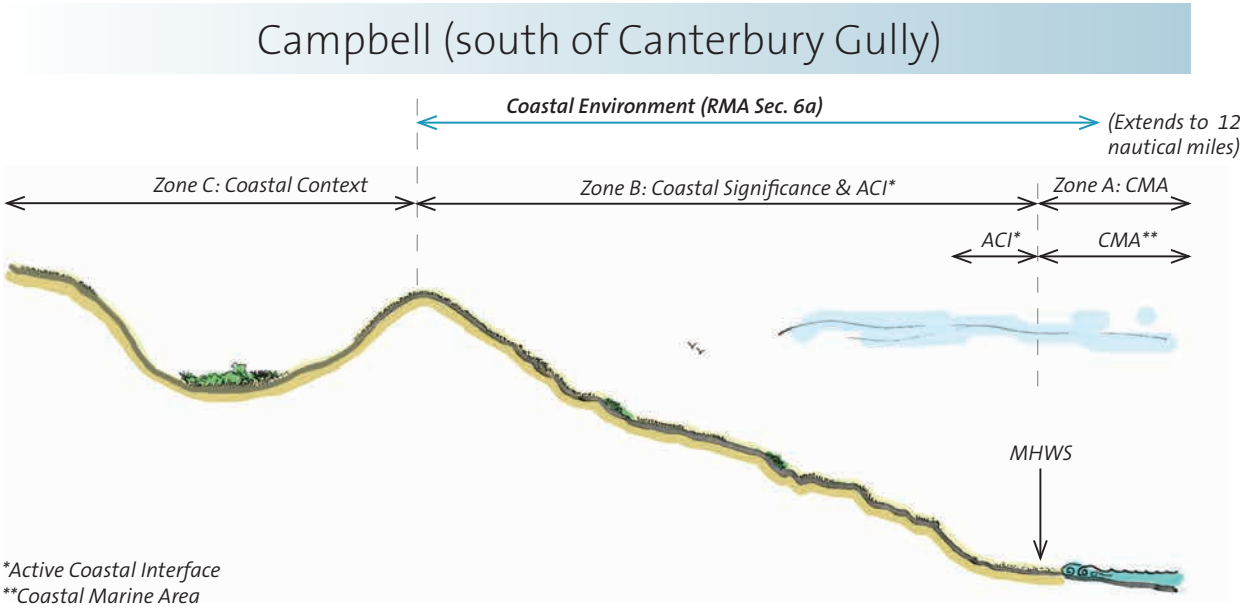
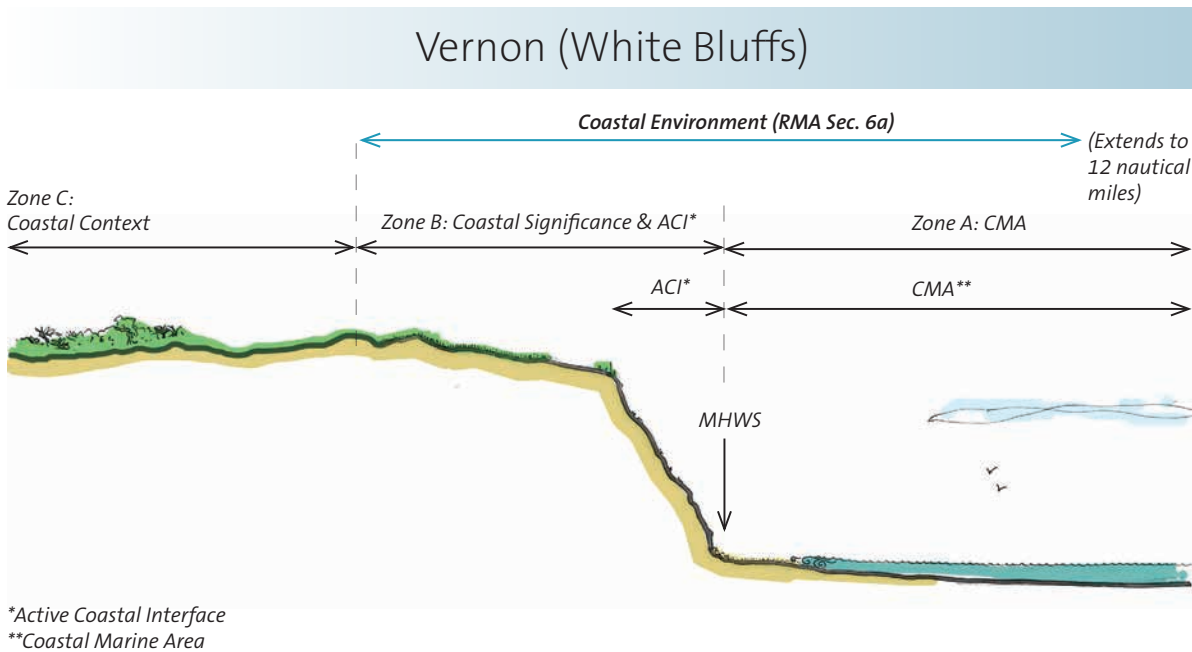
*Active Coastal Interface
 **Coastal Marine Area

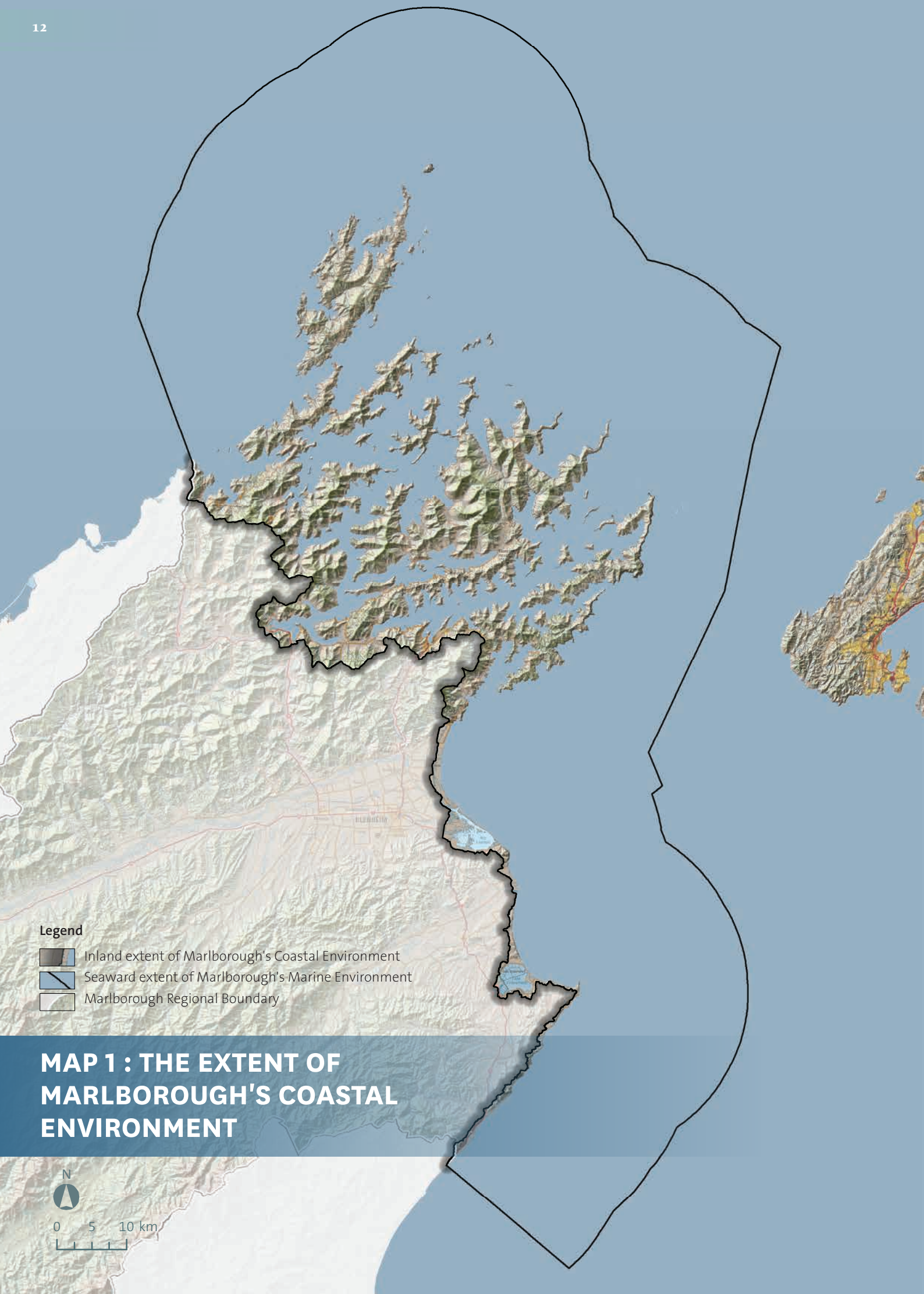


*Active Coastal Interface
 **Coastal Marine Area






*Active Coastal Interface
 **Coastal Marine Area





Legend

-  Inland extent of Marlborough's Coastal Environment
-  Seaward extent of Marlborough's Marine Environment
-  Marlborough Regional Boundary

MAP 1 : THE EXTENT OF MARLBOROUGH'S COASTAL ENVIRONMENT



Coastal Natural Character

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 in the 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. In light of the NZCPS 2010, the definition was discussed at a workshop in August 2011, the first of two convened by DOC in 2011 to provide guidance on policies 1, 13 and 14 in the NZCPS. At this workshop, landscape architects, DOC and local authority personnel, and other environmental practitioners discussed and debated use of the term and its origins. Building on a previous definition from the Ministry for the Environment (MfE), the workshop confirmed the following definition, finding it 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 processes¹ occur; and*
2. *the nature and extent of modification to the ecosystems and landscape/seascape.*

The degree of natural character is highest where there is least modification.

The effect of different types of modification upon natural character varies with context and may be perceived differently by different parts of the community".²

Naturalness

The term 'naturalness' has been discussed in numerous

- 1 *For the purposes of interpreting the NZCPS 2010 Policy 13.2, 'elements, patterns and processes' means: biophysical, ecological, geological and geomorphological aspects; natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks; and the natural movement of water and sediment.*
- 2 *NZCPS 2010 Guidance Note Policy 13: Preservation of natural character, Department of Conservation, page 11*

Environment Court decisions, including the Long Bay decision (A078/2008), which stated the following regarding the term 'natural':

"The absence or compromised presence of one or more of these criteria [below] 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."

- *"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."*

Since this decision, the NZCPS 2010 has come into effect, stating (Policy 13) that natural character may include (but is not limited to):

"(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.

Recognising a lack of guidance for implementing and interpreting the NZCPS 2010, Boffa Miskell held a two-day in-house workshop in early 2011 to develop a consistent approach to natural character assessment and interpretation of NZCPS 2010 terms. At this

workshop, it was evident that ecologists' and landscape architects' views of 'natural' and 'naturalness' are complementary yet sufficiently different to warrant further clarification. Ecologists interpret natural character in terms of indigenous attributes. Whereas landscape architects take a broader view that can encompass both indigenous and exotic naturalistic attributes. Accordingly, the thresholds differ and a refined definition of 'naturalness' was agreed as being:

"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)."*

The naturalness concept was discussed within the Mackenzie District Plan Change 13 Appeal Decision², 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 underpinning the term, they should not be given undue weight at the expense of experiential and associative (e.g. heritage) factors.

A rating of very high to very low was provisionally adopted by the court for rating naturalness.

This construct was reiterated within the Port Gore mussel farm decision³. Here the Judge considered that naturalness "*is an anthropomorphic concept*". The court noted that "*a scale of naturalness of habitats is not 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 rating scale used to assess the indigenous naturalness of an area in context 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, with both requiring assessment.

A Supreme Court decision (NZSC38) in April 2014 on two appeals in relation to salmon farms in the Marlborough Sounds focussed the attention on the underlying policies (in this case the NZCPS), particularly

in relation to policies that state avoidance of effects. The essence of the decision clearly provides strong direction to avoid adverse effects on Outstanding Natural Character and Outstanding Natural Landscapes in the Coastal Environment. The decision states that where policy direction states 'avoid', essentially this is what should occur. The implications of this decision have yet to be fully determined and further guidance on this will develop over time.

Method

Through a 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' of natural character, relevant case law, and those definitions developed in the NZILA Best Practice Note 2010⁴. The assessment approach is based upon an agreed interpretation of key terminology, as well as an assessment matrix and evaluation methodology for identifying at least 'high' and 'outstanding' natural character (as required by Policy 13 (1)(a) and (c) of the NZCPS 2010).

Specifically, the following main points are adopted for this study:

- the methodology can be adapted to suit different **types and scales** of coastal landscapes and ecosystems;
- an understanding of biophysical natural character does require the **input of terrestrial, freshwater and marine ecologists** and other **natural scientists (e.g. geomorphologists)**, as well as the **input of landscape architects and planners**;
- that natural character can be **assessed on a continuum** that describes the expression of natural elements, patterns and processes (or the 'naturalness') in a coastal landscape/ ecosystem 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 **modifications** to the landscape, seascape and ecosystems;
 - the fact that the highest degree of natural character (**greatest naturalness**) **occurs where there is least modification/**

2 *High Country Rosehip Orchards Limited and Mackenzie Lifestyle Limited and Ors v Mackenzie District Council. Interim Decision No. [2011] NZEnvC 387*

3 *Decision No (2012) NZEnvC 72. 26th April 2012 (paragraphs 66 – 67)*

4 *Best Practice Note 10.1: Landscape Assessment and Sustainable Management, 2010*

uncluttered by obvious or disruptive human influence; and

- recognition that the degree of natural character is **context-dependent**, is perceived differently by different communities of interest, and, can change over time.

Building on the Terrestrial Land Systems approach

The methodology for this study builds on the Land Systems framework, which aggregates landtypes and landform components into recognisable landscape units.

This method is already in use in Marlborough, having been used to identify the land natural character areas for the MSRMP and inform the policy approach within the MSRMP.

The Land Systems approach involves a systematic analysis of abiotic and biotic (living) characteristics in terms of their spatial configuration, processes and present condition. The geomorphologic characteristics of the region's complex landscapes are used to distinguish physiographic landform units (landtypes), and are based on a range of data sources including published scientific papers, geological and topographical maps, joint earth science inventories and expert scientific knowledge. The 'baseline' information (along with other information relating to experiential attributes) is critical to making informed judgements on the natural character of any specific area. The information for this study was compiled primarily by

staff at the Department of Conservation, Landcare Research, Lucas Associates and Boffa Miskell.

The land systems approach is a nested hierarchy method of analysis, as illustrated in Figures 3 and 4 overleaf. Four broad landscape systems are recognised in the Marlborough Region (Figure 3 level 1). Within the Drowned River Valleys landscape several land types are recognised (Figure 3 level 2, e.g. Stokes Land Type). The Stokes Land Type is comprised of seven landform components (Figures 3 & 4, level 3,) and can be illustrated by an idealised 3D model and accompanying table documenting its landform (abiotic) and biotic characteristics (Figure 5). Landform components can be identified at a more detailed scale (Figure 3, level 4) and 'mapped' at specific locations (Figure 3, level 5) as and when needed. The hierarchical land systems approach has assisted in determining the boundaries and scale of the natural character assessment.

The land system based approach allows for landform components such as types of headlands or bays to be identified and described. This modelling approach, using 3D drawings and charts enables some understanding of any area of land, and the biota natural to that land. These components underpin the natural character of an area. Rather than a mapped approach, this modelling method is relatively timeless, accommodating change from influences such as from sea level rise.

Knowledge of Marlborough's land types was refreshed by Landcare Research as part of the 2009 Landscape Study. Their brief was to delineate, describe and document the different land types of the Marlborough



Waitata Reach, Marlborough Sounds, a drowned hill and valley system with identifiable land systems

Region, which are illustrated within Section G, Appendix 5. As part of this project, Landcare Research reviewed the previous work within the MSRMP to specifically include descriptions and models of land types that fall within the coastal landscape. As a result, the land typing for South Marlborough differs from that of the Marlborough Sounds where the previously delineated regional land types could be adopted. In South Marlborough the coastal environment forms a narrow coastal strip, which intersects a number of distinctive terrains that extend for considerable distances inland. To be more compatible with the Marlborough Sounds area, Landcare Research reviewed the South Marlborough land types that intersect the coastal environment and remapped them to suit the scope of this study. For example, the Coastal Terrestrial Area of Campbell includes two small sections of the

extensive Northern Loess Mantled Soft Rock Hills and Downs Land Type and the Northern Coastal Strip Land Type (Refer to Section G). Although the majority of these land types extend inland well beyond the coastal environment, the parts that fall within the coastal environment were amalgamated and named Campbell. The Coastal Terrestrial Areas for South Marlborough distinguished in this study are outlined in Section E.

For assessment purposes, the land (terrestrial) and water (marine) areas have been separated to assist the study team to gather the necessary indicators to determine the degree of natural character. The resulting Coastal Marine and Terrestrial Areas range in extent and overall size, depending on the type of biphysical character and are outlined in full overleaf.

Figure 3: Land Systems involves a nested hierarchy approach, windowing in from broad scale to detail.

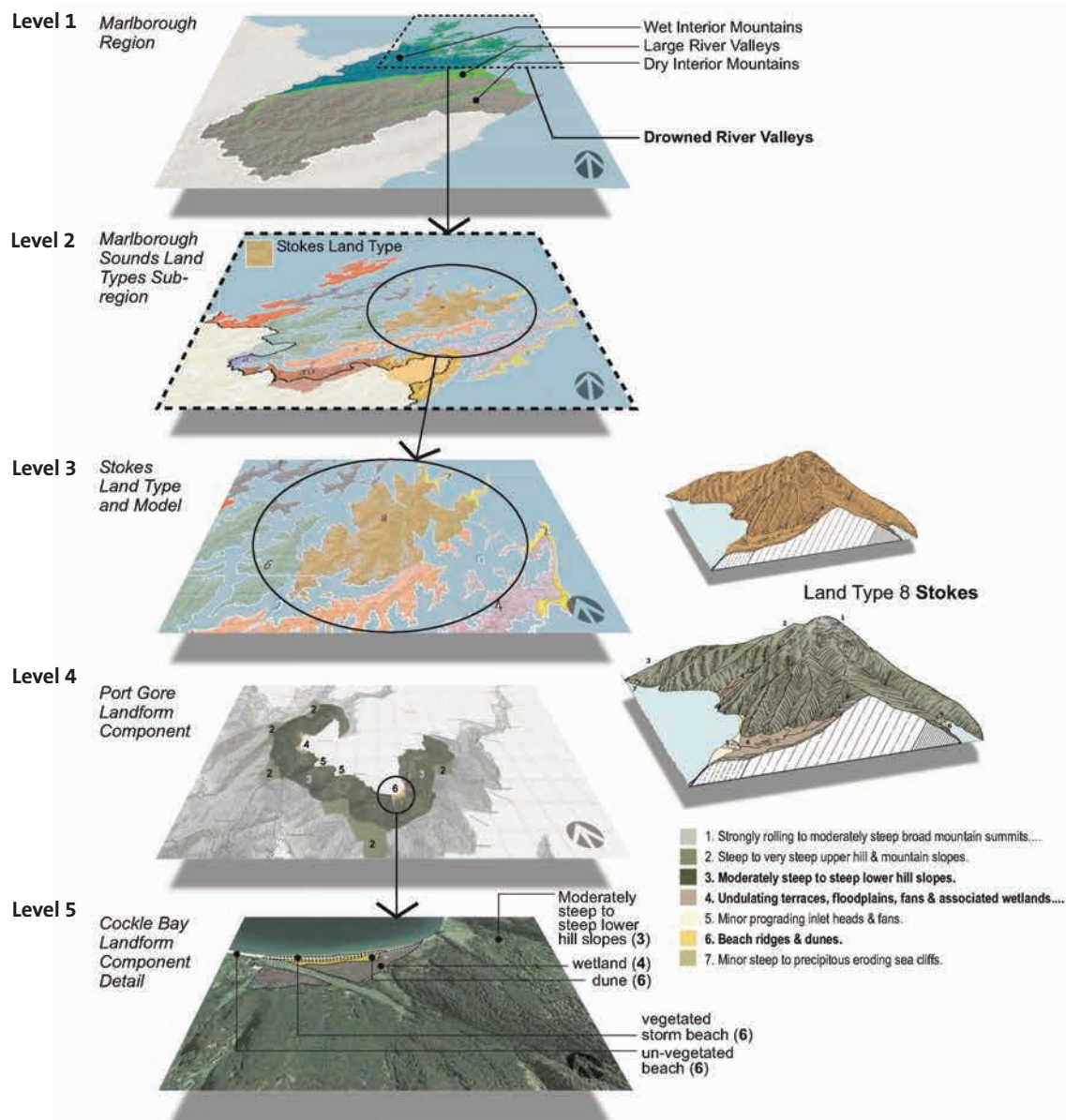


Figure 4: A 3D model diagram of 'Stokes land type' illustrating the different landform components

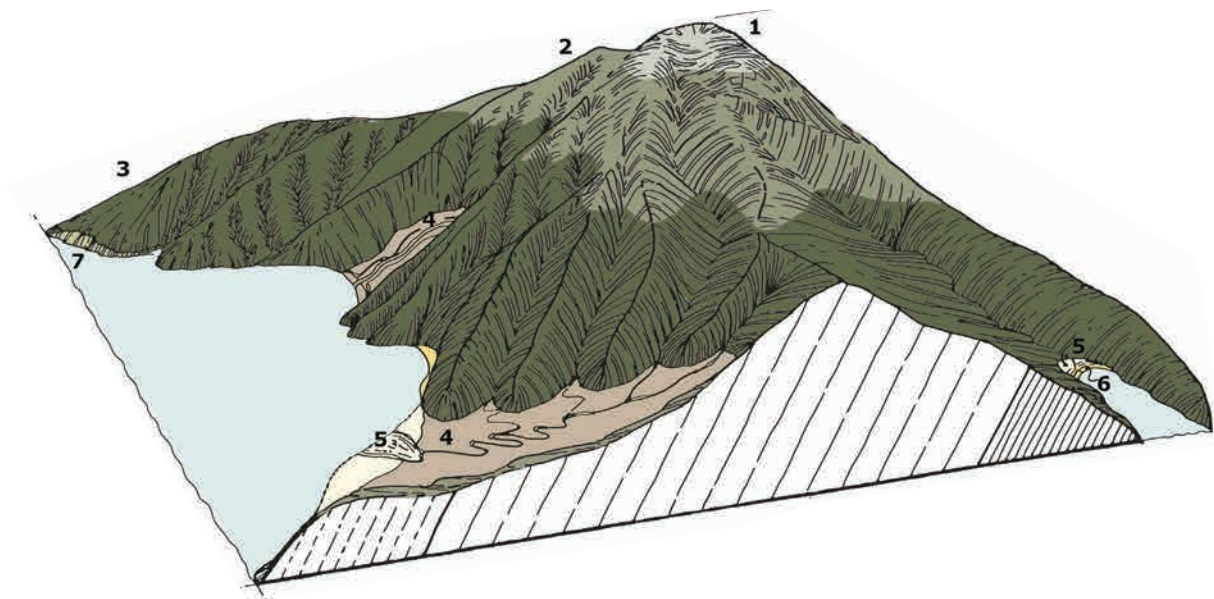


Figure 5: An excerpt from the table to the 'Stokes' land type diagram illustrating landform components 1-3

	Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Past & potential native vegetation
1	Strongly rolling to moderately steep broad mountain summits and upland ridge crests	Siliceous, foliated t.z. 11A to t.z. 111A schist of the Caples Group	1000–1203	Shrub-tussockland (broad and mid-ribbed snow tussocks with mixed shrubs). -Shrub-sedge-cushionfield (<i>Montitega dealbata</i> , <i>Donatia novae-zelandiae</i> , <i>Oreobolus pectinatus</i> , <i>Carpha alpina</i>). Mt Stokes daisy - <i>Celmisia rutlandii</i> rockland.	Grassland Shrub-tussockland (broad and mid-ribbed snow tussocks with mixed shrubs). Shrub-sedge-cushionfield (<i>Montitega dealbata</i> , <i>Donatia novae-zelandiae</i> , <i>Oreobolus pectinatus</i> , <i>Carpha alpina</i>). Mt Stokes daisy - <i>Celmisia rutlandii</i> rockland.
2	Steep to very steep upper hill and mountain slopes	Siliceous, foliated t.z. 11A to t.z. 111A schist of the Caples Group	600–1100	Silver beech forest with leatherwood in places. Mountain beech forest. Silver beech-red beech forest with Halls totara, southern rata, papauma, toro, kamahi and toi.	Forest Silver beech forest with leatherwood in places. Mountain beech forest. Silver beech-red beech forest with Halls totara, southern rata, papauma, toro, kamahi and toi.
3	Moderately steep to steep lower hill slopes	Siliceous, foliated t.z. 11A to t.z. 111A schist of the Caples Group	0–600	Rimu/hard beech - toro-kamahi forest with Halls totara, miro. Tawa - mixed broadleaf forest. Kohekohe - mixed broadleaf forest. Mixed broadleaf-mamaku forest. Tauhinu - bracken shrubland.	Forest Rimu/hard beech - toro-kamahi forest with Halls totara, miro. Rimu-kahikatea/tawa - mixed broadleaf forest. Kahitatea-matai/kohekohe - mixed broadleaf forest.

Coastal Terrestrial Areas

Marlborough Sounds

1. D'Urville (coastal ultramafic dominated land type).
2. Cook Strait (exposed maritime land type).
3. Bulwer (Sounds, dry, non-foliated to weakly foliated land type).
4. Arapawa (Sounds, dry, weakly foliated land type).
5. Portage (Sounds, dry, strongly foliated land type).
6. Nydia (Sounds wet, non foliated to weakly foliated land type).
7. Robertson (moist, non foliated to weakly foliated land type).
8. Stokes (Sounds, wet, weakly to strongly foliated land type).
9. Pelorus (inland western, wet, non foliated to weakly foliated land type).
10. Kaituna (inland eastern wet, strongly foliated land type).

South Marlborough

11. Wairau (Plains–coastal fringe land type).
12. Vernon (Loess-mantled, dry, weakly consolidated conglomerate land type).
13. Awatere (Lower Plains and Plains–Recent floodplains and low terraces land type).
14. Blind (Northern loess-mantled soft rock hills and downs land type).
15. Grassmere (Plains–coastal fringe land type with a very small part of Northern loess- mantled soft rock hills and downs land type).
16. Campbell (Northern loess – mantled soft rock hills and downs land type and Northern Coastal Strip land type).
17. Wharanui (Northern coastal strip land type, Northern soft rock hills and downs land type and small parts of Moist, coastal limestone hills land type and Dry, coastal hard rock hills land type).



The soft rock hills of the Wharanui Coastal Terrestrial Area in South Marlborough are home to some NZ Fur Seals

Coastal Marine Areas

Nine **Coastal Marine Areas** were identified based on the broad differences in biophysical conditions which exist across the Marlborough Sounds and down the south Marlborough coast. The seven areas in the Marlborough Sounds mirror the bio-geographic regions identified by Davidson et al. (2011). A similar scale bio-geographic approach was applied to the south Marlborough coast, resulting in two areas being identified, separated at Cape Campbell.

Marlborough Sounds

- A. **Tasman Bay – south-western D’Urville Island** (a mix of open and enclosed waters, relatively sheltered, warm).
- B. **D’Urville Island – Northern Cook Strait** (a mix of open and enclosed waters, sheltered – exposed, mostly warm).
- C. **Pelorus Sound (including Forsyth Bay)** (enclosed waters, sheltered, warm).

- D. **Queen Charlotte Sound** (enclosed waters, sheltered, cool).
- E. **Tory Channel** (enclosed waters, sheltered, cold).
- F. **Port Underwood** (enclosed waters, mainly sheltered, cold).
- G. **Eastern Cook Strait and outer Queen Charlotte Sound** (open waters, exposed, cold).

South Marlborough



- H. **Cloudy and Clifford Bays** (open waters, exposed, cold).
- I. **Cape Campbell to Willawa Point** (open waters, very exposed, cold).

Overleaf: Maps of the Marlborough Sounds and South Marlborough illustrating the geographic extent of the Coastal Terrestrial and Coastal Marine Areas



The blue waters of Tennyson Inlet form part of the Pelorus Sound Coastal Marine Area

Legend

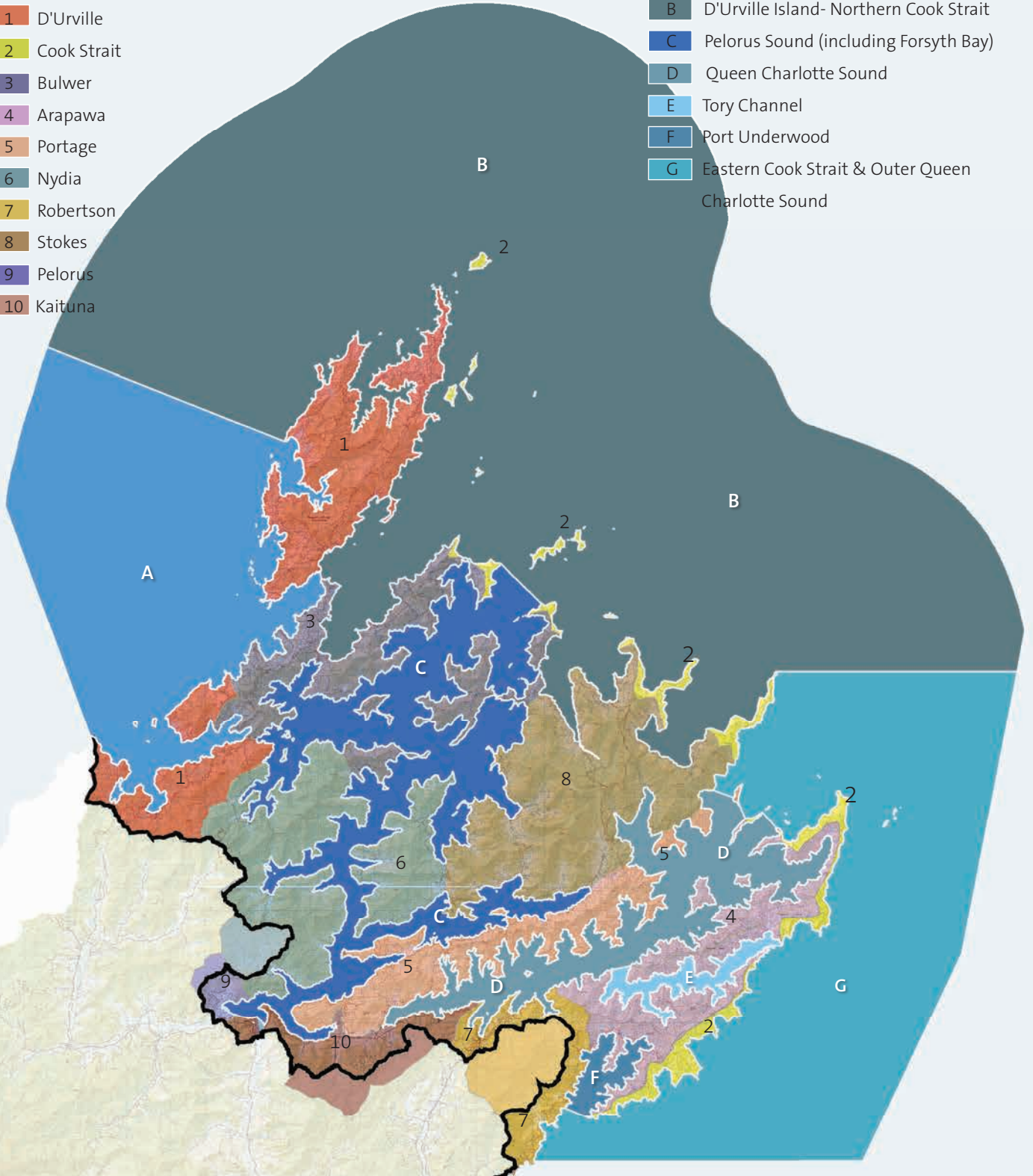
-  Extent of Coastal Environment
-  Marlborough District Boundary

Coastal Terrestrial Areas

-  1 D'Urville
-  2 Cook Strait
-  3 Bulwer
-  4 Arapawa
-  5 Portage
-  6 Nydia
-  7 Robertson
-  8 Stokes
-  9 Pelorus
-  10 Kaituna

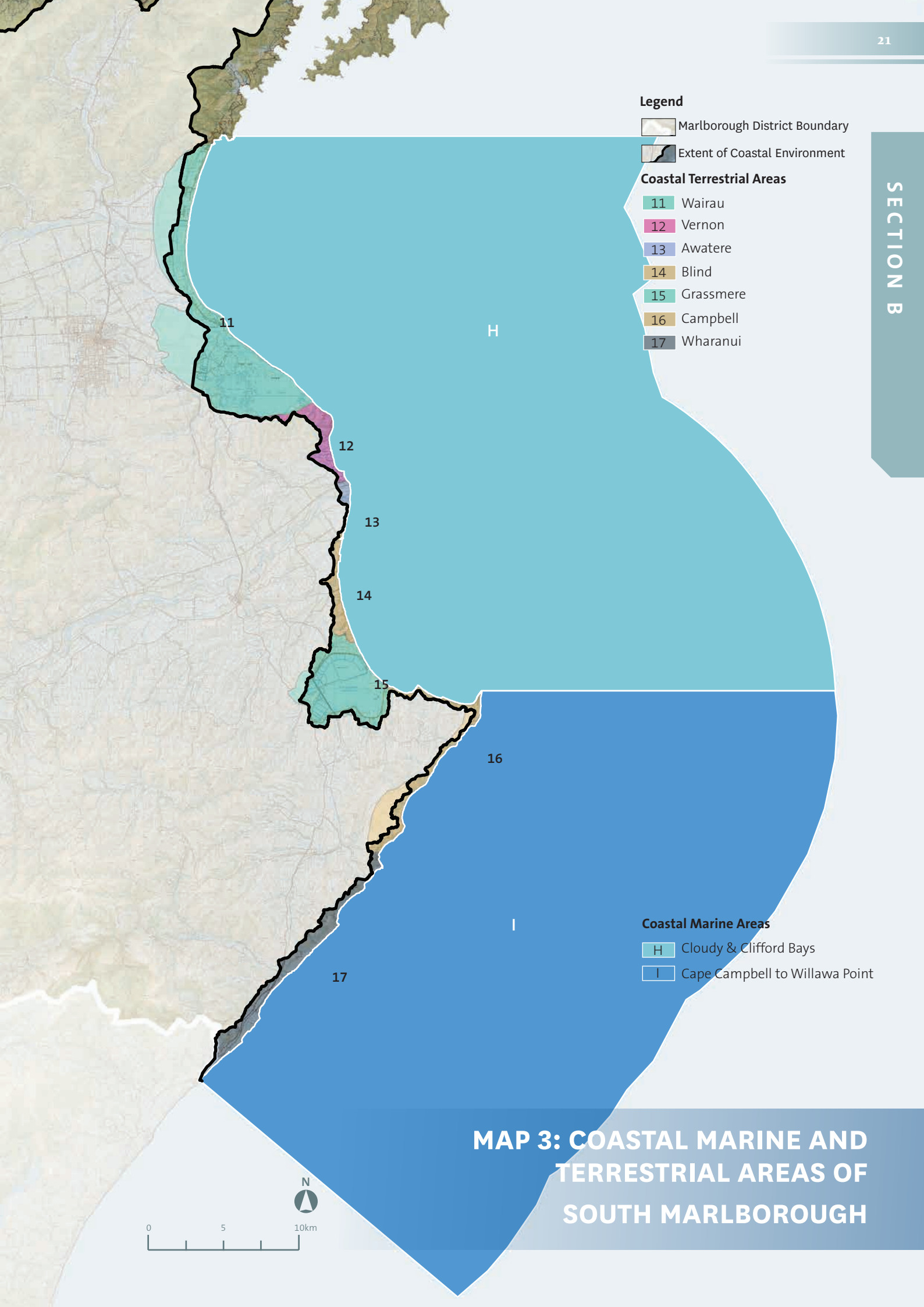
Coastal Marine Areas

-  A Tasman Bay- Southwestern D'Urville Island
-  B D'Urville Island- Northern Cook Strait
-  C Pelorus Sound (including Forsyth Bay)
-  D Queen Charlotte Sound
-  E Tory Channel
-  F Port Underwood
-  G Eastern Cook Strait & Outer Queen Charlotte Sound





MAP 2: COASTAL MARINE AND TERRESTRIAL AREAS OF THE MARLBOROUGH SOUNDS














Legend

-  Marlborough District Boundary
-  Extent of Coastal Environment

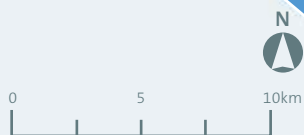
Coastal Terrestrial Areas

-  11 Wairau
-  12 Vernon
-  13 Awatere
-  14 Blind
-  15 Grassmere
-  16 Campbell
-  17 Wharanui

Coastal Marine Areas

-  H Cloudy & Clifford Bays
-  I Cape Campbell to Willawa Point

MAP 3: COASTAL MARINE AND TERRESTRIAL AREAS OF SOUTH MARLBOROUGH



Evaluation of Natural Character Attributes

A number of key attributes need to be considered when assessing the natural character of the coastal environment. Through both Boffa Miskell's and Lucas Associates' experience, including the interpretation of the NZCPS 2010, the list of attributes outlined in the tables overleaf have been identified as a systematic way to consider the different aspects of the natural patterns, processes and elements of the coastal environment and the degree of modification present.

The attributes are described for each Coastal Marine Area and each Coastal Terrestrial Area identified in Sections D and E and are assessed for their degree of natural character by way of a matrix/ evaluation table (refer to page 26).

The list of attributes has been developed to ensure that the descriptors for each attribute are mutually exclusive to the extent possible, whereby avoiding double-counting. They expand on the coastal environment diagram on Figure 1. As the tables on the following pages show, the descriptors of natural character for each attribute differ between the Coastal Marine Area and the Coastal Terrestrial Area.

Perceptual/ experiential attributes for each will have a small degree of overlap, however, the descriptive approach allows for those overlaps to be clearly articulated.

The artificial division of attributes between the Coastal Marine areas and Coastal Terrestrial Areas is used as a way of organising the data, where activities within the water can be quite different from what is occurring on the land. Each attribute is considered equally in a non-mechanistic way, where no weighting is applied. An overall value judgement as to the degree of natural character is made for each Coastal Terrestrial Area and each Coastal Marine Area.

Landcare Research described and modelled the abiotic factors and characteristics of the Coastal Terrestrial Areas at the Land Systems levels 2, 3, 4 and 5 (refer to Figure 3 and 'Study Scale' overleaf). Technical staff at DOC gathered biotic data in relation to terrestrial and freshwater information, and abiotic and biotic information for the marine areas.

It has only been possible to capture marine data where that data exists. There are, unfortunately, 'gaps' in the



The evaluation of a Coastal Marine Area and a Coastal Terrestrial Area in some cases can be very different, despite their adjacent relationship

data, however, the mapped areas illustrate the existing knowledge. It is anticipated that as further information is collected, this mapping will be updated.

While the coastal marine area extends out to the edge of the territorial sea (the 12 mile limit), information on seabed ecology is generally greatest close to shore and decreases appreciably with distance offshore. The strong connection between the land and the sea is also a pivotal feature in terms of defining the natural character of the coast. The present study therefore focused on the marine environment closer to shore, specifically:

- All enclosed waters of the Marlborough Sounds
- The outer Marlborough Sounds bounded by the main headlands and offshore islands and stacks;
- Out to 2 km offshore from the outer coast (including from offshore islands and stacks around the outer Sounds).

The criteria used to assess the marine information is outlined in Appendix 6.

Boffa Miskell and Lucas Associates determined the experiential attributes, and for marine areas, have been

generally restricted to above-water. Where specific dive sites or notable underwater experiences are recognised, these have been recorded. No engagement with tangata whenua has yet been undertaken as part of this study to identify the particular natural character attributes, notably experiential attributes such as '*mauri*' that are characteristic within the coastal environment. This is a recognised gap.

The Coastal Context (Zone C illustrated in Figures 1 & 2) is also considered, where it is relevant, as elements within this zone can affect, or be affected by the natural character of the coastal environment. No natural character rating is ascribed to Zone C, only a description.

The table illustrated on page 26 sets out the matrix approach used to rate the level of natural character.



Jetty in the Marlborough Sounds

Coastal Marine Area (<u>Zone A</u> Refer Figures 1 & 2)		
Attributes	Descriptors	Spectrum of naturalness*
Abiotic systems and landforms	<ul style="list-style-type: none"> - Physical processes including tidal action (and range), currents, waves, water temperature, salinity, sedimentation, turbidity and climate (e.g. wind); - Geomorphology, topography and landform including headlands, bays, channels, coastal formations (e.g. rocks, reefs, stacks), bathymetry, seabed character (e.g. mud, sand, gravels, cobbles/ boulders, bedrock), aspect and exposure; - Erosion and depositional processes - Water Quality; - River mouth processes. 	<ul style="list-style-type: none"> - The degree (very high to very low) to which physical modifications (e.g. trawling and dredging, major port structures, port dredging and dumping, reclamation, jetties, sea defences, groynes, aquaculture and land-derived sedimentation) affect this abiotic attribute; - Refer to Appendix 6 for criteria.
Marine biotic systems	<ul style="list-style-type: none"> - The natural distribution and abundance of species, communities and habitats, including ecological processes; - The diversity and continuity of species, communities and habitats intertidally and subtidally (i.e. biotic patterns) including all marine biotia, reef and soft sediment communities, estuaries/ wetlands, marine mammals and sea birds; - The expression/ appearance of ecological features and processes. 	<ul style="list-style-type: none"> - The degree (very high to very low) to which modifications (e.g. trawling, dredging, aquaculture, reclamation, stopbanks, sedimentation, sewage and other discharges, exotic species, and infrastructure such as ports, marinas, jetties and moorings) affect this biotic attribute; - Refer to Appendix 6 for criteria.
Experiential	<ul style="list-style-type: none"> - The experience in seeing, feeling and perceiving the natural environment of the Coastal Marine Area; - Aromas, visual, auditory, sense of wildness, remoteness, isolation, natural darkness of the night sky and its scenic values; - Access; - Ephemeral biotic activity (e.g. pods of dolphins, flocks of birds, schools of fish) - Natural movement of water and sediment; - Underwater experiences when swimming, diving and snorkelling; - Note heritage elements do not contribute directly to the naturalness experience. 	<ul style="list-style-type: none"> - The degree (very high to very low) to which biotic and abiotic factors and their intactness (or conversely modification) are experienced - Experiential values may be influenced by factors such as structures (e.g. ports, marinas, jetties, moorings, aquaculture), exotic species, and the presence of human activity including recreational pursuits (e.g. diving, swimming, boating, jet skis) and commercial operations (e.g. commercial fishing vessels and servicing boats); - Note different people experience naturalness differently, - No cultural assessment has yet been undertaken.

* Each Coastal Marine Area is measured on the spectrum of naturalness (degree of human modifications) to each attribute from Very High to Very Low, then an overall judgement is made. The degree of physical and experiential naturalness is related to the location's context.

Coastal Significance and Active Coastal Interface (<u>Zone B</u> Refer Figures 1 & 2)		
Attributes	Descriptors	Spectrum of naturalness*
Abiotic systems and landforms	<ul style="list-style-type: none"> - Climatic influences (wind, rain, exposure); - Geomorphology and identification of different types of landforms (i.e. peninsulas, cliffs, dunes, wetlands); - Terrestrial coastal processes, including erosion, river mouth processes including sedimentation (within the terrestrial zone); - Freshwater processes. 	<ul style="list-style-type: none"> - The evident intactness of the abiotic systems. The degree (very high to very low) to which physical modifications such as built structures, road cuts, earthworks and reclamation works affect this abiotic attribute.
Terrestrial biotic systems	<ul style="list-style-type: none"> - The margins of estuaries, wetlands and terrestrial areas in Zone B including the intactness of their natural ecological processes, patterns and elements; - Extent of freshwater communities; - Land cover and associated land use, including the composition, distribution, and condition of land cover, and the presence of indigenous/exotic species; - Presence of indigenous fauna. 	<ul style="list-style-type: none"> - The degree (very high to very low) to which modifications affect this biotic attribute. Influences include the presence of exotic species on native communities, physical structures such as infrastructure, housing, roading, tracking, reclaimed land, stop banks, as well as commercial forestry, agricultural and viticulture land use that reduce the naturalness of the biota; - This attribute also includes modifications to freshwater systems, including channelizing watercourses, stop banks, culverts, dams etc. which affect freshwater biota.
Experiential	<ul style="list-style-type: none"> - The experience in seeing, feeling and perceiving the Coastal Significance and Active Coastal Interface; - Aromas, visual and scenic, auditory, sense of wildness, remoteness, isolation, natural darkness of the night sky; - Ephemeral biotic activity (i.e. seasonality of flora, presence of birds); - Ephemeral human activity affecting the naturalness (such as recreation, commercial activities); - Note, this attribute does not include heritage elements. 	<ul style="list-style-type: none"> - The degree (very high to very low) to which physical and biotic modifications affect the naturalness experienced. Influences reducing naturalness include the presence of physical structures including ports, reclaimed land, infrastructure, roading, lighting, industrial noises and non-natural aromas; - Presence of exotic species; - Presence of humans, including recreational activities (driving, walking, camping, settlements); - Note, different people experience naturalness differently, -No cultural assessment has yet been undertaken.

* Each Coastal Terrestrial Area is measured on the spectrum of naturalness (degree of human modifications) to each attribute from Very High to Very Low. An overall judgement is then made. The degree of physical and experiential naturalness is related to the location's context.

An example (below) of the level 3 Evaluation Table

Level 3 Evaluation Table

Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
<i>Very High</i>			
<i>High</i>			
<i>Moderate to High</i>			
<i>Moderate</i>			
<i>Moderate to Low</i>			
<i>Low</i>			
<i>Very Low</i>			
	Overall Natural Character Rating		Rating (e.g. High)

Study Scale

As explained earlier (see Figures 3-5), the Land Systems approach utilises different scales of reference that steadily zoom in from the broad regional scale to the detailed local scale. This is especially useful in natural character assessments, which are context and scale related. i.e. the coastal environment can be perceived as having different levels of natural character at different scales, depending on the level of detail gathered.

As the simplified diagram in Figure 6 illustrates, both a broad-scale (Level 2) and more detailed scales (Levels 3-5) are considered. The broader scale, which is essentially sub-regional and focuses on the Marlborough Sounds as a whole and South Marlborough as a whole, is described in Section C. In Sections D and E, the focus is on the Level 3 Coastal Terrestrial and Coastal Marine Areas, with, where appropriate, specific mention of areas at Levels 4 and 5. This nested hierarchy approach (depicted by Figure 3) has been useful in further identifying specific features or stretches of coastline holding higher levels of natural character than the remaining parts of the area.

Outstanding levels of natural character are dealt with separately in Section F of this study and outstanding natural character is discussed overleaf.



Natural character values at the most detailed scale (Level 5). Specific species composition, health, along with modifications can be more accurately assessed

Natural Character Assessment Scale

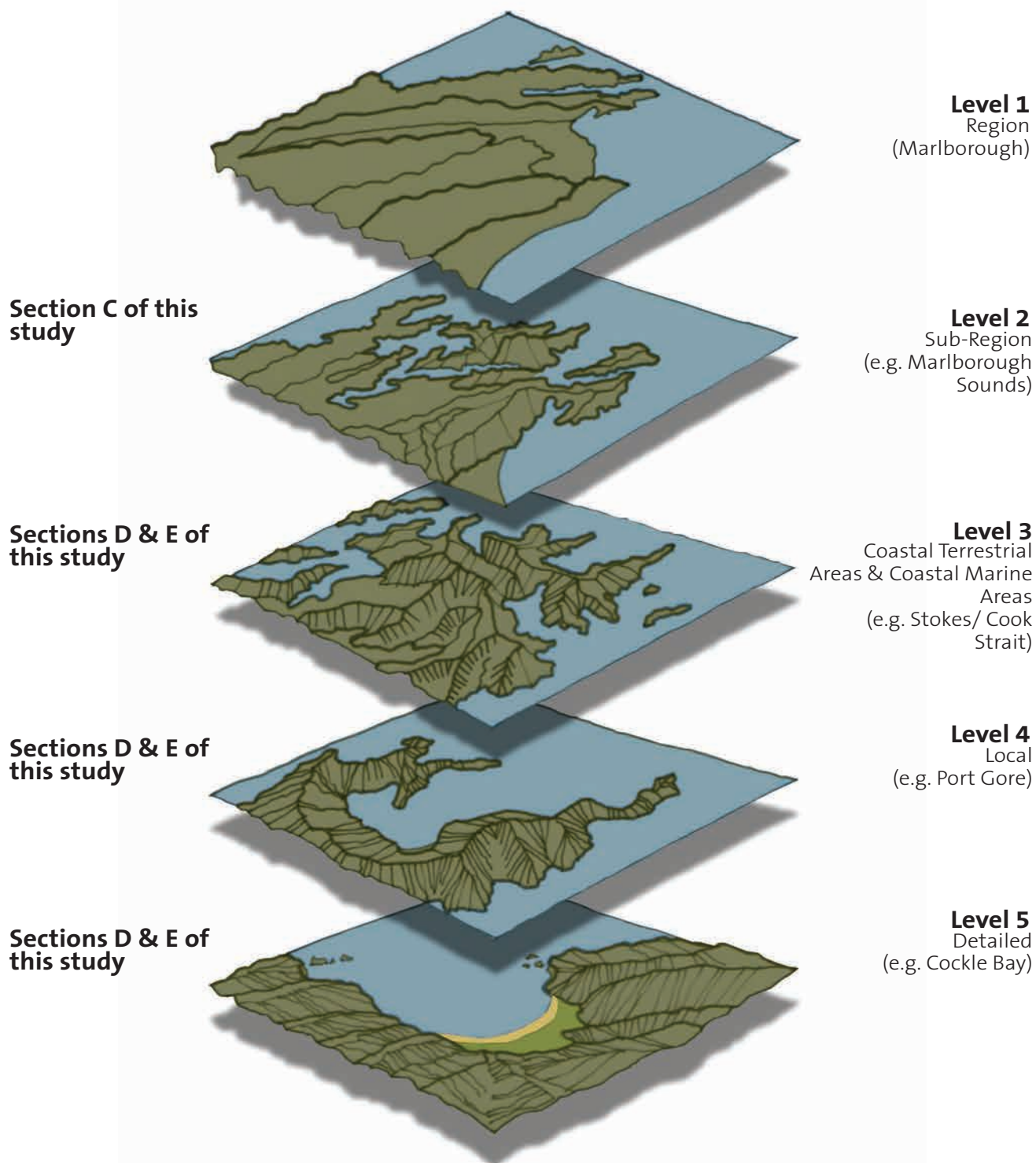


Figure 6: A diagram representing the range of scales used in this study. The study focuses on the Level 3 scale (Coastal Terrestrial and Coastal Marine Areas) and, where appropriate, comments on an area within the Coastal Terrestrial Area or Coastal Marine Area at the Levels 4 or 5 scale, such as 'Port Gore' and 'Cockle Bay' as depicted above. This diagram shows the 'nested hierarchy' approach to land systems and land form components used for this study.

Outstanding Natural Character

Areas of Outstanding Natural Character have been identified through an assessment process and mapped in Section F of this study. Under RMA s6(a) it is necessary to determine the existing attributes and extent of natural character and assess how these may be affected by a specific planning regime or proposal. This approach is also required under the NZCPS 2010. However, Policy 13 of the NZCPS 2010 also specifically requires that an evaluation is made as to whether the natural character in the existing coastal environment is at least high. Policy 13(1) of the NZCPS 2010 states:

"(1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use and development:

(a) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and

(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;"

An area with outstanding natural character may be an area within the coastal environment that is considered to have high or very high levels of natural character, although it is important to note that the high or very high ratings do not in themselves equate to 'outstanding' as clarified by the following definition, which was established and agreed at the Boffa Miskell 2011 internal workshop:

'Outstanding' is a comparative evaluative term meaning; to stand out, exceptional, pre-eminent.

It was determined by the study team that outstanding natural character should be assessed separately from the main assessment which determines areas holding very low to very high levels of natural character. It was also determined that outstanding natural character assessments should combine both terrestrial and marine components so that important sequences of ecological naturalness (such as from the top of a ridge above sea level to the bottom of the adjacent sea and interconnected systems) are considered.

An assessment to establish whether all or parts of a coastal area contain outstanding natural character needs only be undertaken when **all** of the attributes, when appraised at an adequate scale (in this case Level 4 & 5) and using adequate data, are assessed as being of 'high' or 'very high' levels of natural character for the actual part to be identified as outstanding natural character.

Under the methodology an area of **outstanding natural character** (ONC) must:

'exhibit a combination of natural elements, patterns and processes that are exceptional in their extent, intactness, integrity and lack of built structures (the 'clutter' factor) and other modifications compared to other areas in the Marlborough Region.'

More information on this and the mapped areas of outstanding natural character in Marlborough are contained within Section F of this study.



Kuru Pongi, the Trio Islands, are assessed as possessing Outstanding Coastal Natural Character because of their combination of natural elements and processes that are exceptional in their extent compared to other areas in the Marlborough Region.

Information

Digital Mapping

GIS has been used to assist in the mapping of the Coastal Environment. The mapping scale varies but the majority of the data used for this study is at scales coarser than 1:50,000. The Coastal Terrestrial and Coastal Marine Areas have been mapped on 1:250,000 topographical maps. More detailed evaluation mapping, in Sections D and E are mapped at approximately 1:50,000 to 1:10,000 scale. Areas of Outstanding Natural Character mapped at a scale of approximately 1:50,000.

The study team utilised the following GIS sources:

- Topo Maps (LINZ)
- Digital contour information 20m interval (LINZ)
- New Zealand Land Cover Database v3 (derived from the 2007-2008 LUCAS satellite imagery)
- DOC conservation Units (May 2009)
- QE II covenants (March 2007)
- River Environment Classification (NIWA)
- Land Resource Inventory (Landcare Research)

- Geopreservation sites and areas (Kenny & Hayward, 1998).

The following data had been provided by MDC for the entire region for the Review of the Marlborough Landscape Study:

- Current georeferenced orthophotos of the region
- Digitised (shp file format) land typing of the Marlborough Region, and grouped into landscape types (data at 1:250,000 with some at 1:50,000)
- Digitised (shp file format) outstanding natural features and landscapes from district plans
- Landscape series from MSRMP and WARMP, e.g. prominent ridgelines and significant landscapes
- Ecological series from MSRMP and WARMP

Refer to Appendix 1 for a comprehensive list of References and a Bibliography used for this study



Above: A narrow and precipitous peninsula within Forsyth Bay

New Zealand Land Cover Database (LCDB)

To assist in understanding the extent of land cover for each Coastal Terrestrial Area, the Department of Conservation used the New Zealand Land Cover Database.

LCDB contains detailed information on classes of land cover and their boundaries and is a record of land cover changes over time. It is a digital map of the surface of New Zealand derived from satellite imagery. The first two editions, LCDB-1 and LCDB-2, show the state of New Zealand's land cover in 1996-1997 and in 2000-2001 respectively. These digital maps underpin much of the work of central and regional government, industry and research institutions. The information is used for land, water, and biodiversity management, pest control and monitoring, wildfire threat and risk analysis, and environmental monitoring and reporting.

The current version LCDB v3 (or LCDB-3) contains 33 classes designed to be compatible with earlier LCDB versions. The polygon features contain a code and boundary representing the land cover type at each of three periods; summer 1996/97, summer 2001/02, and summer 2008/09. The data set was designed to be compatible in scale and accuracy with Land Information New Zealand's 1:50,000 topographic database. LCDB v3.0 was released in July 2012 and includes non-temporal edits to the summer 1997/97, summer 2001/02 time periods along with the new summer 2008/09 period.

The Department of Conservation amalgamated a number of vegetation types to best represent a 'snap shot' of percentages of different types of land cover. For example, for the Marlborough Sounds, each 'Biotic' subsection within Level 3 starts with an overview of that particular Coastal Terrestrial Area, followed by a percentage of the area's typical land cover, including:

- Native Forest
- Native Shrubland (Manuka/kanuka; broadleaved indigenous hardwood, matagouri or grey scrub; subalpine shrubland and flaxland)
- Exotic treeland (Exotic forest; forest-harvested; deciduous hardwoods)
- Exotic Scrub (gorse and broom)
- Pasture (High producing exotic grassland; low producing grassland; short-rotation cropland)

Refer to www.lcdb.scinfo.org.nz for further information on scales and mapping.

Right: Early morning mist clears in the Marlborough Sounds



