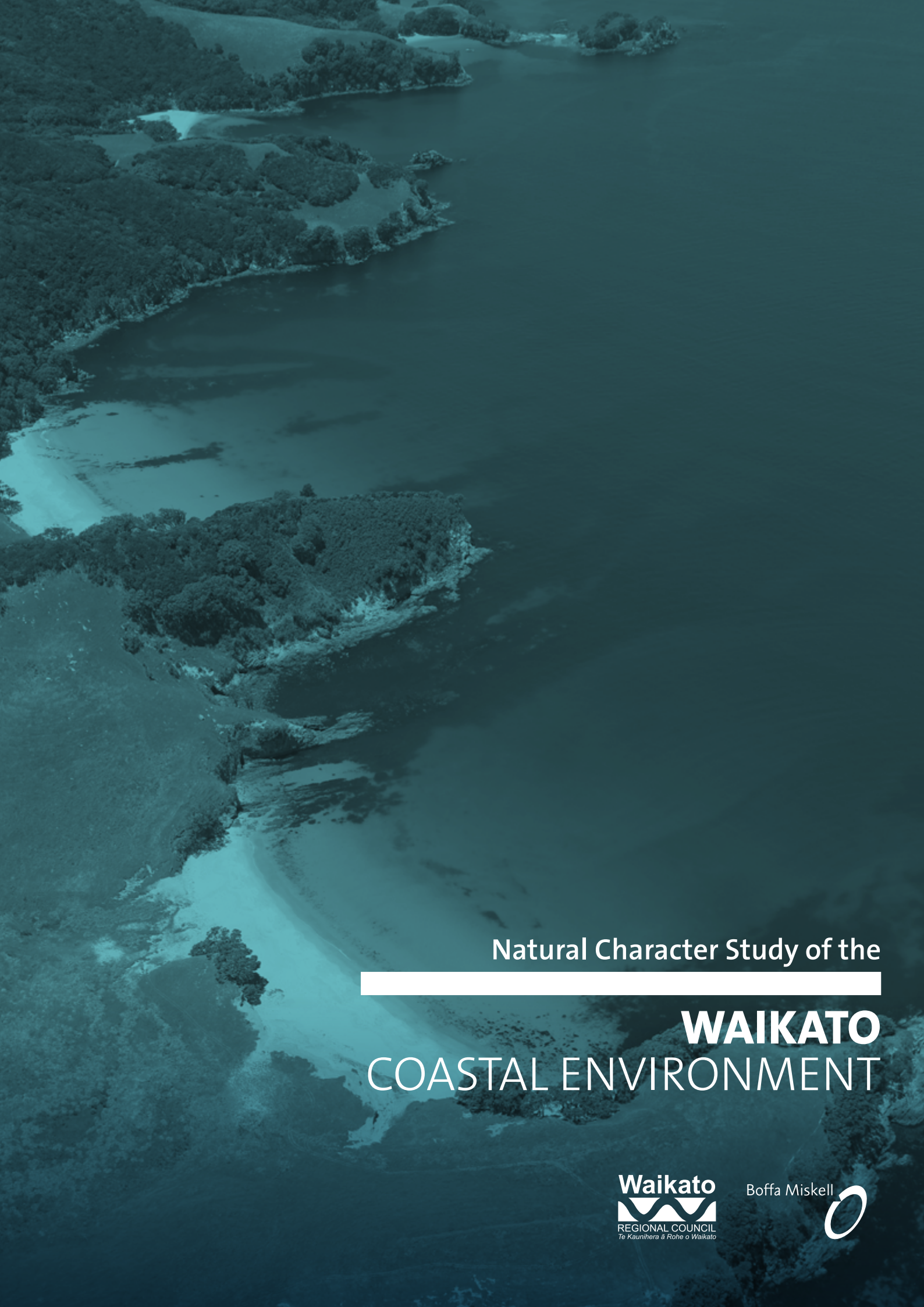

Natural Character Study of the

WAIKATO
COASTAL ENVIRONMENT

Waikato Regional Council
Te Kaunihera ā Rohe o Waikato

Boffa Miskell

Waikato Regional Council Technical Report 2016/05

Approved for release by: Tracey May
Date: July 2016

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Natural Character of the

WAIKATO COASTAL ENVIRONMENT

Prepared for Waikato Regional Council | **March 2016**

CONTENTS

SECTION A: INTRODUCTION

Purpose of Study

Waikato Regional Council ('WRC' or 'the council') engaged Boffa Miskell Limited ('BML') to undertake a natural character assessment within the mapped coastal environment of the region's east and west coasts. This study will be undertaken in light of the New Zealand Coastal Policy Statement 2010 ('NZCPS') and the Proposed Waikato Regional Policy Statement. Part of the report relating to the East Coast study will be used to inform Sea Change Tai Timu Tai Pari – The Hauraki Gulf Marine Spatial Plan Project of which the council is a partner agency.

Furthermore, the East Coast study builds upon existing natural character related work undertaken by Vicky Froude using the QINNCE index of naturalness.

Background

When the NZCPS was released in December 2010, local authorities were tasked under Policy 13 to map or otherwise identify (at least) areas of high natural character in the coastal environment. The NZCPS also introduced the new term, 'outstanding natural character'. Local authorities had, at the time, no guidance on how to undertake the necessary natural character assessments. It was therefore necessary to develop a methodology for coastal natural character assessments and interpretation of NZCPS terms as part of this study. Since then, guidance has been developed by the Department of Conservation (Natural Character and the NZCPS 2012).

Assessing natural character is not new and the methodology developed draws on the considerable experience gained from evaluating coastal landscapes over the past 20 years and on case law. As more councils undertake coastal assessments under the NZCPS 2010, it is possible that the methodology will be further refined through ongoing peer review processes, workshops and eventually through case law. Furthermore, whilst this study was being prepared, the Supreme Court decision in relation to New Zealand King Salmon was released, which has implications for natural character.

Left: Coastal waterfall Awakino Coastline, West Coast

Study Approach

Study Focus

The principal focus of this study is using a consistent assessment approach, incorporating both landscape and ecological expertise, to develop a method for natural character assessment under Policy 13 of the NZCPS 2013.

WRC has defined the extent of the coastal environment for both coasts, so the method, rationale and delineation of the inland extent of the coastal environment under Policy 1 of the NZCPS 2010 does not form part of this study. WRC's mapped terrestrial extent will be adopted as part of this study.

Part of the region's east coast was mapped and delineated for its natural character as part of the QINNCE method, used by Vicky Froude of Eco Logic Ltd. Not all of WRC's eastern coastline was included within this QINNCE study, so this study will review the QINNCE method and use any relevant data pertaining to abiotic and biotic aspects of WRC's east coast.

This study will also briefly address aspects of natural character restoration potential under Policy 14 of the NZCPS. However, this study does not address Policy 11 (indigenous biological diversity) nor Policy 15 (natural features and natural landscapes).

The New Zealand Coastal Policy Statement 2010 and supporting guidance notes on Policies 1, 13 and 14

Study Process

This study has been undertaken as an independent technical assessment by BML with a review provided by Department of Conservation ('DOC') and technical staff at the Waikato Regional Council ('WRC').

The study method has been adopted from recently completed natural character studies, including the Marlborough Coastal Natural Character Study, June 2014 and three DOC workshops held in 2011 and 2015. Due to the geographic scale difference between the Waikato Region and the Marlborough Region, a more refined scaling was determined for Waikato, although the overriding method of characterisation and evaluation remains consistent.

Refinement of the methodology took place during a workshop, hosted by BML in early December 2014. Attendees included DOC, WRC and BML personnel.

The methodology outlined in this document has been developed through an iterative process involving a range of professional environmental and planning practitioners. It builds upon the existing work that was made available for this study (including the QINNCE methodology, landscape work for Thames Coromandel District Council and Waikato Regional Policy Statement natural character assessment criteria.

Images below: (Left) Google Earth provided a valuable data source, especially when uploaded, GPS positioned site photographs can be automatically located, enabling greater use and ease of referencing images.

(Right) Land Cover Data Base (LCDB) when clipped to each Coastal Terrestrial Area (CTA) provides an excel list of all land cover within that area.

		CTA 15	
		CTA 15	
		CTA 15	
		CTA 15	
	Herbaceous Freshwater Vegetation	CTA 15	
55	High Producing Exotic Grassland	CTA 15	7,25
62	Indigenous Forest	CTA 15	221
69	Lake or Pond	CTA 15	7,
75	Low Producing Grassland	CTA 15	1,360.2
83	Manuka and/or Kanuka	CTA 15	732,4
100	Sand or Gravel	CTA 15	1,468,6
109	Surface Mine or Dump	CTA 15	660.1
2	Broadleaved Indigenous Hardwoods	CTA 16	408,3
18	Estuarine Open Water	CTA 16	208,
23	Exotic Forest	CTA 16	207
9	Flaxland	CTA 16	
	Gorse and/or Broom	CTA 16	1
	rbaceous Saline Vegetation	CTA 16	
	roducing Exotic Grassland	CTA 16	
	Forest	CTA 16	

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 scales at which the study was undertaken;
- approach to natural character evaluation;
- digital mapping; and
- use of the New Zealand landcover database (LCDB).

Relationship between Landscape and Natural Character

Landscape and natural character are both RMA section 6 Matters of National Importance. They are distinct topics, each with their own attributes and considerations – something which is reflected in the NZCPS 2010 which states that natural character is not the same as natural features and landscape, or amenity values.

Landscape is defined by the New Zealand Institute of Landscape Architects ('NZILA')[1] as:

'...the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations'.

Natural Character, is essentially concerned with the degree of "naturalness" associated with the natural elements, processes and patterns within the landscape and seascape. In a statutory sense this applies to the coastal environment, wetlands, lakes, rivers and their margins. This study concerns the coastal environment. Natural Character can also be said to be a part of or component of landscape, resting more within the biophysical aspects of landscape.

The relationship between Landscape and Natural Character can be best summarised by the following diagram and is explained further below in the next few paragraphs.

1. Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

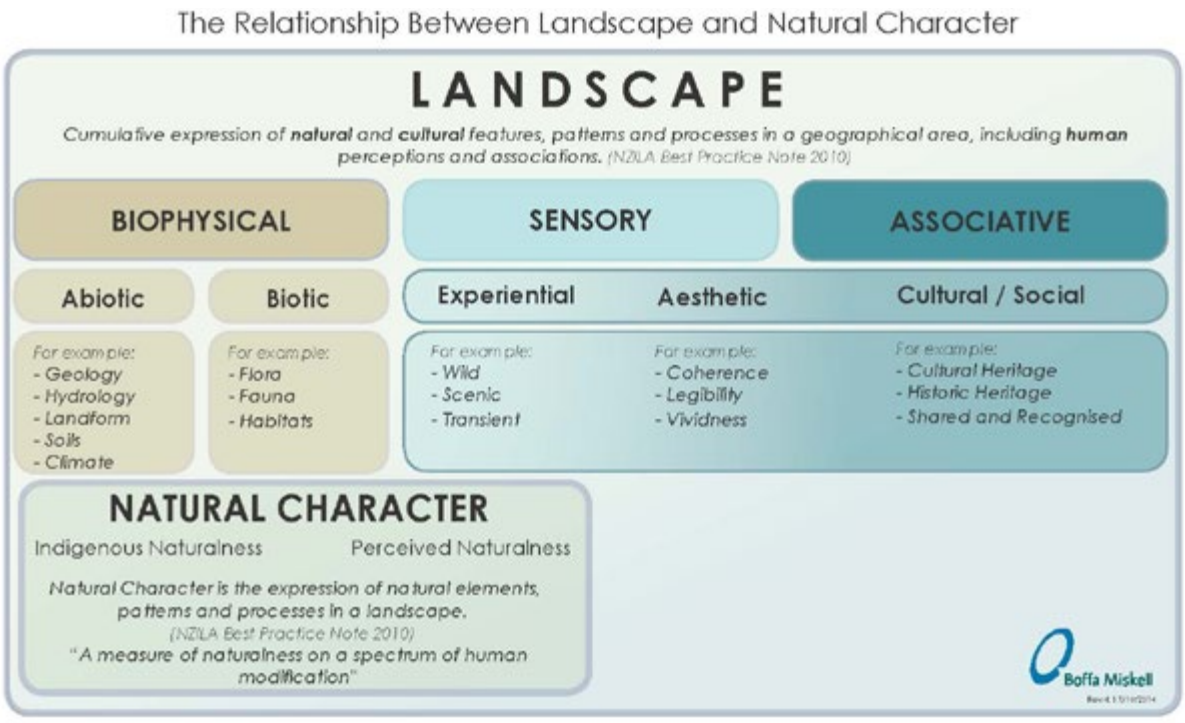


Diagram 1: The relationship between landscape and natural character under the RMA as interpreted by Boffa Miskell

Defining the Coastal Environment

As outlined, Policy 1 of the NZCPS outlines the need to determine the inland extent of the coastal environment. Policy 1 states:

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, saltmarshes, 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.

As outlined, WRC has already mapped the inland extent of the coastal environment, which defines the study area for this assessment.

The Coastal Environment – Zones of Significance

For consistency with other coastal studies, BML has developed the following Zones of Significance framework to determine the extent of the Coastal Environment, as interpreted under Policy 1 of the NZCPS 2010. As illustrated on **Figure 1** below the framework interprets the Coastal Environment to contain the following zones 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.

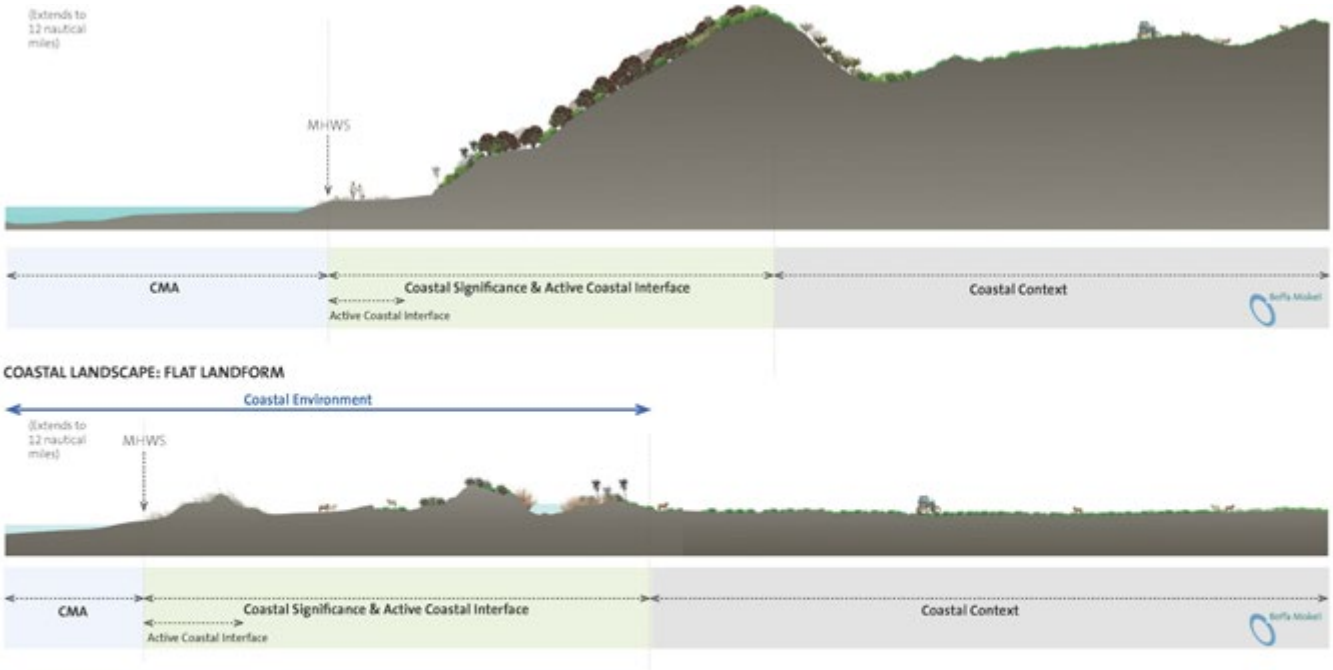


Figure 1: Representative diagrams of the coastal environment

The coastal environment has been divided into two areas to aid description. These two areas, divided by the mean high water spring (MHWS) mark, are labelled Coastal Terrestrial Areas and Coastal Marine Areas. Landward of the coastal environment is a zone labelled the Coastal Context zone. A description of each zone is summarised below:

As outlined earlier, WRC have already determined the extent of the coastal environment and the above methodology of dividing the coastal environment into two zones is purely a way of organising the data.

Coastal Landscape

Coastal environment

Coastal Context

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 of a river or a point that is calculated by multiplying the width of the river mouth by five.
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 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 perception. This zone is where coastal processes are significant and may include cliffs, settled (or modified) dune lands, farm land, settlements and coastal forests. For this project, this zone is also referred to as the **Coastal Terrestrial Zone**.
Zone C	**Coastal Context**. This area is where coastal elements, patterns and processes have an influencing presence on the coastal landscape and would include developed dune ridges which no longer exhibit significant coastal processes plus coastal plains and hill-slopes. This zone generally extends inland from Zone B to where coastal influences are sufficiently diminished. It is also recognised that 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 will not be identified as it falls outside of the Coastal Environment.

Above: Golf course and and housing development on Omara Spit, Whangapoua Harbour

Coastal Natural Character

Definition of Natural Character

The environments with the greatest natural character are those with comparatively low levels of human modification. Areas with high natural character are 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. At a workshop convened by DOC in August 2011 the following definition was confirmed:

'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[2] 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.'[3]

This is the definition adopted for this study. Essentially, BML understand that natural character is a sub-set or component of landscape. Whereas landscape encompasses biophysical, aesthetic and associative components, natural character is primarily concerned with the degree of naturalness associated with the natural elements, patterns and process within the landscape (or coastal environment in this study) and the level or degree of modification to those components.

Naturalness

The term 'naturalness' has been discussed in numerous Environment Court decisions, including Long Bay[4], 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 the development of this definition, 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;

2. 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.

3. Department of Conservation Natural Character Workshop Minutes; 2 August 2011(DOCDM-795012)

4. A78/2008, Long Bay – Okura Great Park Society v North Shore City Council

(g) a range of natural character from pristine to modified;

(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, BML 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 and take a broader view that can encompass both indigenous and exotic natural attributes. Accordingly, the thresholds differ and a refined definition of 'naturalness' was agreed as being:

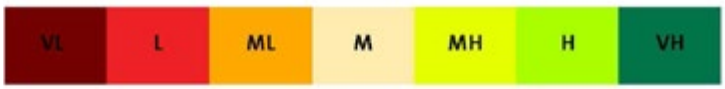
"A measure of the degree of human modification of a landscape/ seascape or ecosystem expressed in terms of:

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 Decision[5] , where the court restated the principle that perceptions of naturalness under the RMA are 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 (i.e. recreational) factors.

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



This construct was also reiterated within the Port Gore mussel farm decision[6]. 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.

For the purposes of this report, the term 'natural' is interpreted slightly differently for use in the terms 'natural' character and 'natural' landscapes. Natural as in 'natural character' is inferring a bias towards the natural science attributes with some experiential aspects, whilst natural as in 'natural landscapes' is referring more to the visual or aesthetic aspects of naturalness (i.e. it looks natural) rather than ecological intactness.

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 directive policies that require the 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.

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

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

Method

Since and through the 2011 BML and DOC workshops, BML has developed a robust and consistent assessment approach that incorporates landscape and ecological expertise while taking into consideration the 'MfE definition', relevant case law and those definitions developed in the NZILA Best Practice Note 2010[7] . The assessment approach is based on agreed interpretation of key terminology and 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).

For this study, the following points are relevant:

- the methodology can be adapted to suit different types and scales of coastal landscapes and ecosystems;
- an understanding of 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;
- natural character assessment occurs on a continuum of modification 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/ uncluttered by obvious or disruptive human influence; and
- coastal natural character is context-dependent and can change over time.

7. Best Practice Note 10.1: Landscape Assessment and Sustainable Management, 2010

Evaluation of Natural Character

For the purposes of this study, the degree of natural character will be ranked on a seven-point scale:

- Very High (least degree of modification)
- High
- Moderate to High
- Moderate
- Moderate to Low
- Low
- Very Low (greatest degree of modification).

In accordance with the requirement outlined within Policy 13 of the 2010 NZCPS, at least areas of high and very high natural character will be mapped. Areas of Outstanding Natural Character will also be considered and where appropriate these will also be mapped. The overall natural character for each Coastal Terrestrial and Coastal Marine Area will be obtained by amalgamating the 'values' assigned to each of the components assessed.

Following the methodology used for the Marlborough Coastal Study, the division of the study into Coastal Terrestrial Areas and Coastal Marine Areas is recommended. This division will be partly informed by Victoria Froude's QINNCE assessment for the East Coast, which extends from the WRC's boundary with Auckland Council north of Wharekawa to Cape Colville, the northernmost point of the Coromandel Peninsula. A QINNCE assessment of the remainder of the East Coast (i.e. the coastline from Cape Colville to the boundary with the Bay of Plenty Regional Council) as well as the entire West Coast, has not been completed.

On that basis, specialist scientists (i.e. terrestrial and marine ecologists) determined the spatial extent of the Coastal Terrestrial and Coastal Marine Areas.

Interpretation of the QINNCE measurements of natural character is incorporated by review of the mapped units and scoring and descriptions associated. Where areas are identified as having higher QINNCE scores these have been reviewed and where appropriate aligned to potential areas of high, very high or outstanding natural character.

The study team then made a collective judgement on appropriate boundaries between Areas. The factors influencing delineation of Coastal Terrestrial Areas included landform composition, freshwater catchments, land management and land cover. Aspects influencing delineation of the Coastal Marine Areas included continuity of biotic patterns parallel to the shore, down the intertidal and subtidal zones and influences of exotic species and water quality. The objective of defining the Areas was to delineate areas with a generally homogeneous level of natural character.

A number of key attributes needs to be considered when assessing the natural character of the coastal environment. The Waikato Regional Policy Statement (RPS) outlines a table listing the necessary natural character assessment criteria (Table 12-3). This includes Biophysical characteristics and Perceptual values. Through BML's experience, including the interpretation of the NZCPS 2010 and the RPS, the list of attributes outlined in Tables 1 and 2 *(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. They include all aspects of the RPS and where necessary we have specifically outlined them.

The attributes include:

- Abiotic (non-living) components,
- Biotic (living) components and
- Experiential (or perceptual) components.

These three attributes generally avoid potential double-counting aspects that could be considered to sit in numerous components (i.e. land use involves both biotic and experiential aspects; dynamic components relate just as much to biophysical aspects as it does to experiential).

The attributes are described for each Coastal Marine Area and each Coastal Terrestrial Area for both the East Coast (identified in Section C) and the West Coast (identified in Section D) and are assessed for their degree of natural character by way of a matrix/evaluation table (refer to Table 3). For robustness, the natural character assessment criteria are included as listed in Table 12-3 of the Waikato Regional Plan, albeit re-ordered to three categories. The descriptors in the tables overleaf are considered to adequately reflect (and enhance in some cases) the Regional Plan criteria.

The list of attributes has been developed to avoid double-counting if possible and to ensure that the indicators for each attribute are mutually exclusive. They expand on the coastal environment diagram on Figure 1. As Table 1 and Table 2 illustrate, the indicators of natural character for each attribute differ between the Coastal Marine Area and the Coastal Terrestrial Area. Perceptual and experiential attributes for each 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 described specific to the particular area (rather than using standard descriptions) so that variations in the attributes between different areas are recorded and taken into account when assessing the degree of natural character. An overall value judgement as to the degree of natural character is made for each Coastal Terrestrial Area and each Coastal Marine Area. This data can inform decisions on an area's collective 'natural character' rating, involving both marine and terrestrial areas. There is a natural 'weighting' towards biophysical components (i.e. abiotic and biotic) over perceptual (experiential), as outlined within Diagram 1.

BML Marine Scientist Dr. Sharon De Luca described the abiotic and biotic characteristics for the Coastal Marine Areas. BML Ecologist, Louise Saunders described the abiotic and biotic characteristics for the Coastal Terrestrial Areas. BML Landscape Architects, James Bentley and Rebecca Ryder, described the experiential characteristics for both the Coastal Marine Areas and Coastal Terrestrial Areas. Further assistance and technical advice was provided by those listed on Page 1 of this study, including District and Regional Council and staff from the Department of Conservation.

It is important to note that 'experiential' aspects that are mentioned within Policy 13(2) of the NZCPS refer to the degree of naturalness of the coastal environment (as per the definition of natural character - *refer to earlier sections of this report*). Wider interpretations of experience (i.e. recreational activities) of a place are more associated with landscape assessments and, for Waikato, are considered within the Regional Landscape Study.

Table 1

Coastal Marine Areas – Zone A		
Attributes	**Descriptors**	**Spectrum of naturalness***
Marine Abiotic Systems	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. Including RPS Assessment criteria: Landforms (Geology/ Geomorphology), Sea/ Estuarine Water Bodies (abiotic) Natural Processes (abiotic)	- 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;
Marine Biotic systems	- 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 biota, reef and soft sediment communities, estuaries/ wetlands, marine mammals and sea birds; - The expression/ appearance of ecological features and processes. Including RPS Assessment criteria: Sea/ Estuarine Water Bodies (biotic) Activities/ Structures Natural Processes (biotic)	- 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;
Marine Experiential	- 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. Including RPS Assessment criteria: Wilderness/ Remoteness; Experiential Attributes; Context/ Setting Transient/ Dynamic attributes Night-time values	- 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;

NATURAL SCIENCE

HUMAN

** 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.*

Table 2

Coastal Terrestrial Areas – Zone B		
Attributes	Descriptors	Spectrum of naturalness*
Terrestrial Abiotic Systems	- 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. Including RPS Assessment criteria: Landforms (Geology/ Geomorphology) Natural Processes (abiotic)	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	- 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. Including RPS Assessment criteria: Vegetation Cover & Type; Land Uses/ Activities/ Structures Habitat Value Natural Processes (biotic)	- 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.
Terrestrial Experiential	- 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. Including RPS Assessment criteria: Wilderness/ Remoteness; Experiential Attributes; Context/ Setting Transient/ Dynamic attributes Night-time values	- 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,

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** Each Coastal Terrestrial 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.*

For an area to rate 'high' or 'very high' for experiential aspects of natural character, their intactness of biotic and abiotic factors needs to be high with no or little human modification. This means that, for example, a popular beach near a populated area, is likely to rate moderate/ low in terms of the experiential attributes of natural character due to the lack of high degrees of naturalness (remoteness/ darkness of the sky etc.) and high level of modifications, despite the extensive range of available recreation opportunities in the area. The shared and recognised aspects of available recreation infrastructure and activities are factored into landscape assessments as a positive contributor, while it is considered a detractor in natural character assessments. No cultural input has yet been sought through consultation with iwi.

Experiential descriptions for the marine areas have been generally restricted to 'above-water' experiences or activities. Where specific dive sites or notable underwater experiences are recognised, these have been recorded. No community engagement or consultation has been undertaken within this phase of the project. Experiential characteristics and values are therefore those researched by the study team.

While it has been possible to obtain marine scientific data, the data is limited and significant gaps exist. However, the mapped areas reflect the best existing knowledge and it is anticipated that mapping can be updated as further information is obtained.

Further development of the experiential values within this report will be undertaken by Council in consultation with iwi, landowners, stakeholders and the general public.

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 use of GIS tools such as SeaSketch assisted in determining characteristics such as aquaculture locations and trawling/ shipping routes, which also had a bearing on the evaluation. The present study therefore focused on the marine environment closer to shore and where possible used data to support decisions further away from land. Generally a buffer of 2km offshore was used, as was enclosed bays and coves. Where appropriate bathymetric data has also informed the extent of the identified Coastal Marine Area's and was mainly applied around island groups and rocky shorelines extending beyond the 2km bufffer area.

Although the Coastal Context (Zone C illustrated in Figure 1) is considered and described because of its potential to influence natural character within the coastal environment, no natural character rating is ascribed to Zone C.

The following table (Table 3) shows the matrix approach used to rank the level of natural character in relation to the natural character attributes.

Table 3

Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High			
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
	Overall Natural Character Rating		Moderate to High

Study Scale

Natural Character assessments use different scales of reference that steadily decrease from the broad regional scale to the detailed local scale. Natural character is 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.

As the simplified diagram in Figure 2 illustrates, for this study both a broad-scale (Level 1 and 2) and more detailed scales (Levels 3-4) are considered. The broader scale, which is essentially the entire Waikato Region (Level 1) and the two coastal areas – East and West (Level 2), are described in Section B. Sections C and D describe the Level 3 Coastal Terrestrial and Coastal Marine Areas for both coasts. Where appropriate, areas at Levels 4 are described.

The hierarchical approach, depicted by Figure 2 has been useful in further identifying specific features or stretches of coastline with higher levels of natural character compared to the remaining parts of the Coastal Marine and Coastal Terrestrial Areas.

Areas with Outstanding Natural Character are addressed in Section E as set out in the Section below.

Natural Character Scale

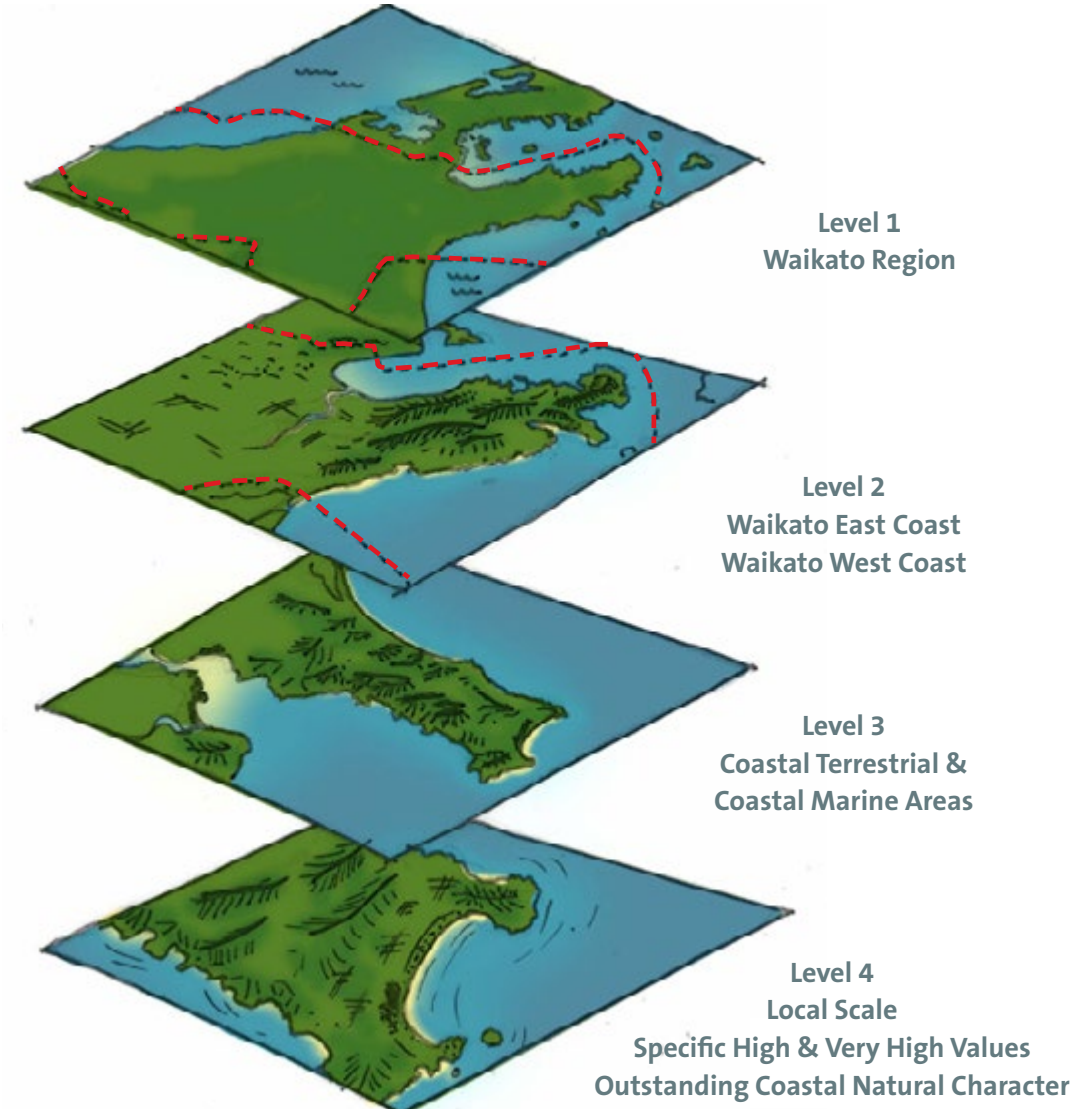

Figure 2: A diagram representing the range of scales of study for natural character related work as outlined in this study

Outstanding Natural Character

Areas of Outstanding Natural Character have been identified through a detailed assessment process (at the **Level 4 scale**) and mapped in **Section E** 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. 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 contains outstanding natural character:

"(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 BML definition:

'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 (at Level 4). This decision to separate out this assessment from the main natural character study required a re-evaluation of the highest rated areas (i.e. high and very high) at the local scale (Level 4 for the purposes of this study). The re-evaluation of the high and very high areas means that only the highest rated areas of natural character will be considered. This approach is also consistent with studies identifying outstanding natural landscapes (i.e. a landscape or feature must be of sufficient naturalness to be considered outstanding).

It was also determined that outstanding natural character should combine both terrestrial and marine components (as opposed to the Level 4 assessment which considers them separately) 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.

Below: Mussel farm traffic, Firth of Thames

Method

Under the methodology, an area of outstanding natural character 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 Waikato Region. (Boffa Miskell)

An assessment to establish whether all or parts of a coastal area contain outstanding natural character needs only be undertaken when an area rates high or very high at the most detailed mapping scale (i.e. Level 4). Where adjacent land and sea are mapped as either high or very high at the Level 4 scale, particular emphasis is taken to examine the sequential relationship of biotic patterns.

The evaluative study of outstanding natural character areas is undertaken at a regional or district scale, therefore comparison of other areas within the region or district is critical in understanding the outstanding values and characteristics that underpin these areas.

Digital and GIS Mapping data

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

The Study Team have compiled a vast GIS library of data from a number of sources. This information was used to inform the descriptions and mapping extents of specific kinds of data and has not been reproduced within the accompanying maps.

The study team utilised the following GIS sources from **Boffa Miskell**:

- Topo Maps (LINZ)
- Digital contour information at 20 metre intervals (LINZ)
- New Zealand Land Cover Database v3 (derived from the 2007-2008 LUCAS satellite imagery)
- DOC conservation units
- QE II covenants
- River Environment Classification (NIWA)
- Land Resource Inventory (Landcare Research)
- Regional and Territorial Authority boundaries
- Geopreservation Sites

The following information was supplied by **Waikato Regional Council**:

- QINCCE report and associated data sets (mapping)
- Coastal Environment Line
- Bioclimatic Zones
- Cycle & Walking Tracks

- Boundary to 12 mile limit
- NZ topo coastline
- Biosecurity Key ecological sites
- Biodiversity Vegetation 2002
- Biodiversity Vegetation 2007
- Community Biodiversity layers
- Agribase layers
- Marine Farms
- Harbours, moorings and anchorage
- Estuarine vegetation, harbour features, mangrove extents
- Outstanding Natural Features and Landscapes
- Sea Change – Tai Timu Tai Pari – Hauraki Gulf Spatial Plan online GIS layers (seasketch)

The following information was supplied by **Thames Coromandel District Council**:

- Landscape Amenity
- Landscape Outstanding
- Current Coastal Erosion Line
- Future Coastal Protection Line
- Natural Character

The following information was supplied by **Hauraki District Council**:

- Significant Natural Features Inventory (mapped BML)
- Significant Natural Areas

The following information was supplied by **Auckland Council** (to cover the former Franklin District Council area that is now within the jurisdiction of Hauraki District Council and Waikato Regional Council):

- Cultural heritage Index
- Sites of Special Wildlife Interest
- Recommended Areas for protection
- Sites of Natural Significance
- Protected Natural Areas Vegetation
- Protected Natural Areas Wildlife
- Protected Natural Areas Landforms
- Natural Heritage Wetlands
- Landscape Values
- High Conservation Value
- Geology Types
- Coastal Protection Area
- Regional Parks
- Outstanding Natural Feature or Landscapes

The following information was supplied by **The Department of Conservation**:

- Nga Whenua Rahui Covenant protected areas

The following information was supplied by **Otorohanga District Council:**

- West Coast Landscape and Natural Character Assessment (Kawhia and Aotea Catchments)

Local District Council relevant Sites of Ecological Significances, Oustanding Natural Features and Landscapes and Natural Character Areas.

New Zealand Land Cover Database (LCDB)

To assist in understanding the land cover for each Coastal Terrestrial Area, BML 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 three editions, LCDB-1, LCDB-2 and LCDB-3, 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 v4 (or LCDB-4) 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 four periods; summer 1996/97, summer 2001/02, summer 2008/09 and summer 2012/13 for LCDB-4. The data set was designed to be compatible in scale and accuracy with Land Information New Zealand's 1:50,000 topographic database. LCDB-4 was released in June 2014 and

Below: Quintessentially the Coromandel: Pohutukawa tree in bloom

includes a change layer, "LCDB v4.0 change" which is available to indicate both non-temporal and temporal changes made between LCDB v3.3 and LVCDB v4.0. The non-temporal changes include error in earlier mapping. An "authority" attribute is also available in this layer acknowledging the source of the latest mapping of both non-temporal and temporal change.

BML amalgamated a number of vegetation types to best represent a 'snap shot' of percentages of different types of land cover. For example, for the Port Jackson Coastal Terrestrial Area, 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:

- **Indigenous Forest** (Indigenous forest)

- **Native Shrubland** (Fernland; manuka/kanuka; matagouri or grey scrub; broadleaved indigenous hardwoods; sub alpine shrubland)

- **Native wetland** (herbaceous freshwater vegetation; herbaceous saline vegetation and flaxland)

- **Mangrove** (mangrove)

- **Exotic treeland** (Exotic forest; forest-harvested; deciduous hardwoods)

- **Exotic Scrub** (gorse and broom; mixed exotic shrubland)

- **Rural Production Land** (High producing exotic grassland; low producing grassland; tall tussock grassland, depleted grassland; short-rotation cropland; orchard vineyard)

- **Bare or Lightly-vegetated surfaces** (sand and gravel; gravel and rock; landslide; permanent snow and ice; alpine grass/ herbfield)

- **Artificial Surfaces** (built-up areas, urban parks/ open space; surface mines and dumps; transport infrastructure)

Below: Sugar Loaf Wharf, Te Kouma

Left: Matarangi Beach and the settlement of Matarangi