

Natural Character Study of the

**WAIKATO  
COASTAL  
ENVIRONMENT**



# Waikato Regional Council Technical Report 2016/05R

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**

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# 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.*



...ous Hardwoods		
... (settlement)	CTA 15	
... Open Water	CTA 15	
... Forest	CTA 15	
... Gorse and/or Broom	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	7,1
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	648,1
2 Broadleaved Indigenous Hardwoods	CTA 16	408,3
18 Estuarine Open Water	CTA 16	200,0
23 Exotic Forest	CTA 16	207,0
9 Flaxland	CTA 16	
... Gorse and/or Broom	CTA 16	1
... Herbaceous Saline Vegetation	CTA 16	
... Producing Exotic Grassland	CTA 16	
... Forest	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')<sup>1</sup> 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

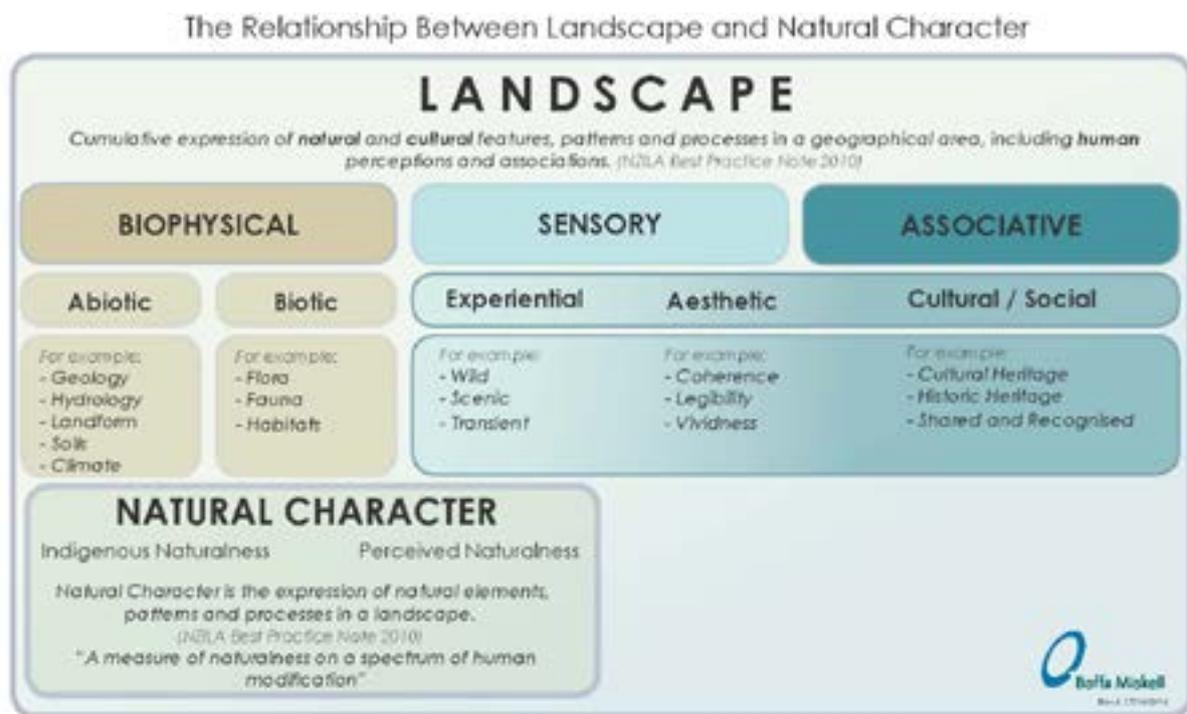


Diagram 1: The relationship between landscape and natural character under the RMA as interpreted by Boffa Miskell

## 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.

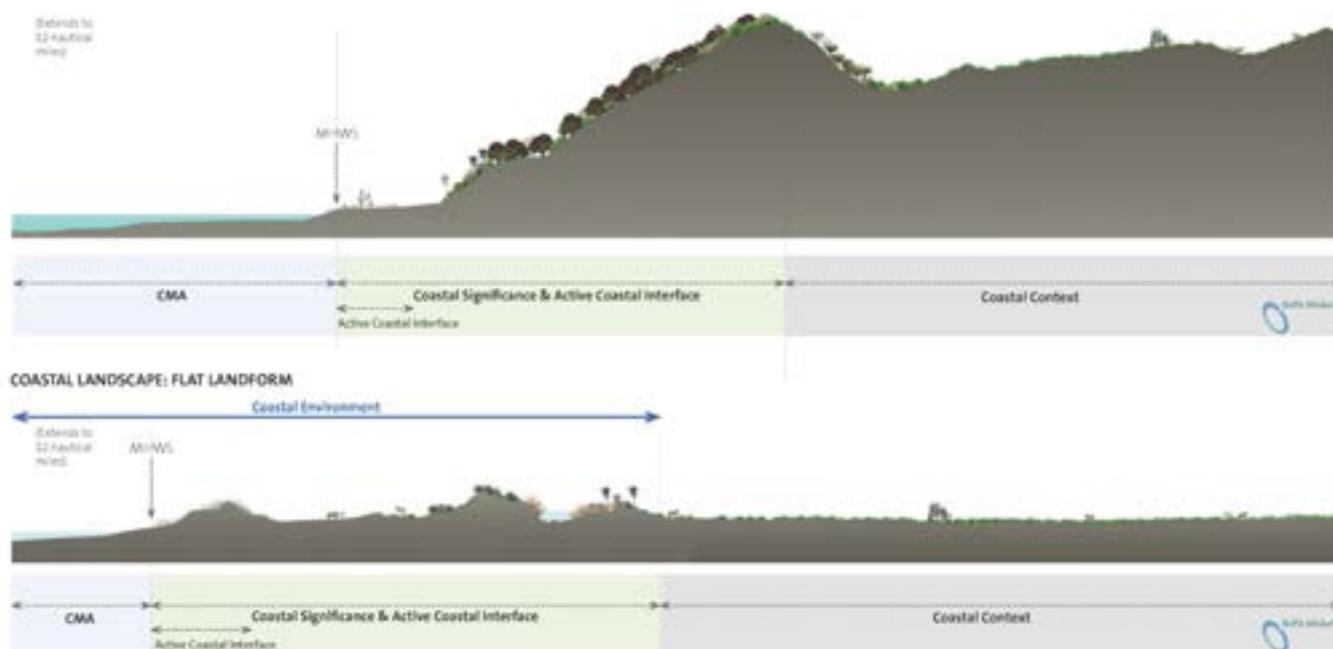


Figure 1: Representative diagrams of the coastal environment

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 ↓	<b>Zone A</b>	This zone includes the <b>Coastal Marine Area (CMA)</b> . 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.
	<b>Zone B</b>	The <b>Coastal Significance Zone</b> 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 <b>Coastal Terrestrial Zone</b> .
	<b>Zone C</b>	<b>Coastal Context.</b> 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 hillslopes. 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 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<sup>2</sup> 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.<sup>3</sup>***

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<sup>4</sup>, 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.”*

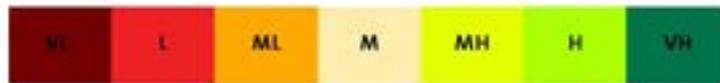
Recognising a lack of guidance for implementing and interpreting the NZCPS 2010, BML held a two-day in-house workshop in early 2011 to develop a consistent approach to natural character assessment and interpretation of NZCPS 2010 terms. At this workshop, it was evident that ecologists’ and landscape 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<sup>5</sup>, 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<sup>6</sup>. 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<sup>7</sup>. 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.

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

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## 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, these have been 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 were 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*
↑ NATURAL SCIENCE ↓	<b>Marine Abiotic Systems</b> 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.	- 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;
	Including RPS Assessment criteria: Landforms (Geology/ Geomorphology), Sea/ Estuarine Water Bodies (abiotic) Natural Processes (abiotic)	
	<b>Marine Biotic systems</b> - 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)		
<b>Marine Experiential</b> - 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.	- 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;	
Including RPS Assessment criteria: Wilderness/ Remoteness; Experiential Attributes; Context/ Setting Transient/ Dynamic attributes Night-time values		
↑ 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*
<p style="text-align: center;">↑</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">NATURAL SCIENCE</p>	<p><b>Terrestrial Abiotic Systems</b></p> <ul style="list-style-type: none"> <li>- Climatic influences (wind, rain, exposure);</li> <li>- Geomorphology and identification of different types of landforms (i.e. peninsulas, cliffs, dunes, wetlands);</li> <li>- Terrestrial coastal processes, including erosion, river mouth processes including sedimentation (within the terrestrial zone);</li> <li>- Freshwater processes.</li> </ul>	<p>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.</p>
	<p>Including RPS Assessment criteria:</p> <p>Landforms (Geology/ Geomorphology)</p> <p>Natural Processes (abiotic)</p>	
<p style="text-align: center;">↓</p>	<p><b>Terrestrial Biotic systems</b></p> <ul style="list-style-type: none"> <li>- The margins of estuaries, wetlands and terrestrial areas in Zone B including the intactness of their natural ecological processes, patterns and elements;</li> <li>- Extent of freshwater communities;</li> <li>- Land cover and associated land use, including the composition, distribution and condition of land cover and the presence of indigenous/exotic species;</li> <li>- Presence of indigenous fauna.</li> </ul>	<p>- 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;</p> <p>- This attribute also includes modifications to freshwater systems, including channelizing watercourses, stop banks, culverts, dams etc. which affect freshwater biota.</p>
	<p>Including RPS Assessment criteria:</p> <p>Vegetation Cover &amp; Type;</p> <p>Land Uses/ Activities/ Structures</p> <p>Habitat Value</p> <p>Natural Processes (biotic)</p>	
<p style="text-align: center;">↑</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">HUMAN</p> <p style="text-align: center;">↓</p>	<p><b>Terrestrial Experiential</b></p> <ul style="list-style-type: none"> <li>- The experience in seeing, feeling and perceiving the Coastal Significance and Active Coastal Interface;</li> <li>- Aromas, visual and scenic, auditory, sense of wildness, remoteness, isolation, natural darkness of the night sky;</li> <li>- Ephemeral biotic activity (i.e. seasonality of flora, presence of birds);</li> <li>- Ephemeral human activity affecting the naturalness (such as recreation, commercial activities);</li> <li>- Note, this attribute does not include heritage elements.</li> </ul>	<p>- 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;</p> <p>- Presence of exotic species;</p> <p>- Presence of humans, including recreational activities (driving, walking, camping, settlements);</p> <p>- Note, different people experience naturalness differently,</p>
<p>Including RPS Assessment criteria:</p> <p>Wilderness/ Remoteness;</p> <p>Experiential Attributes;</p> <p>Context/ Setting</p> <p>Transient/ Dynamic attributes</p> <p>Night-time values</p>		

\* 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. Therefore, the present study 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 buffer 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
<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>			
	<b>Overall Natural Character Rating</b>		<b>Moderate to High</b>

## 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

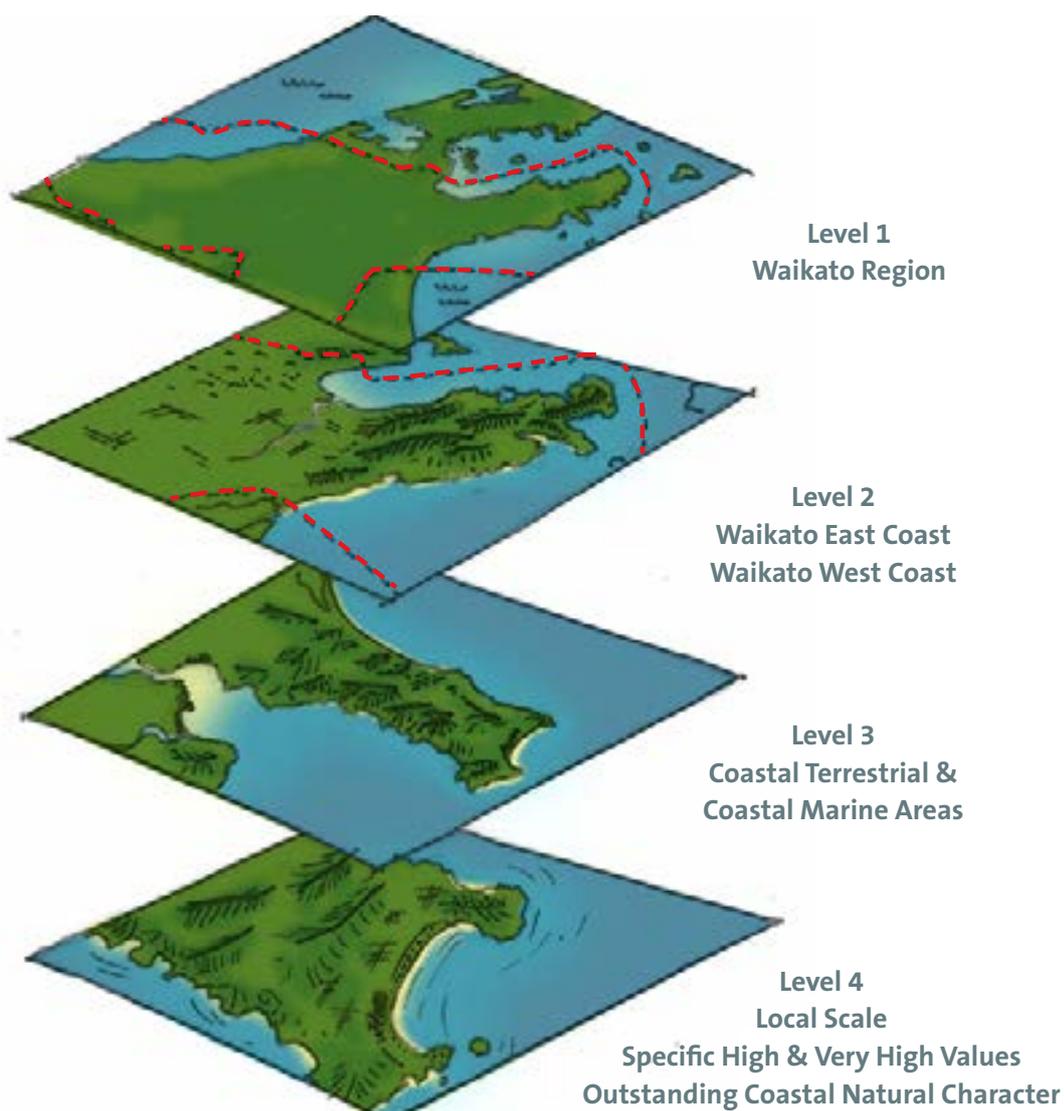


Figure 2: A diagram representing the range of scales of study for natural character related work as outlined in this study

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## 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**:

- QINCCCE 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 (Kaawhia and Aotea Catchments)

Local District Council relevant Sites of Ecological Significances, Outstanding 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.

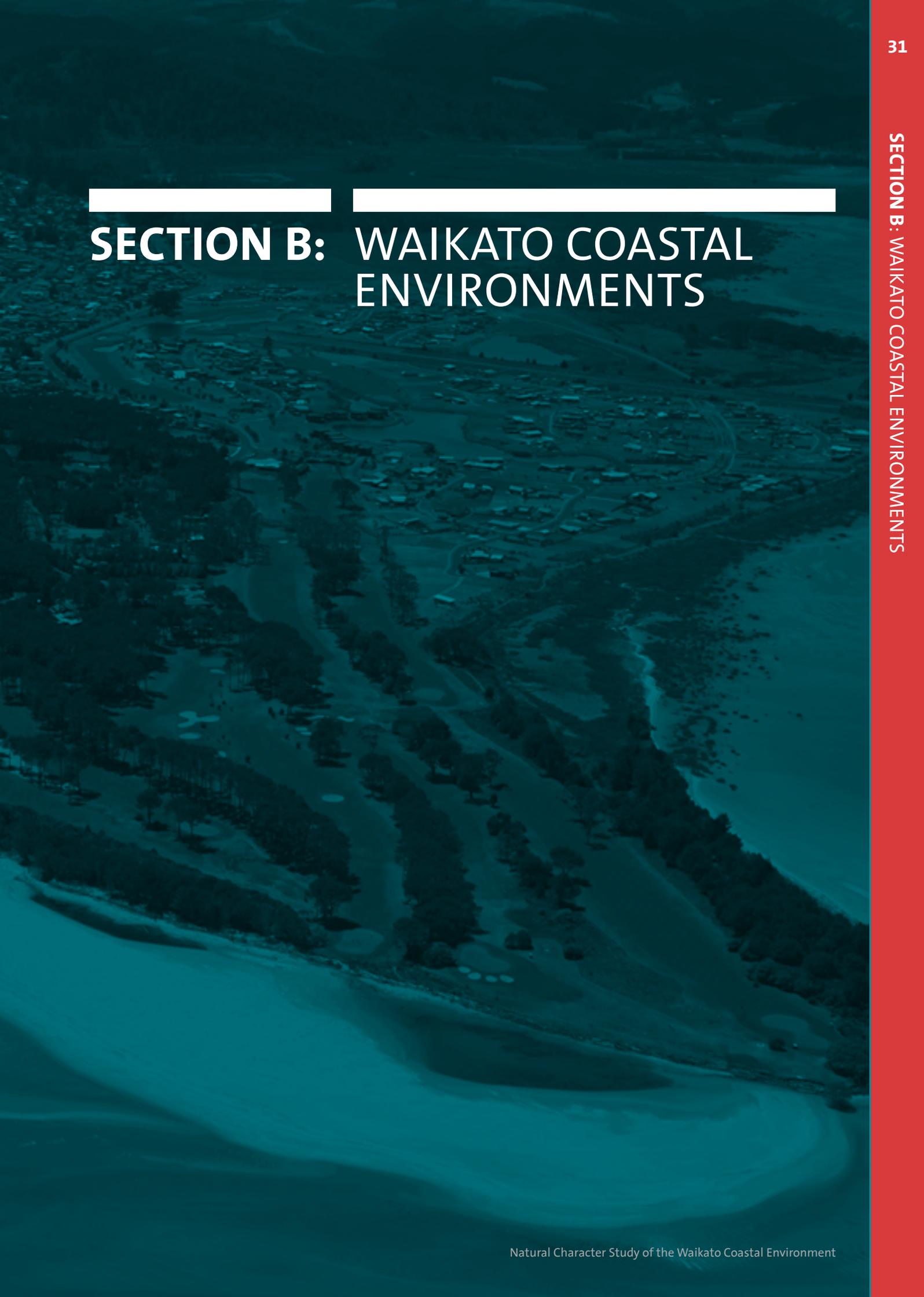
BML amalgamated a number of vegetation types to best represent a ‘snap shot’ of percentages of different types of land cover. For example, for the Port Jackson Coastal Terrestrial Area, each ‘Biotic’ subsection within Level 3 starts with an overview of that particular Coastal Terrestrial Area, followed 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*







# SECTION B: WAIKATO COASTAL ENVIRONMENTS

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## Introduction to the Waikato Region & its Coasts

The Waikato Region encompasses a tract of land extending across the central upper North Island to connect with two very different coastal areas; the rugged west coast, which includes Kaawhia and Whaangaroa harbours and the Hauraki Gulf, Firth of Thames and waters off the Coromandel Peninsula within the Region's east. The Region is highly fertile and retains a varied topography from the low-lying Hauraki Plains bordering the Firth of Thames, to the indigenous forest-clad mountains that define the spine of the Coromandel Peninsula. The coastal environment of this Region of two coasts is justifiably varied and is recognised by its broad topography and large population of people that live and reside within and adjacent to this area.

The Region comprises a number of Districts. Those with a coastal component include Waikato, Otorohanga and Waitomo Districts in the west and Hauraki and Thames Coromandel Districts in the east.

In the west, the large harbours of Whaangaroa, Aotea and Kaawhia are accessible sheltered areas which are very different from the remaining rugged and broadly isolated coastline.

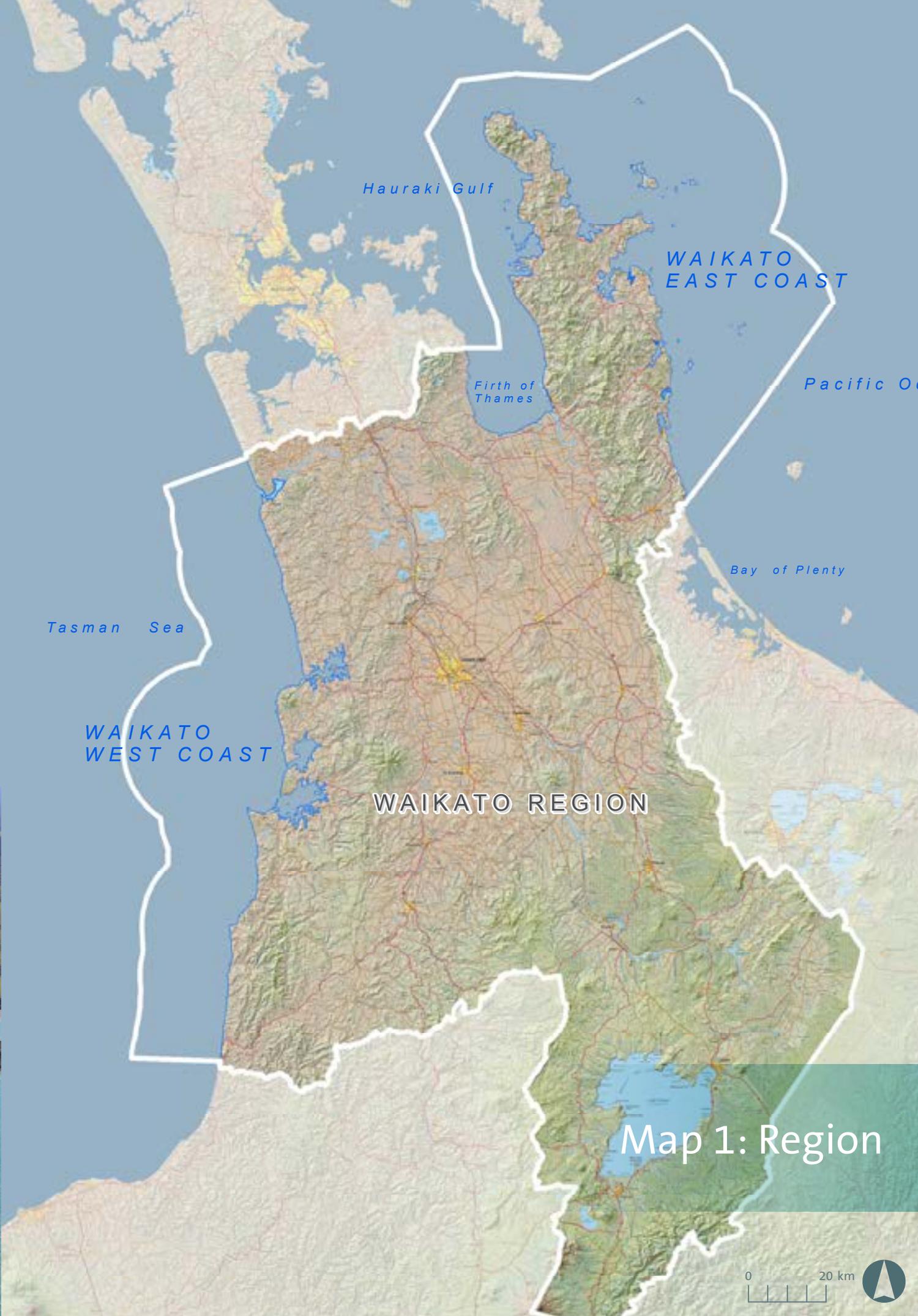
Central to the Region's eastern shores is the prominent Coromandel Peninsula which forms a significant part of this part of the region's coastal landscape. The coastal environment of this part of the region also includes the calmer waters of the Firth of Thames.

Broadly, the East Coast coastal environment can be divided into two broad areas: the Hauraki Gulf and Firth of Thames Area (western side) and the Western Bay of Plenty and Pacific Ocean Area (or the eastern side). Within the West Coast, the deeply indented, predominantly sheltered harbours contrast with the linear, exposed coastline which forms the majority of this coastal length.

Each coast area is outlined and described over the page.

*Below: Te Kouma Harbour*





Map 1: Region





## Waikato East Coast: Hauraki Gulf & Firth of Thames

The Hauraki Gulf and Firth of Thames occupy the western half of Waikato's East Coast. The broad open and predominantly sheltered waters of the Hauraki Gulf extend further westwards towards the adjacent Auckland Region. The Firth of Thames is framed by the Hunua Ranges to the west and the Coromandel Range to the east. Towards the north, the waters are associated with the more open character of the Hauraki Gulf and support numerous islands, craggy peninsulas and large embayments.

## Waikato East Coast: Eastern Coromandel Peninsula

Extending from Cape Colville to the border with the Bay of Plenty Region, the eastern half of Waikato's East Coast is rugged and more open and exposed than the western half. This part includes many indented bays, coves, and numerous island groups. Large estuaries frequent this side of the peninsula supporting an array of habitats.

## Broad Collective Characteristics

The coastal environment of the Waikato East Coast comprises a relatively slender strip of land which varies considerably from the western shores of the Firth of Thames to the eastern shores of the Coromandel Peninsula. This section outlines the collective characteristics and values at the Level 1 and 2 scales. For the purpose of this report, only Level 2 (the Waikato East Coast) will be rated at the end of this section.

The interplay of the various characteristics both on land and within the sea create a unique environment for its broad scale variability. The marine component is described first, followed by the terrestrial component.

*Left: Hauraki Gulf Mangroves*

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## Marine

### **Collective Abiotic Characteristics of Waikato's East Coast Coastal Marine Environment**

The Coromandel Peninsula comprises an uplifted horst block that is tilted eastward and forms the eastern-most part of the Hauraki Volcanic centre (Bradshaw, 1991). The East Auckland current flows southward adjacent to the north-east coast as a series of vortices. Along the northeast coast of New Zealand, the tidal stream runs northeast on the flood tide and southeast on the ebb tide. The tidal velocity on a spring tide in the open ocean is approximately 0.5 m/s, reducing to approximately 0.13m/s on the east coast (Bradshaw, 1991).

As the northeast coast of New Zealand is sheltered from winds and swells generated across the Tasman Sea, the wave energy is lower and more variable on the northeast coast of New Zealand compared to other exposed coastlines. The northeast coast is a variable and mixed storm/swell wave environment (Bradshaw, 1991).

There is an active tectonic plate margin beneath the East Coromandel coastline which results in a steep rocky coastline and a relatively narrow continental shelf. The coastline comprises steep rocky headlands separated by narrow shallow bays. The southern exposed coast is higher energy and the conditions are current dominated, whereas the northern embayed coastline is lower energy and conditions are wave or current dominated. The east Coromandel coastline has a history of coastal erosion associated with episodic storms from the north and east (Bradshaw, 1991).

Firth of Thames lies within the southern part of the Hauraki Gulf. Both the Waihou and Piako rivers drain into this area along with smaller natural waterways and numerous canals from the extensive drainage networks located on the Hauraki Plains. These drainage networks have flows sourced from the intensively farmed Waikato Plains, peat bogs and occasional point source inputs such as municipal wastewater treatment and industrial facilities. In aggregate, these water ways contribute to the nutrient and sediment loads entering the Firth.

The tidal environment of the east coast of the Coromandel is microtidal, with small variations in tide height (Bradshaw, 1991).

Estuaries of the east Coromandel are generally small and shallow, whereas beach morphologies are either coarse grained pocket systems or medium to fine beaches with barrier spits.

There has been rapid expansion of mangrove habitat in estuaries on the Coromandel Peninsula over the past 25 years primarily due to increased sediment discharged from the land.

Wetlands of the Firth of Thames comprise extensive intertidal mudflats. Large shell banks (Chenier Plains) were formed some 4,500 years ago and are arguably one of the best functioning examples of this ecosystem globally. This wetland is of international importance for wading birds - under the RAMSAR Convention.

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## Collective Biotic Characteristics of Waikato's East Coast Coastal Marine Environment

The Firth of Thames lies within the Hauraki Gulf Marine Park. The Hauraki Gulf is recognised as having high biological diversity and environmental quality (O'Donnell, 2011). The Firth of Thames comprises extensive intertidal mudflats and large shell banks were formed some 4,500 years ago. This wetland is of international importance for wading birds.

Firth of Thames is a wetland of international importance under Ramsar Convention. Threats to the ecological values of the Firth of Thames include dairy-farm runoff, historic mussel dredging (>40 ago) and sedimentation. Southern right whales and Bryde's Whales can be seen in the bay to calve and rest.

The west coast of the Coromandel Peninsula contains a number of gravel beaches, sandy beaches, estuaries and rocky shore habitats. The marine environment comprises a diversity of invertebrates and fish and supports a number of coastal and wading bird species. There are also a number of Areas of Significant Conservation Value (ASCV) on the west coast.

The east coast also contains a number of ASCVs, all of which are important for coastal and wading birds (Dowding, 2013). Most of the sand dunes and spits present in this area have been modified to some extent by human activity e.g. introduction of exotic species, coastal subdivision, grazing and pine plantations. Some foredunes have natural communities of spinifex and shore bindweed and some rear dunes contain communities of pohuehue, knotted sedge, tauhinu and sand coprosma. Natural gravel beach communities are rare and are primarily dominated by exotic species. Some of the estuaries and harbours have retained their natural vegetation communities (Humphreys and Tyler, 1990).

Aquaculture (only mussel and oyster) is a dominant feature along the western coasts of the Coromandel Peninsula, with only minimal presence along the eastern coast.

New Zealand dotterel, an endangered bird, can be found on a number of beaches on the Coromandel.

Sheltered from the worst of the southerly winds Te Whanganui A Hei Marine Reserve supports an array of rich and varied habitats. Reefs of hard rock, soft sediments, intricate caves, and underwater arches provide homes for complex communities of plants, crustacean, molluscs and fish (DOC).

## Collective Experiential Characteristics of Waikato's East Coast Coastal Marine Environment

The Coromandel Peninsula is regarded as one of the North Island's most popular recreation and leisure destinations. From open sandy coastline to sheltered harbours to wide sand bays and rocky coastline, the Coromandel offers opportunities for almost every type of water based recreational activity. Fishing, diving, snorkelling, sailing, surfing, water skiing, kite boarding, stand up paddle boarding, canoeing and kayaking and kaimoana gathering are some of the many recreational activities that frequent these coastal waters. Access to the water's edge is apparent along the majority of the coastline. Steeper rocky shorelines and islands are the few areas where the coastal edge becomes inaccessible. Boating is a popular activity within the Coromandel with a number of settlements including marinas, being Whitianga, Tairua and Whangamata.

Three main water bodies comprise different experiences and modifications as compared to one another. The sweeping bay of the Firth of Thames with its expansive intertidal zone demonstrates a striking transient seascape with wildlife apparent throughout. Marine farming is visually apparent from most of the coastline within the Firth of Thames and is coupled with recreational fishing amongst the mussel and spat catching farms.

Further north along the Coromandel Peninsula the harbours and estuaries of Manaia, Te Kouma, Wyuna Bay, Amodeo Bay up to Colville provide sheltered harbours flanked by a scattering of islands. Pockets of mussel and oyster farms are found throughout these areas and are sited in close proximity to the islands and headlands. The waters of this area are frequented with recreational use, commercial fishing and transport routes. A sense of remoteness and isolation is gained within pocketed areas around headlands, bays, and islands; however, the area is frequented with recreational and commercial activity. Similarly many of the waters surrounding the coastline contain marine farms, jetties, boat ramps and reclamation that affects the experience of naturalness within this landscape.

Beyond Port Jackson, the Eastern Coromandel Coastal Marine Area extends south along the entire eastern edge of the peninsula to meet Orokawa Bay, within the Bay of Plenty Region. The series of bays, harbours, estuaries, and rocky shoreline are pocketed with settlements that maximise access to the water. Commercial use of the open waters is associated with offshore shipping that extends on the outer edges of the region. Other than where the coastal settlements are sited, the coastal edges and immediate adjoining water body remains unmodified. Marine farming is minimal and the coast's only marine reserve, Whanganui A Hei Marine Reserve, is located offshore of Cathedral Cove. This reserve offers good snorkelling, with excellent opportunities to view large rock lobster, snapper and other coastal species up close.

The numerous offshore islands along the Eastern Coastline provide isolated coves and bays visually discrete from the mainland shoreline.

*Above: Marina at Whitianga*



## Terrestrial

### Collective Abiotic Characteristics of Waikato's East Coast Coastal Terrestrial Environment

Waikato's East Coast encompasses a range of land types that have a direct influence on the coastal environment. The hard rock hills and mountains of the Hunua Ranges in the east and the ancient volcanic Coromandel Peninsula to the west, are separated by the low-lying alluvial Hauraki Plains. The axial Hauraki Fault, which follows the western extent of the Coromandel Peninsula, is also pivotal to the region's geomorphology.

The Waihou and Piako Rivers are the largest watercourses in this part of region and drain into the relatively shallow waters of the Firth of Thames. Formed and moulded by tectonic, fluvial, and climatic forces, this area retains distinctive geomorphic coastal features that are seen nowhere else in New Zealand.

The largest component of this dynamic coastline is associated with the ancient volcanic region of the Coromandel Peninsula. Sculpted by millions of years of erosion and coastal processes, this area retains prominent and spectacular landscape features that are remnants of solidified magma from the volcanoes that erupted during the Miocene and Pliocene periods (Molley, 2002). Therefore, the landscape is well dissected by prolonged weathering and erosion, where deep ridges, mountain plateaus and rocky pinnacles define the geomorphology of the peninsula. The 'spine' of the peninsula is flanked by rugged undulating hill-country which extends towards the coastlines creating rocky cliffs and sandy beaches.

Underlain by greywacke, some of the more impressive volcanic remnant landscapes formed by wave erosion are evident on the peninsula's eastern coast and include the coastal arch of Cathedral Cove and many of the offshore islands, including the Mercury Islands. The iconic Moehau Range dominates the northernmost part of the Coromandel. The Kuaotunu Peninsula also has some striking outcrops of basaltic rocks (Molley, 2002). Due to the previous volcanism of the peninsula, remnant reminders of hydrothermal activity are still evident along the eastern coastline and include places such as Hot Water Beach.

Streams and watercourses tend to be short, with steep valleys and often wide alluvial accumulations at the river's mouth. It is often in this 'easier' country where settlement has occurred.

A noted abiotic feature of the Coromandel are the numerous islands that dot the shoreline. Resultant of sea-level rises through glacial and past fluvial activity, the islands hold many spectacular distinctive features such as the basalt exposures on Red Mercury Island.

The flat Hauraki Plains are to the west. Formed through fluvial activity and tectonic processes, the coastal component of the Hauraki Plains comprises waterlogged gley soils, wetlands and mudflats remaining from the ancient bed of the Waikato River. An extensive shell bank (chenier plain) is a striking feature at Pūkoro - Miranda.

The climate of this coastal environment is variable, but generally very warm during the summer and moderately warm in the winter months. Frosts are light and infrequent. Humidity is high. With predominantly north-westerly and north-easterly airflows the Coromandel Peninsula tends to receive high quantities of rainfall, often in short intensive storms, varying from 1,150mm in low lying area to 2,500mm at higher elevations.

*Turquoise waters around Rabbit Island off Opito Point*



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## **Collective Biotic Characteristics of Waikato's East Coast Coastal Terrestrial Environment**

Land cover analysis: The total land area of the Coastal Terrestrial Areas is 83,932ha which includes 3,367ha of islands. Of this, 38% of the land cover is rural production land, 23% is indigenous shrubland, 13% is indigenous forest and 11% is exotic treeland. Of the remainder, 5% is waterbodies, 4% is artificial surfaces, 3% is mangroves and 1.4% is indigenous wetlands. There are very small areas (<1% each) of bare surfaces and exotic scrub, in aggregate covering only 1.2%. The total indigenous land cover is 41%.

The terrestrial coastal biota of Waikato's East Coast ranges from relatively intact and extensive indigenous ecosystems at the more remote northern end of the Coromandel Peninsula, to the highly modified and depleted production dominated areas around the Firth of Thames. Roothing access and slope appears to be a principal influence on whether the steeper land is covered in exotic forest or indigenous forest or shrubland. The more remote and inaccessible areas are still dominated by indigenous forest or shrubland.

In general, if they are present at all, mangroves, indigenous wetlands, water bodies and bare surfaces comprise only very minor parts of the landscape in every Coastal Terrestrial Area.

Pohutukawa trees are a feature of coastal slopes and are one of the most noted species in this area, principally due to their close coastal presence next to main highways.

There are numerous offshore islands. Some of which are public conservation land administered by the Department of Conservation. Others are privately owned and some are Maori-owned. Islands managed by DOC include the Mercury group (excluding Great Mercury Island (Ahuahu), Cuvier Island (Repanga Island), the Aldermen Islands and Whenuakura and Rawengaiti islands off Whangamata. These islands hold endangered fauna such as tuatara, Middle Island tusked weta, Duvaucel's gecko, tieke/North Island saddleback and Pycroft's petrel. There are also rare plants including Cook's scurvy grass, parapara, giant flowered broom and milk trees.

## **Collective Experiential Characteristics of Waikato's East Coast Coastal Terrestrial Environment**

The sweeping curve of the Firth of Thames and the indented coastline of the Coromandel Peninsula imbues the East Waikato Coastal Terrestrial Environment with a multitude of experiential characteristics. How people experience the terrestrial component is highly dependent on their accessibility to and involvement with the coastal environment. Although there is overlap with the experiential characteristics of the Coastal Marine Areas, the focus here is on experiences, perception, intactness, and modification of naturalness in the coastal terrestrial environment.

The rugged cliffs, narrow peninsulas, sandy beaches, harbours, islands and coastal flats culminate in making the coastal environment of the East Waikato Coastal Terrestrial Environment extremely memorable for both residents and visitors.

The more sheltered inner waters attract greater concentrations of residential/ commercial development, while more exposed wild and rugged areas offer different opportunities. The highest areas of natural character for experiential values tend to be located on more difficult terrain, or the more exposed, isolated locations, including islands, prominent headlands, peninsulas and rocky bays and cliffs. More accessible and modified areas, such as sheltered bays, typically hold lower levels of natural character. However, this is not always the case as some sheltered coastal flats retain very high perceived naturalness due to their intact ecosystem.

Popular locations such as Hot Water Beach, Cathedral Cove and sandy beaches at Whitianga, Tairua, Pauanui and Whangamata hold reasonably high degrees of naturalness. Some, such as New Chums Beach, have international recognition as being the jewel in New Zealand's crown! However, their popularity results in experiential aspects including remoteness and wildness being considerably lower, due to the presence of numerous people and associated modifications (such as car parks and walkways) to facilitate access. Other common types of modification include houses built to capitalise on sea views and recreational facilities built to provide opportunities for experiences (i.e., camping, tramping). These factors impact on the natural character of the coastal terrestrial environment.

Much of the Coastal Terrestrial Area has road access along the coastline, although there are parts where accessibility becomes more restrictive. Such areas include part of the northernmost part of the region, around the exposed coastline north and south of Port Charles and the rugged coastline north of Wharekaho Beach (north of Whitianga). Where road access is more limited, the experience of remoteness tends to be highest. Coastal walkways, such as the Coromandel Walkway, Muriwai Walk and numerous tracks leading into the Coromandel Range are wholly located within the coastal environment, offering people opportunities in which to experience the coastline.

Offshore there are numerous islands, many of which are free of significant modification. Some islands are habitat for regionally rare or threatened species and function as wildlife sanctuaries. Others, such as Mahurangi Island, offer an experience of remoteness for visitors.

Summary of Level 2 Marine & Terrestrial Values			
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		High





## Waikato West Coast: Whaaingaroa, Aotea and Kaawhia Harbours

The highly indented and sheltered harbours of Waikato's West Coast are in contrast to the more exposed, predominantly linear coastline that forms the majority of this area. Although settlement within the West Coast is sparse, most are concentrated within these harbours. The harbours are the focus of the numerous watercourses that drain the surrounding undulating catchments, and are often calm which is ideal for access to the water.

## Waikato West Coast: Exposed Western Coast

The active Exposed West Coast is typical of a high energy-wave coastal environment. The coastline varies from wide sandy ironsand beaches with large dune incursions and dune sheets to steep rocky shorelines with coastal caves to steep erosive sedimentary cliff faces. The coastline is exposed and reflective of the high energy wind and wave action that extends along the entire coast.

## Broad Collective Characteristics

The coastal environment of the Waikato West Coast is very different from the East Coast. This section outlines the collective characteristics and values at the Level 1 and 2 scales. For the purpose of this report, only Level 2 (the Waikato West Coast) will be rated at the end of this section.

The interplay of the various characteristics both on land and within the sea create a unique environment for its broad scale variability. As with the East Coast, the marine component is described first, followed by the terrestrial component.

*Left: Grazing land terminates abruptly at the coast below Tirua Point*

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## Marine

### **Collective Abiotic Characteristics of Waikato's West Coast Coastal Marine Environment**

Waikato Region's west coast is part of a large coastal unit that extends from Cape Egmont to Cape Reinga. It is regarded as one system comprised of a high energy coastline with uniform orientation to prevailing westerly airflow, waves and sediment sources. Sediment transport is from south to north, with pulses of black sand travelling up the coast as a result of large wave events driven by the west to south west swell. Within the larger system are smaller littoral cells defined by physical control features such as headlands, harbour mouths and river mouths that control the local wave climate and the longshore movement of sediment. These littoral cells and their control features impact directly on erosion and accretion dynamics at the coastal margin resulting in shoreline fluctuations that have temporal scales of hours/days to decades/centuries. Many of the long term patterns of shoreline fluctuation that have been observed are not well understood.

The coast line is typically comprised of a soft shore (sands and gravels) with fluctuating width depending on the conditions within the littoral cell and larger scale sediment dynamics in the West Coast unit. Where this exists, it is present as a thin veneer of sand over rock, small dunes, or extensive sand dune formations. This soft shore (position, depth, width) can be highly dynamic, especially near harbour entrances and river mouths where the high energy coastal environment influences tidal and sub-tidal channels, tidal currents, and swell waves. In circumstances when sediment supply becomes limited, beaches can rapidly erode and shorelines shift landward. Conversely, when sediment supply is available, beaches can accrete and shorelines shift seaward. Where this occurs adjacent to development, seawalls and other erosion protection measures have been installed with varying success and sometimes impacting on beach widths and levels.

Where there is no soft shore, the coastline consists of coastal cliffs comprised of soft sedimentary rock, hard sedimentary, or hard volcanic rock. The long term instability in this coastal cliff environment as influenced by a range of factors (climate, wave conditions, land use) contributes to sediment dynamics in the adjacent littoral cell.

### **Collective Biotic Characteristics of Waikato's West Coast Coastal Marine Environment**

In general, there is very little information about coastal marine biotic characteristics for the West Coast compared to the wealth of information available for the East Coast. Although there is more information relating to the three harbours, long term data on biotic indicators is lacking and most information is sporadic and limited to one-off surveys.

There are few rocky reefs or offshore islands, and almost no information on those few that are present. Benthic soft sediment communities have only been surveyed within the harbours or river mouths, with no information available for the open coast. Information on fish and marine mammals is similarly limited, but data on West Coast marine area use by shorebirds is comparatively good.

On the open coast, given the very low degree of modification of the marine environment and good water quality, benthic marine life on the open coast can be expected to be relatively unmodified. Benthic communities can be expected to have naturally low abundance and diversity in soft sediments and higher abundance and diversity where physical features provide habitat variability (e.g. rocky reefs, islands, etc.). Fish life is likely to be similarly unmodified.

The harbours and river mouths are focal points for biotic diversity and abundance. The harbours have extensive sea grass meadows and shellfish beds. All three harbours have relatively low rates of sedimentation and water quality largely unchanged by anthropomorphic activity, so fish diversity can be expected to be relatively unmodified. The harbours and river deltas are likely to perform significant ecosystem services as nurseries for fish and other aquatic life, and provide a notable food resource for shorebirds.

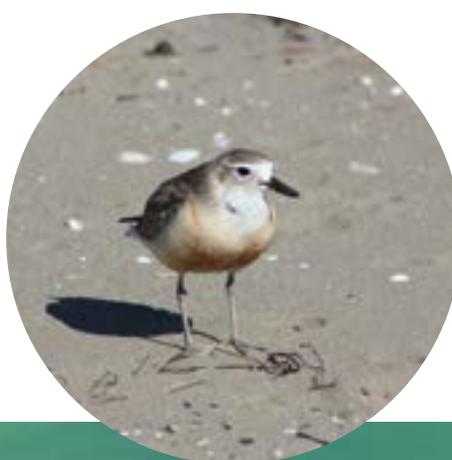
The West Coast is internationally renowned for its significant role in supporting resident and migrating shorebirds, principally within the harbours but also at Port Waikato and along some of the beaches. For instance 95% of the global wrybill population migrate along the West Coast.

Maui's dolphin, the world's rarest dolphin species, is only found on the West Coast from New Plymouth to Dargaville. However, there is no information about the relative importance of the Waikato Region's portion of the West Coast. A range of other dolphin and whale species are also found along the West Coast but data on these is limited to records of strandings. New Zealand fur seals are also present, with three known haul out locations and one known breeding site.

### **Collective Experiential Characteristics of Waikato's West Coast Coastal Marine Environment**

Waikato's West Coast encompasses a range of land types that have a direct influence on the coastal environment. The marine environment is effectively divided into the sheltered harbours and the exposed open ocean. The range of experiential attributes of both are quite different, however retain a sense of congeniality. Despite the three harbours of Whaaingarua, Aotea and Kaawhia retaining a more sheltered coastal experience to the exposed open coast to the west, all retain senses of wildness and remoteness that is different from that of the East Coast.

With the three harbours retaining the greatest population of the whole West Coast, the sheltered intended harbour waters are used for a variety of activities, including boating and swimming. There are a few boat ramps and a small number of aquaculture related activities that directly affect the degree of naturalness of these harbour waters.



*Top: NZ Fur Seal; Middle: Wrybill and main Maui dolphin*

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The open ocean is exposed and often wild, and along with parts of the harbours retain senses of remoteness and isolation. There are three surf breaks of national significance noted near Raglan (Manu Bay/ Whale Bay and Indicators) and a number of other areas including Vortex Bay where surfing has almost idolised this small West Coast area. During summer, the waters can become very busy, although surfing is undertaken all year round.

Due to the semi-remoteness of accessibility to this coast, the waters retain a high level of naturalness, where the elements, patterns and processes appear very evident and almost intact.

## Terrestrial

### **Collective Abiotic Characteristics of Waikato's West Coast Coastal Terrestrial Environment**

The majority of Waikato's West Coast land types are associated with the Triassic-Jurassic sedimentary rocks that extend almost along the entire coastline. These ancient rocks have been overlain with limestones, calcareous sandstones and siltstones during the Oligocene and have been weathered by climatic and alluvial forces.

Much of the landform along the coast is reasonably linear, resultant of faulting and folding parallel with the coast, with only the three large harbours of Whaaingarua, Aotea and Kaawhia providing physical relief along the coast. Kaawhia Harbour, the largest of all three, is a drowned valley, impounded by a sand bar, with sand-dunes up to 100m in height on the northern side. Aotea Harbour also has giant sand dunes along its northern coast. The dunes are rich in titanomagnetite, with some areas being mined for iron ore.

Ancient volcanic activity has also assisted in forming this landscape, where Karioi, the largest volcano on the coast is estimated to be 2.3-2.4 million years old. Thick lava flows resultant from constant, often violent volcanic activity has created numerous dramatic rock features, notably the regionally significant Te Toto sequence of lavas.

There are numerous Geopreservation Sites along this coastline, many of which are associated with Kaawhia Harbour and are of national significance. They comprise a comprehensive collection of geomorphological features that are extremely legible, clearly demonstrating the formative processes. Coupled with this are the numerous small features that pepper this coastal environment, ranging from steep and precarious cliff faces, exposed rocky shelves, waterfalls, deeply incised gullies and extensive sand dunes.

The Waikato River is the largest river in the area, with numerous other smaller rivers draining the landscape. Streams and watercourses tend to be short as they wend themselves through relatively easy pasture country towards the coast.

The climate is typically warm, with humid summers and mild winters, with the prevailing winds being from the west and southwest. Due to the orientation and position of Kaawhia Harbour, moist winds from both the south and northwest bring rain.

## Collective Biotic Characteristics of Waikato's West Coast Coastal Terrestrial Environment

Land cover analysis: The total area of the West Coast Coastal Terrestrial Environment is just over 45,000ha. Almost 80% of the land cover is rural production land with a further 22% being plantation forestry and 3% being a sand mine. Of the remainder, 15% is estuarine open water, lake/pond, and sand/gravel, and 2% is urban area. Only 8% is indigenous vegetation comprising forest, wetland or manuka/kanuka scrubland. There is a very small area (<1%) of gorse/broom.

While primary production (rural farmland or forestry) dominates the entire coastal terrestrial area, indigenous vegetation is clearly higher in the southern half of the coastline, with the largest forest remnants associated with Aotea Harbour, Karioi, and the Marokopa and Awakino Coastal Terrestrial Areas. If the findings of the Shore Futures report play out in respect of a continued slow decrease in population and land use intensity, indigenous vegetation cover can be expected to slowly increase over time on rural land south of Kaawhia as marginal land continues to revert to indigenous scrub and gorse. While landform and waterway connectivity is relatively unmodified, primary production land use will continue to dictate terrestrial ecological values and, to a lesser extent, freshwater ecological values by fundamentally affecting vegetation cover.

Besides land use, the dominant influence on biotic characteristics of the coast will continue to be the abiotic processes experienced at the coastal margin. These include:

- Extreme weather conditions including persistent westerly winds and salt spray shearing off and stunting vegetation and causing sand dune movement.
- A linear high energy coastline with narrow beaches, heavy wave action, and long shore sediment transport with continued active erosion of sand dune and sedimentary rock formations.
- A steep high coastal cliff environment that naturally limits coastal vegetation extent, diversity and cover and fish passage for migratory species returning to freshwater.
- Sheltered harbour environments experiencing relatively little anthropogenic pollution with abundant resources for fish and birds, particularly migratory shorebirds.

*Mangrove habitat at Waingaro, Whaingaroa Harbour*



Although the collective biotic values are low, there are hotspots where biotic value are high. The highest ecological values are contained within the intertidal and sub-tidal areas of the harbours, particularly Aotea and Kaawhia, where estuarine vegetation (seagrass beds) continue to cover large areas. High ecological values are associated with Karioi, Te Tehe Bush, Moeatoa Scenic Reserve, and large forest patches around Aotea Harbour, where indigenous forest is least modified and ecological sequences from coastal vegetation to submontane forest are likely to be most intact.

### **Collective Experiential Characteristics of Waikato's West Coast Coastal Terrestrial Environment**

The relative isolation of the west coast is punctuated only briefly by a small number of settlements that are located adjacent to the main harbours. The biggest, Whaingaroa, services as a holiday and relaxed living location, where people come to experience predominantly the active waves for surfing and other marine-related recreational activities. Kaawhia and Aotea are two further smaller settlements located south of Raglan which services a similar kind of clientele. The large indented harbours of Whaingaroa, Aotea and Kaawhia provide a more sheltered and serene setting than the more active and exposed coastline. The harbours are the focus of the numerous watercourses that drain the surrounding undulating catchments, and are often calm which is ideal for access to the water.

As with the East Coast, the West Coast imbues a wide variety of experiential characteristics and values. How people experience these environments will tend to be dependent on how accessible they are. Much of the land tenure of the West Coast is in private hands and used for grazing. The undulating terrain of a mix of back dunes, limestone and greywacke (with volcanic rock also apparent) mean that any roads are small and winding. There is no road that singularly extends along the coastline. Most are small farm tracks, with only Port Waikato and Raglan being connected via a sinuous track located frequently outside of the coastal environment within the coastal context zone.

It is with this in mind that settlement is sparse outside of the three main settlements. Occasional baches are noted along the coastline, and further smaller grouping of buildings and hamlets are also evident, such as at Port Waikato, Marokoa, Awakino and Mokau.

As a result of the geology and topography, there are a number of natural features that draw visitors to the area. The exposed and geomorphologically interesting rocks at Kaawhia Harbour attract geologists from around the country. Caves and ancient lava flow areas (such as around Karioi) also promote local and regional interest. A walk up to the summit of Karioi also provides expansive views of the coast. Numerous limestone outcrops which are accentuated within the pasturelands in the country north of Raglan are noted characteristics.

Along the open coast, via air, or on a floating vessel, where the land meets the sea, are an intricate and often breath-taking sequence of coastal features, which reveal this relatively isolated coasts secrets. Coastal cliffs, dunes, stacks, platforms, waterfalls and coastal caves reveal the geological history and active coastal processes. Experiential values are reasonably high, with the predominant modification resting in pastoral grazing activities.

This exposed and rugged coastline, indented by the three large harbours of Whaingaroa, Aotea and Kaawhia expresses a range of experiential characteristics. Much of the coastline is inaccessible, however it is the harbours where most activity occurs. These harbours contain the West Coast's three largest towns, Whaingaroa, Aotea and Kaawhia and are often regarded as holiday destinations, although a number of people permanently reside here. The harbours are the focus of the numerous watercourses that drain the surrounding undulating catchments, and are often sheltered which is ideal for access to the water.



Summary of Level 2 Marine & Terrestrial Values			
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			High

Above: The small coastal settlement of Marokopa on the Marokopa River



# SECTION C: WAIKATO'S EAST COAST MARINE AND TERRESTRIAL AREAS

## Coastal Marine and Coastal Terrestrial Areas

The Study Team determined that within the East Waikato Region there are three Coastal Marine Areas and 14 Coastal Terrestrial Areas. These are identified in the tables below, illustrated on Map 2 and described in this section of the report. These Coastal Marine and Coastal Terrestrial Areas are essentially mapped at the Level 3 scale, as outlined within Section B of this report.

For each of the Coastal Marine and Coastal Terrestrial Areas the collective characteristics of the Areas' abiotic, biotic, and experiential attributes are described first. Following this, an explanation around the size of the Area is given. A description of the adjacent Coastal Context follows, which will provide relationships associated with the Areas' broader setting.

Further to this, each specific Area is discussed and evaluated. Freshwater aspects are covered within the Coastal Terrestrial Areas. An evaluation table at the end of each Area subsection summaries the values and ratings at the Level 3 scale for Coastal Marine and Coastal Terrestrial Areas. Finally, any specific values within the 'Area' are listed, mapped and rated at the Level 4 scale (or local/ specific scale). Refer to Figure 2 for an explanation of the Levels. An overall evaluation map is provided at the end of this section, illustrating the ratings for the Level 3 and Level 4 areas (refer again to Figure 2)

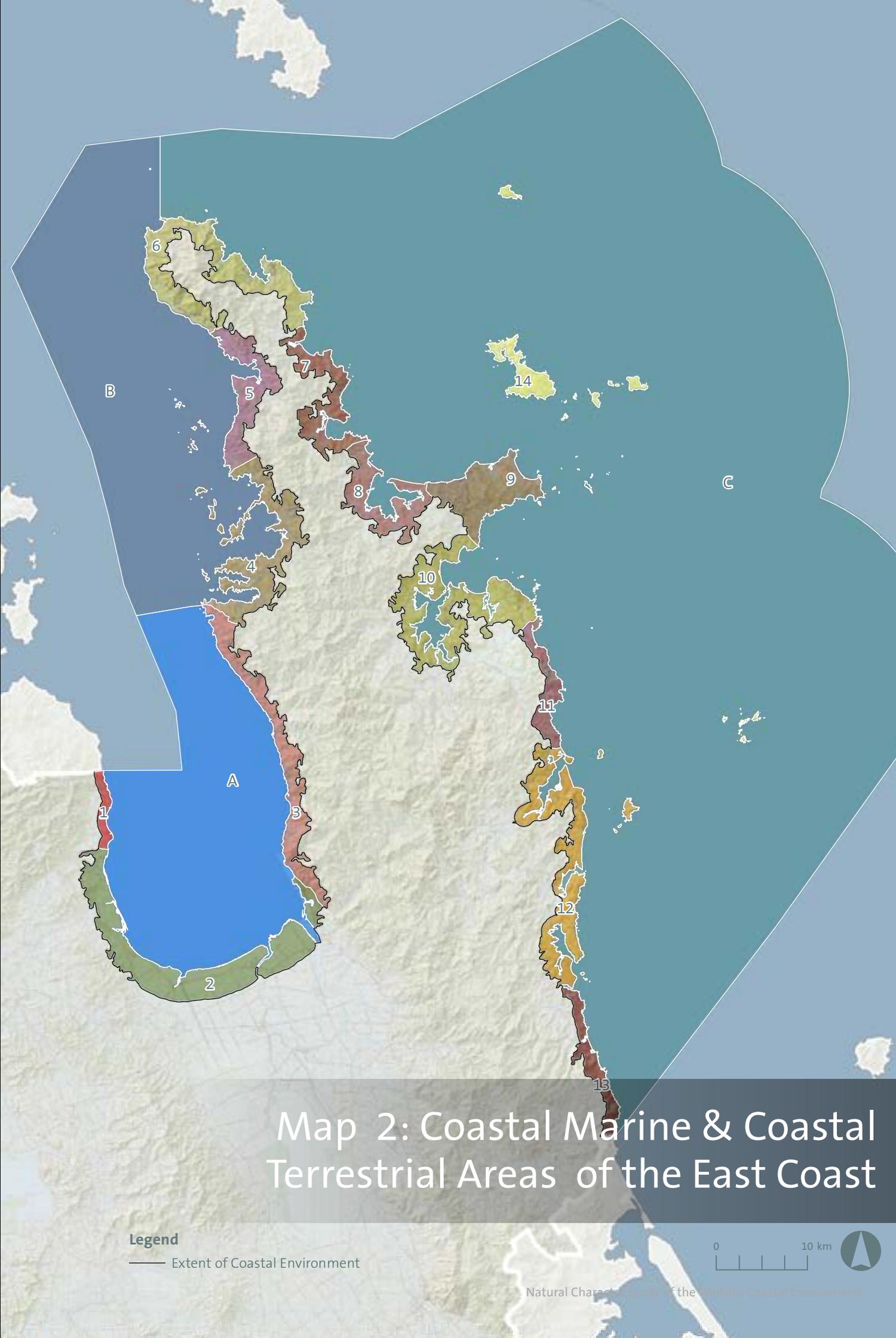
An overall summary of all values is presented at the end of this Section.



Above: Mud flats of the Firth of Thames

Coastal Marine Areas	
A	Firth of Thames
B	Western Coromandel
C	Eastern Coromandel

Coastal Terrestrial Areas	
1	Whakatiwai
2	Hauraki
3	Thames Coast
4	Coromandel Harbour
5	Colville
6	Port Jackson
7	Kennedy Bay
8	Whangapoua
9	Opito
10	Whitianga
11	Hot Water Beach
12	Tairua
13	Whiritoa
14	Outer Island Groups



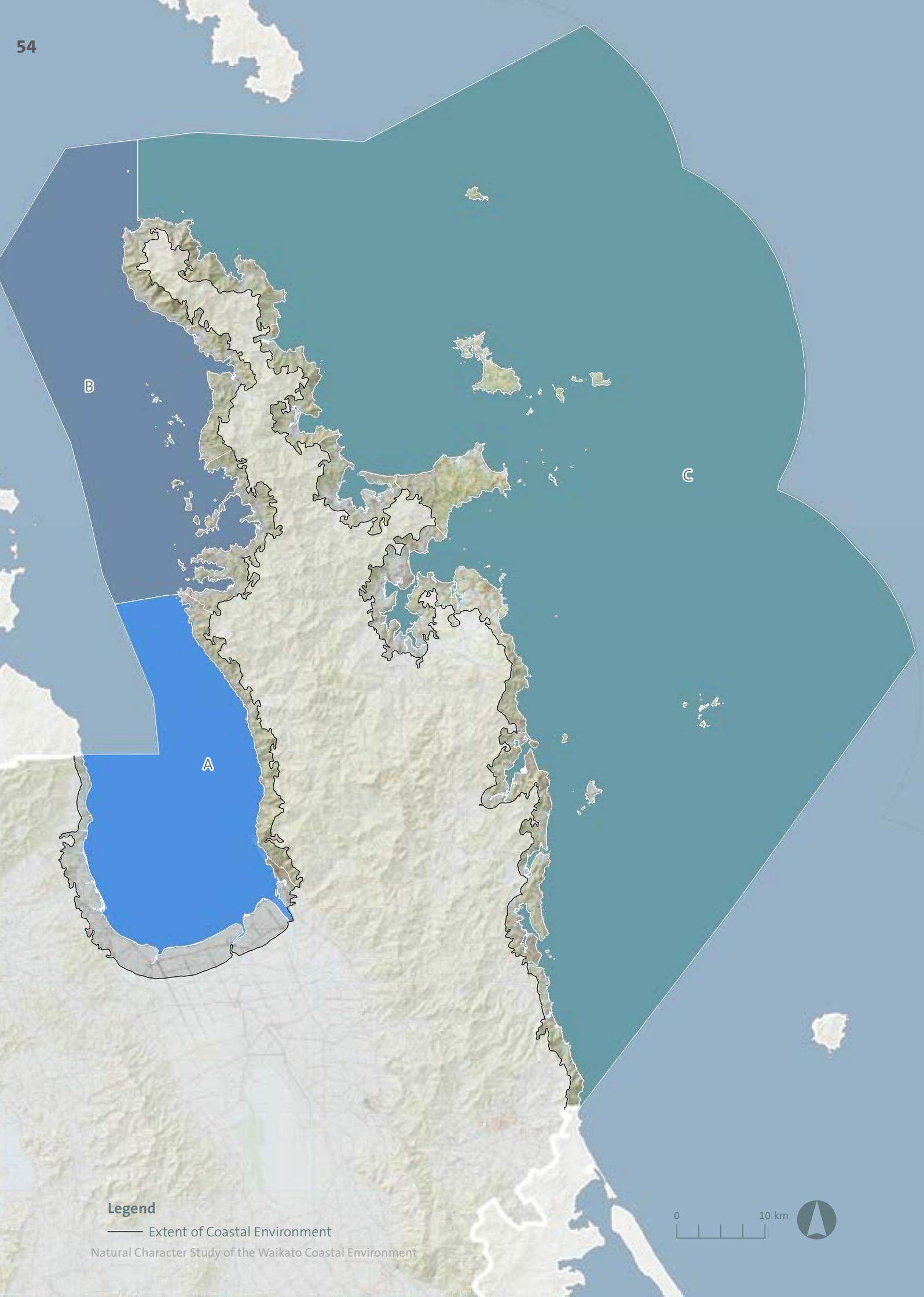
Map 2: Coastal Marine & Coastal Terrestrial Areas of the East Coast

**Legend**

— Extent of Coastal Environment

0 10 km





B

C

A

**Legend**

— Extent of Coastal Environment

Natural Character Study of the Waikato Coastal Environment

0 10 km



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## COASTAL MARINE AREAS

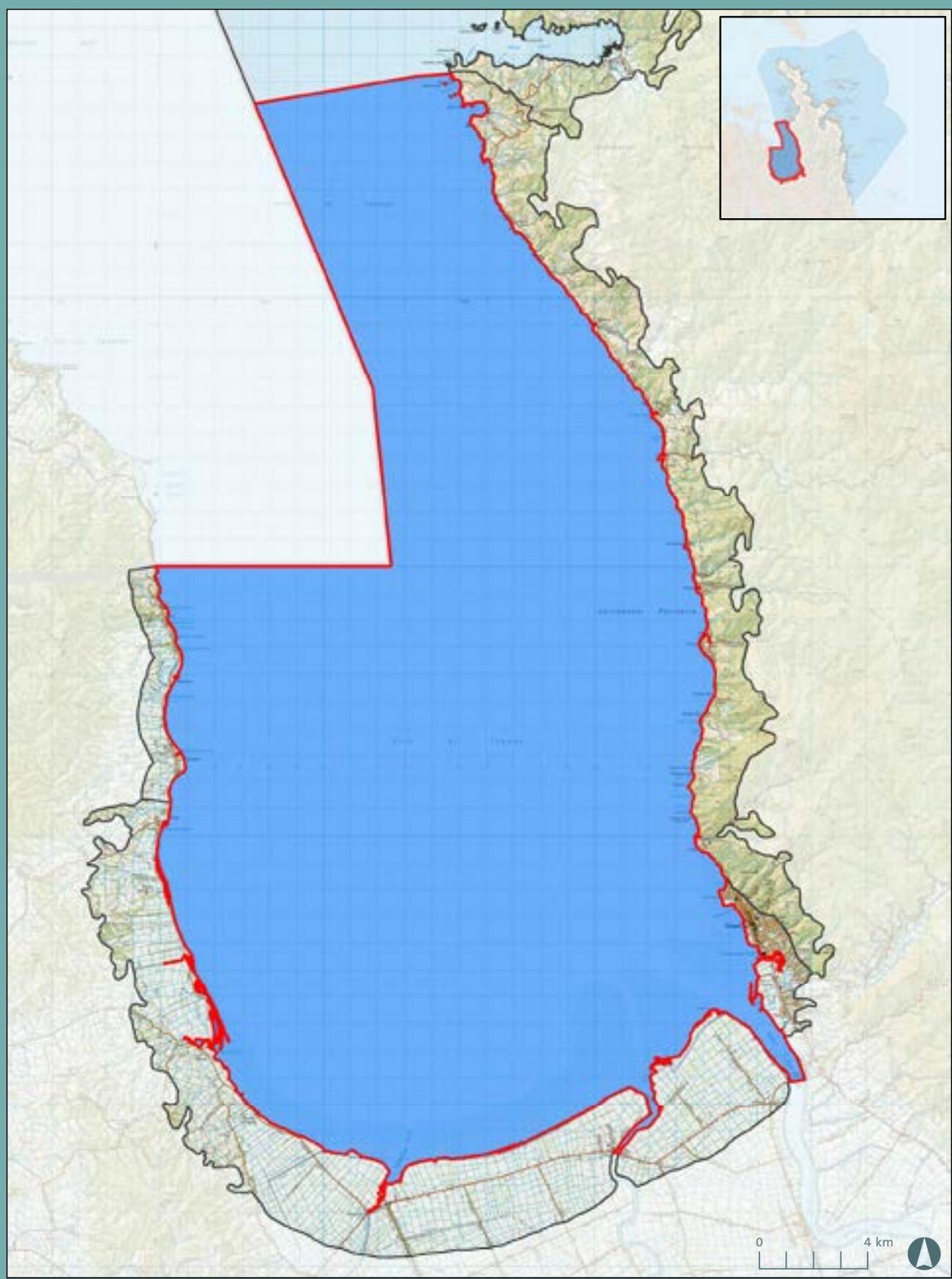
Coastal Marine Areas	
A	Firth of Thames
B	Western Coromandel
C	Eastern Coromandel

*Below: The deep blue waters off Pukenui Point, south of Waikawa Bay*



# Firth of Thames

COASTAL MARINE AREA A:



## Collective Characteristics

The southern part of the Firth of Thames is shallow with low water clarity at times and high sedimentation. Shell barrier beaches, shell banks and saline vegetation habitat internationally important for migratory wading birds.

### Abiotic

The Firth of Thames lies within the southern part of the Hauraki Gulf. The Waihou and Piako rivers drain into this area. Pastoral land use dominates the catchments of these rivers, including dairy farming.

The northern half of the Firth of Thames has an average water depth of 24m, whereas average water depth in the southern half is around 5m. Tidal currents are moderately strong (Snelder et al., 2005). Tidal currents are strong in central areas of the Hauraki Gulf extending into the Firth of Thames (Gorman, R., referenced in SeaSketch). Tidal height in the Firth of Thames is low.

The shell barrier beach (Chenier Plain) at Pūkoro - Miranda is the largest in New Zealand and is the only one of its type in the world that is actively aggrading. This is also a naturally rare ecosystem type.

Benthic sediment in the Firth of Thames is dominated by mud and muddy sands, with the intertidal area on the south and west sides comprising mud and muddy sand (Jackson, 2014, referenced in SeaSketch).

Dredging and/or disposal is carried out on the coastal edge at Wharekawa and to the north of Wharekawa. Dredging is also carried out at Kaiaua to maintain access to a boat ramp.

Boat ramps are present at Wharekawa, south of Whakatiwai, Kaiaua, south of Tararu, Ngarimu Bay, Te Puru, Waiomu, Ruamahunga and Waikawau.

### Biotic

The Firth of Thames contains a Ramsar site of international importance to migratory waders. The Ramsar site covers the intertidal area of the southern and western shores of the Firth of Thames between Kaiaua and the west bank of the Waihou River, adjacent to the township of Thames (Sagar, 2008). 132 species of birds use the Ramsar site either as residents or at various stages of their migration pattern. Of these species, some are endemic or threatened including bar-tailed godwits, pied oystercatchers, pied stilts, black stilts, New Zealand dotterels and wrybill. Open water foraging species include Australasian gannet, Caspian tern, white-fronted tern, pied shag, spotted shag, flesh-footed shearwater, blue penguin, red-billed gull and black-billed gull (Sagar, 2008).

*Above: Mangroves and mud of the Firth of Thames*



Numerous important high tide roost sites exist in the Firth of Thames (Dowding, 2013) e.g. the mouth of the Pūkoro-ro - Miranda Stream and the Kauaeranga River.

There are a number of sites between Thames and Manaia where the threatened New Zealand dotterel breed (Dowding, 2013).

Common fish species in the Firth of Thames include snapper, red gurnard, john dory, spotted stargazer, barracouta, rig, rays, sand and yellow-bellied flounder, kahawai and yellow-eye mullet (Snelder et al., 2005). The richness of reef fish species in the Firth of Thames is relatively low, with up to approximately 18 species predicted to occur in southern parts and up to Matariki Bay (Smith et al., 2013, referenced in SeaSketch).

With respect to demersal fishes, the Firth of Thames primarily includes areas of very high and high conservation value, with smaller areas of moderate conservation value<sup>8</sup>.

Orca and common dolphin have rarely been observed in the Firth of Thames<sup>9</sup>.

Mangrove forest area has expanded significantly in the Firth of Thames.

Estuary monitoring has indicated that there has been little change in estuary health in the Firth of Thames over the past ten years (Needham et al, 2014).

Two large approved aquaculture areas (mussel farms) are present in the Firth of Thames adjacent to Kereta and a smaller area to the north of Kirita Bay. Additionally, there are numerous applications submitted for marine farm areas adjacent to Wharekawa.

Recreational fishing is a common practice within the Firth of Thames, with a greater density of boats per square kilometre in northern areas.

8. Predicted conservation value for demersal fish is sourced from SeaSketch, where we refer to the top 10% of areas that have the highest conservation value as "very high", 10-30% as high, 30-50% as moderate and 50-100% as low. This data is a modelling output informed by numerous studies of demersal fish (see metadata for demersal fish in SeaSketch).

9. SeaSketch references the Department of Conservation's marine mammal sightings database, which is informed by reports from the public, scientific research and DOC surveys.

*Below: Boating activity around the offshore mussel farms in the Firth of Thames*



## Experiential

Accessible from a number of coastal settlements, the sheltered Firth of Thames is frequented with activity associated with recreational and commercial fishing and aquaculture. The shallow harbour creates large open areas of sea floor exposure at low tide, including exposure of the shell banks between Pūkorokoro - Miranda and Kaiaua. This is a habitat for a number of shorebirds including the rare NZ Dotterel.

This southern end of the Firth remains largely remote and void of human activity and modification on the water body. Near Pūkorokoro - Miranda, the coastal waters and shoreline are a popular location for bird watching, emphasising the perceptions of naturalness in this area.

The eastern edge of the Firth comprises frequent settlements which have resulted in jetties, seawalls, boat ramps, reclamation and marine markers scattered along the coastline and marine environment. The rocky shoreline, where unmodified, displays a striking intertidal zone between the sandy beach bays that are pocketed along this coastline.

At the northern extent of this area, expansive marine farming is visually apparent from the coastline and on the water body itself. Activity from mussel farm boats is constantly visible around the farm all year and during fine weather, this area acts as a popular location for recreational fishing. This constant activity and permanent and visible marine farming structures detract from the perceptions of naturalness and are considered relatively low in this area.

Rating at Level 3			
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			<b>Moderate to High</b>

## Coastal Marine Area A: Frith of Thames Specific Characteristics at Level 4

These are mapped with reference to **Map 3**

Area	Rating	Key Values	Additional Comments
Southern Shores	Very High	<ul style="list-style-type: none"> <li>The shell barrier beach (Chenier Plain) at Miranda is the largest in New Zealand and is, abiotically, the only one of its type that is actively aggrading in the world.</li> <li>The Firth of Thames contains a Ramsar site of international importance to migratory wading birds</li> <li>Largely remote southern unmodified shores covered with mangroves amplifies perceived naturalness</li> <li>Collectively, this area retains unmodified inner waters that amplify naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Excludes more modified trafficked parts of the Firth, including large areas of aquaculture mid bay.</li> </ul>

*Mangroves along the Southern Shores*





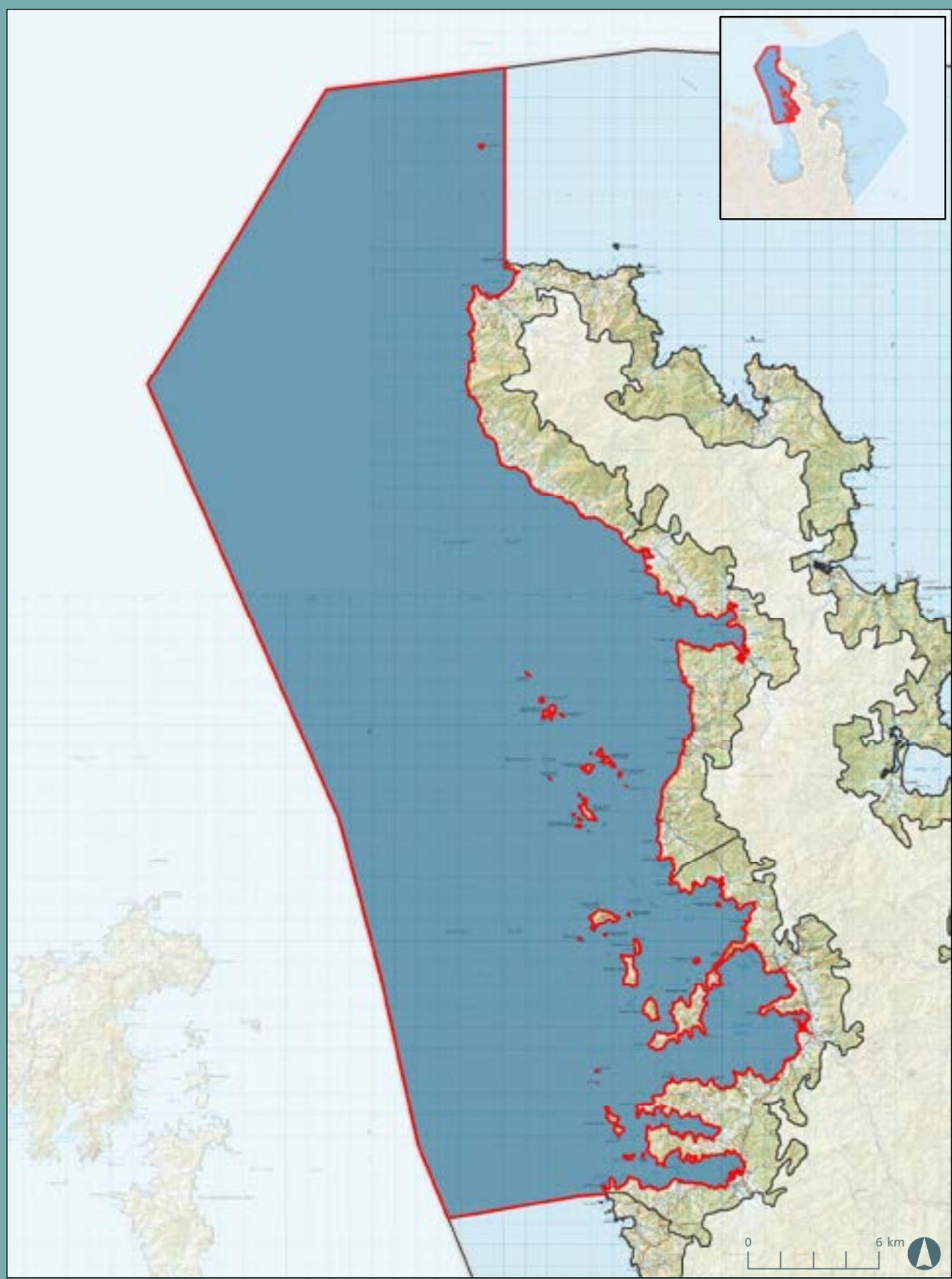
**Legend**

- Extent of Coastal Environment
- ▭ Coastal Marine Area A: Firth of Thames
- Firth of Thames Coastal Natural Character Ratings: Level 4
  - ▭ High
  - ▭ Very High

Map 3

# Western Coromandel

COASTAL MARINE AREA B:



## Collective Characteristics

There are a range of marine habitat types present in this area. Estuaries and near shore waters, with often muddy sand and rocky shore towards Fantail Bay northwards. Low level of modification from Papaaroa northwards.

### Abiotic

This coastline comprises a variety of environments, including mixed sand and gravel beaches, harbours and estuaries. Estuaries on the west coast typically have wide, unconstructed entrances (e.g. Manaia, Coromandel, Te Kouma).

Water depth increases gradually from the coast along the western side of the Coromandel, whereas the bathymetry is steeper around the Port Jackson headland. Tidal currents are strong around the Port Jackson headland and in central areas of the Hauraki Gulf extending into the Firth of Thames (Gorman, R., referenced in SeaSketch). Tidal height is low along the western coast and moderate around Port Jackson.

Benthic sediment varies in character along the west coast of Coromandel. The Manaia and Coromandel Harbours are predominantly muds and sands, whereas from Golden Bay to Papaaroa sediment is mixed grain size. Sediment is mud from Papaaroa to just south of Fantail Bay. Rocky shore is present on the immediately coastal margin along this coast in many places, particularly from south of Fantail Bay to Port Jackson. Seaward of the rocky shore sediments are mud and muddy sand. The Port Jackson headland has mixed and coarse sand with rock shore present immediately adjacent to the land in some areas (Jackson, 2014, referenced in SeaSketch).

Shipping traffic is busy around the Port Jackson headland and along the east coast where vessels move along the coast of New Zealand to various Ports. The wharf at Te Kouma (Sugarloaf wharf) in southern Coromandel Harbour has busy shipping traffic as mussel barges regularly offload shellfish and is a popular yacht anchorage during summer. A passenger ferry service from/to Auckland and Waiheke Island also operates within this harbour.

There are numerous boat ramps along the west coast of the Coromandel, including Te Kouma Harbour, Waipapa Bay, Coromandel township, Wyuna Bay, Long Bay, Oamaru Bay and Amodeo Bay. Elsewhere along parts of this coast boats are launched directly off the beach.

A linear reclamation is present within Coromandel Harbour, accommodating numerous jetties and moorings for commercial vessels, most likely associated with the aquaculture industry.

*Below: The remote Channel Island in the Western Coromandel Coastal Marine Area*



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## Biotic

Within Coromandel Harbour and Colville Bay there are several important shorebird high tide roost sites and breeding sites for New Zealand dotterel (Dowding, 2013). North of Coromandel there are a number of New Zealand dotterel breeding sites. Brown teal also flock in Whangaahei Bay within Colville Bay.

The richness of reef fish species from Matariki Bay to Port Jackson is variable but in general, it increases from around 15 in Manaia Harbour to 25 at Port Jackson (Smith et al., 2013 referenced in SeaSketch).

Areas of very high conservation value for demersal fish occur at Te Kouma, around Whanganui, Waimate and Motuoruhi Islands and to the west of Port Jackson in deeper water. High conservation areas for demersal fish dominate Coromandel Harbour and adjacent to Colville Bay. The coastal water immediately seaward of Otautu Bay and to the north, up to and around Port Jackson, is of moderate to low conservation value for demersal fish (Smith et al., 2013, referenced in SeaSketch).

Orca, bottle-nose dolphin and common dolphin have been observed along the western coast of the Coromandel, with common dolphin being the most numerous. Whale sightings in the Firth of Thames are very rare.

Whale sightings from Manaia Harbour to Port Jackson have primarily been Bryde's Whale, with occasional sightings of southern right, minke and humpback whales.

Coastal vegetation sequences in parts of Manaia Harbour, Te Kouma Harbour and Coromandel Harbour grade from terrestrial vegetation to saltmarsh to mangroves and to seagrass. Mangroves and saltmarsh are present within Colville Bay and Whangaahei Bay. All of these estuarine vegetation types are important habitats for indigenous species.

Between Manaia Harbour and Moturua Island (Rabbit Island) there are a large number of approved aquaculture areas where mussels and oysters are currently cultured. There are no new marine farm areas currently applied for along the western side of the Coromandel Peninsula, however some have been extended recently.

Recreational fishing is commonly undertaken along the west coast of the Coromandel Peninsula, with hot spots adjacent to Kereta, Coromandel township and Papaaroha.

*Below: The NZ dotterel*



## Experiential

The coastal waters are accessible from numerous locations along this coast. Manaia harbour and its margins remain largely untouched with a large intertidal zone dominated by mangrove population and some boat ramps and the coastal road.

Coromandel Harbour is sheltered by a series of islands, (Rangipukea, Cow and Calf, Whanganui, Motutapere, Waimate and Motukakarikitahi) which are surrounded themselves by rocky shelves that are popular locations for recreational fishing. Scattered around these islands, there are smaller mussel farms that are also frequented by recreational fishing.

The intertidal shoreline of Coromandel Harbour is modified with Oyster farms and the shoreline also modified with coastal roading, reclamation and boat ramps and the main jetty at McGregor Bay. This harbour also supports the home of commercial fishing, the Auckland / Coromandel passenger ferry and its sheltered waters enable it to be frequented with recreational boating, fishing and swimming.

The modified harbour edges, marine farming, commercial use and frequented recreational use combine to lessen the experiential values of natural character in this area.

Further north along the coast, the islands of Motuoruhi, Motuokino, Motukaramea, Motumorirau, Hautapu Rocks are surrounded by rocky shelves and unmodified coastal waters. Whilst popular fishing spots, these areas are less frequented than Coromandel Harbour and provide a sense of isolation and remoteness when amongst them. Similarly, the cluster of islands around Motukaramea, Motuwi and Motukahaua Islands provide a similar environment and experience.

The coastal edge of Long Bay to Koputauaki Bay is relatively unmodified with some boat ramps within the bays and isolated moorings. Further north, the waters become more inaccessible from the coast and the sense of remoteness greatens. From Colville to Port Jackson, the coastal edge is remote and human activity on the water sparse. For this extent of the coastal waters the perceptions of naturalness are high.

Rating at Level 3			
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			<b>Moderate to High</b>

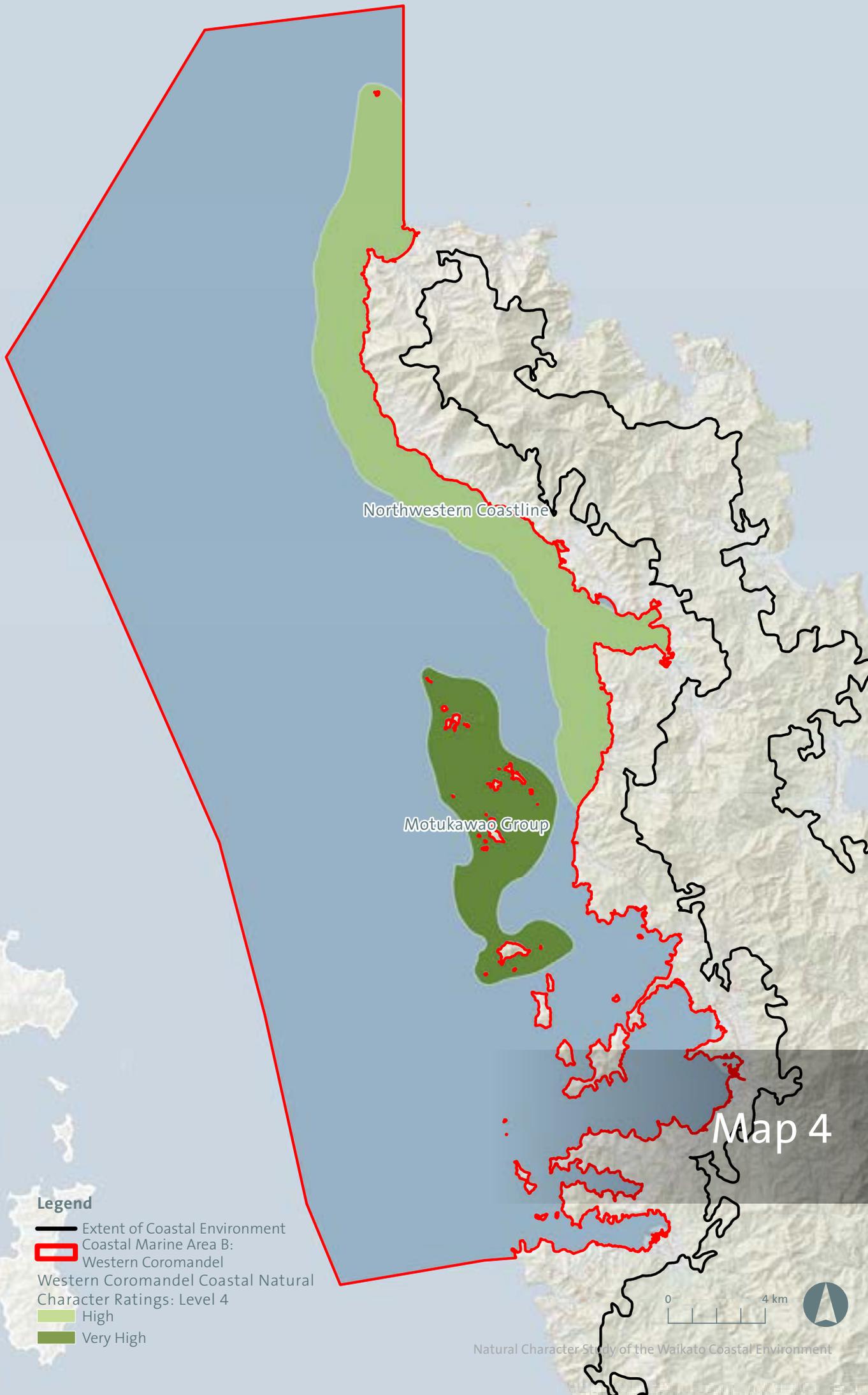
## Coastal Marine Area B: Western Coromandel Characteristics at Level 4

These are mapped with reference to **Map 4**

Area	Rating	Key Values	Additional Comments
Northwestern Coastline	High	<ul style="list-style-type: none"> <li>• Biotically, north of Coromandel, there are a number of New Zealand dotterel breeding sites. Brown teal also flock in Whangaahei Bay within Colville Bay.</li> <li>• North of Papaaroha (including near shore islands) – there are low level of modification to the Coastal Marine Area and high perceived naturalness values</li> </ul>	<ul style="list-style-type: none"> <li>• Excludes more modified trafficked parts of the Firth.</li> </ul>
Motukawao Group	Very High	<ul style="list-style-type: none"> <li>• Abiotically, Islands are surrounded by unmodified rocky shelves and open waters providing a sense of isolation and remoteness</li> <li>• Area is of very high conservation value for demersal fish occur around Mouoruhi Island</li> <li>• This body of water including its submarine environment provides an unmodified connection and interplay with the island group amplifying naturalness</li> </ul>	<ul style="list-style-type: none"> <li>• Southern extent determined by aquaculture off Motukopake Island and by shipping area.</li> <li>• This area of very high natural character includes the small scale aquaculture off Moturua Island (Rabbit Island). This scale of aquaculture does not diminish the overall very high levels of naturalness of the whole area</li> </ul>

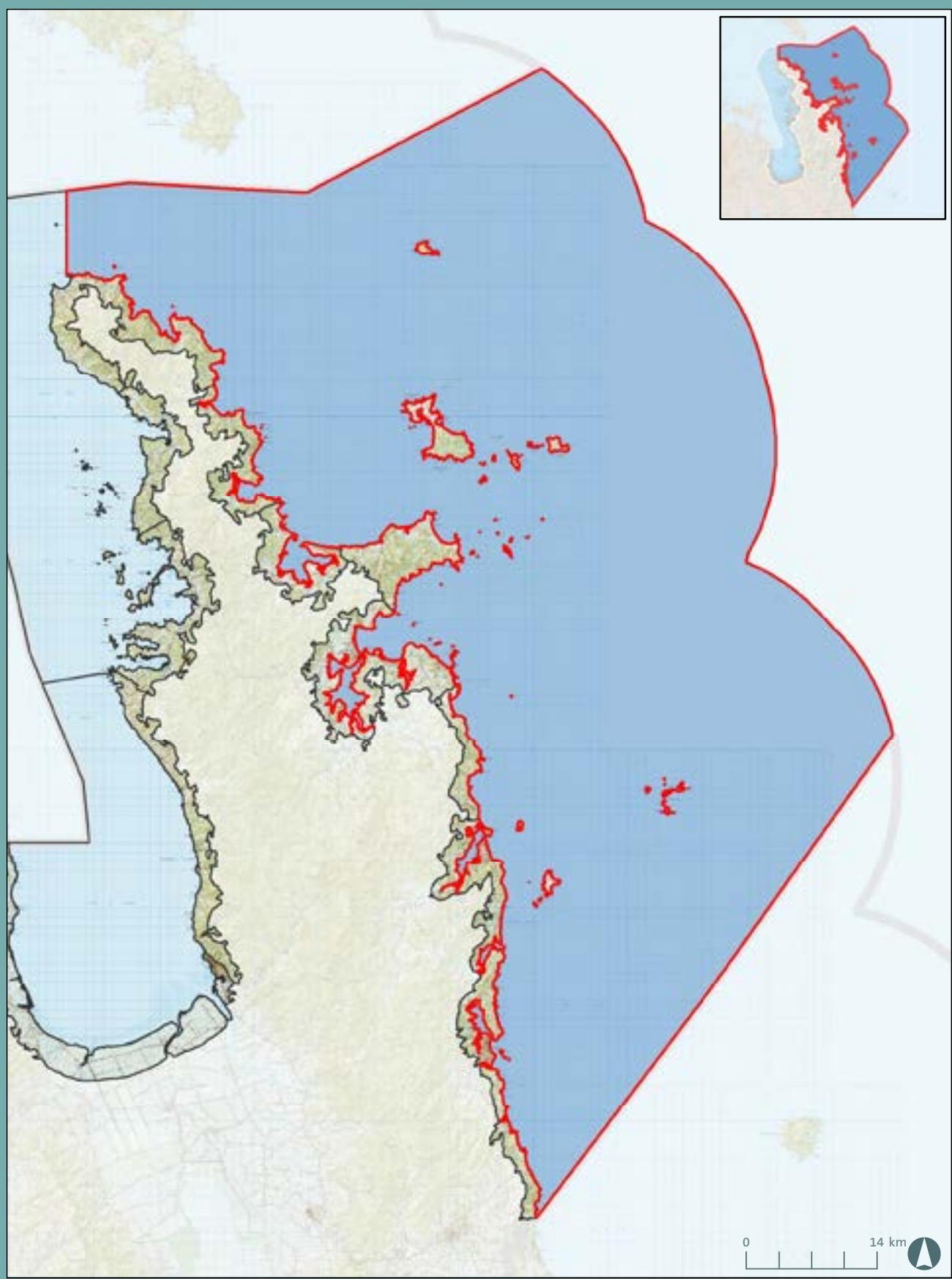
*Below: Colville Bay*





# Eastern Coromandel

COASTAL MARINE AREA C:



## Collective Characteristics

Marine habitats include rocky headlands, sandy beaches, harbours, and estuaries. Erosive steep catchments leading to infilling of estuaries. Breeding habitat for threatened wading birds present in many locations along the coast. Relatively unmodified marine environments between populated beach areas.

### Abiotic

This coastline is characterised by embayed sandy beaches separated by rocky headlands and cliffs. The catchments of the east coast estuaries are erosive due to steep topography, high intensive rainfall events and the presence of barriers at estuary mouths. Estuaries on the east coast of the Coromandel Peninsula are at various stages of infilling (e.g. Tairua, Whitianga, Wharekawa, Whangamata, Whangapoua). Infilling of estuaries can impede navigation and may be perceived by some communities as leading to reduced visual effects and reduced aesthetic value (ARC, 1996).

Bathymetry indicates that between Port Jackson and Tuatēawa sediment drops away rapidly, whereas from Whangapoua southwards the bathymetry is less steep. Tidal currents are high around the headland to the north of Opito Bay and from Port Charles around the Port Jackson headland. Wave height is moderate to high from Port Jackson to Taiharuru Bay and low to north of Tairua. South of Tairua wave height is moderate. Wave height is high around the offshore islands particularly on the eastern side.

Benthic sediment along the eastern coast of the Coromandel is predominantly coarse or sandy, with muddy sediment further seaward.

The Te Whanganui-A-hei (Cathedral Cove) Marine Reserve is located between Hahei and Cook Bluff. The reserve is approximately 9km<sup>2</sup> and contains a variety of habitats including hard rock, soft sediment, caves and arches.

Boat ramps are present at Tuatēawa, Whangapoua Harbour, Matarangi, Kuaotunu Beach, Opito Bay, Ohuka Beach, Whitianga Harbour (3), Cooks Beach, Tairua Harbour (5) and Whangamata Harbour,

Dredging is carried out in Whitianga Harbour associated with the canal housing development, in Whangamata harbour adjacent to the boat ramp and in Tairua Harbour to maintain a navigable channel. Dredging is also carried out to maintain access to the marinas.

Marine vegetation removal sites exist throughout the Tairua Harbour and in Whangamata Harbour, presumably for mangrove management. There are also numerous areas of disturbance and beach scraping areas within the Coastal Marine Area along this coast.

Whangamata Bar is one of New Zealand's premier surf breaks and is also located within this Coastal Marine Area.

*Below: Whale Rock looking towards Ohinau Island*



## Biotic

The biotic values along the east coast of Coromandel Peninsula are variable and depend on degree of modification.

Waikawau Bay comprises breeding areas for New Zealand dotterel and variable oystercatchers. Towards the mouth of the estuary, there is a wetland that is an important habitat for bittern, banded rail and fernbird (Dowding, 2013).

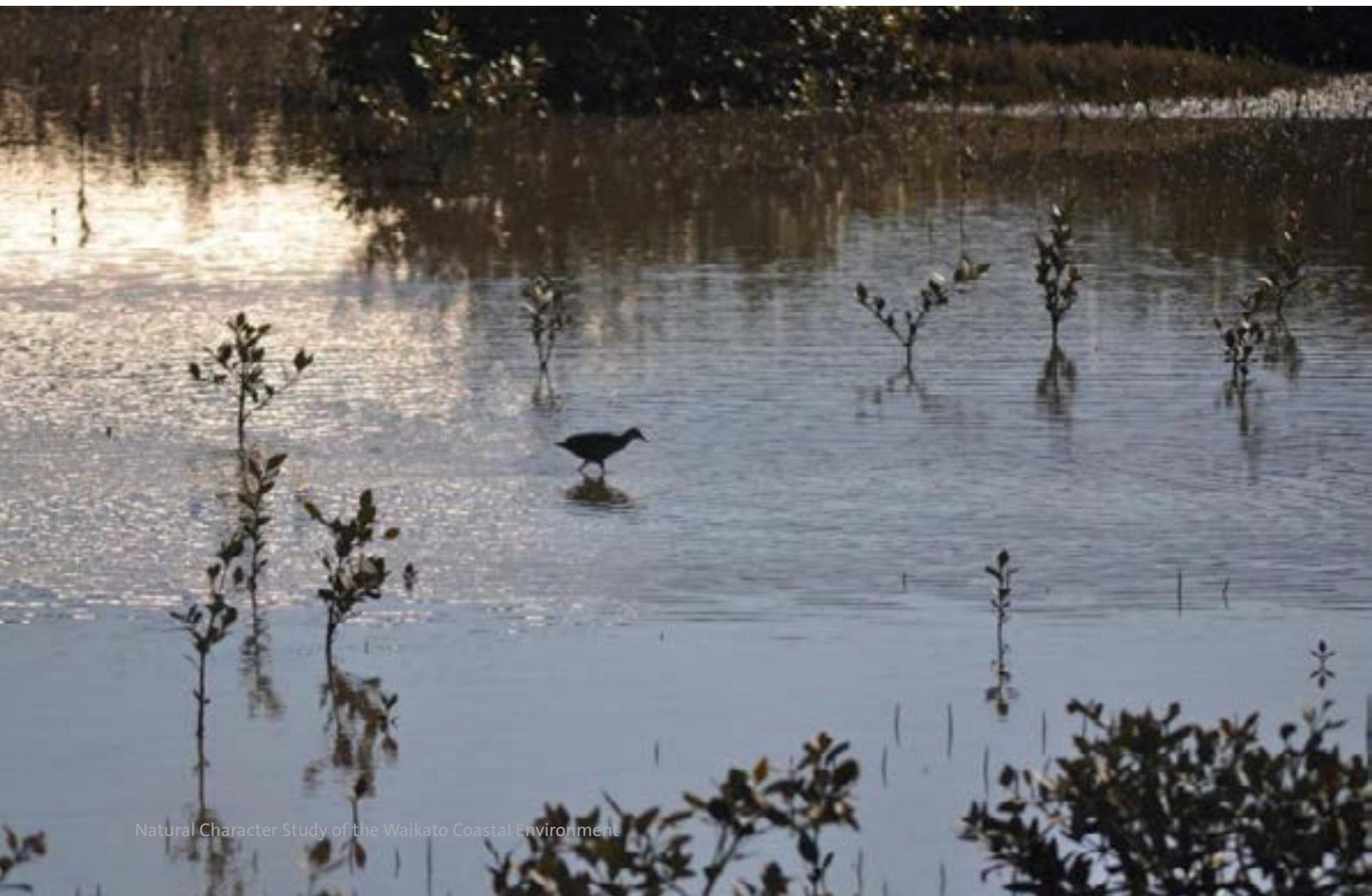
Whangapoua Harbour is recognised in the Waikato Regional Coastal Plan as an area of outstanding wildlife habitat and valued by the Department of Conservation and Regional/District Councils as an Area of Significant Conservation Value. The intertidal areas, seagrass, saltmarsh and mangroves support a variety of benthic invertebrates, fish and wading birds (Jones, 2008). New Zealand dotterel breed around Whangapoua Harbour and high tide roost habitat for wading birds, is also present on the northern end of Matarangi Beach (Dowding, 2013).

Extensive New Zealand dotterel breeding habitat is present at Otama Beach and Opito Bay. The wetland behind Otama Beach supports bittern (Dowding, 2013).

Between Opito Bay and Mercury Bay there are areas where New Zealand dotterel breed (Dowding, 2013).

Tairua Harbour has extensive saltmarsh, seagrass and mangrove habitat. Tairua Harbour has a high diversity of estuarine invertebrates (cockles, wedge shell, pipi), fish (rockfish, yellow-eyed mullet, kahawai, variable triplefin, trevally, flounder, parore, grey mullet, eel, snapper and stingray) and coastal bird species (including threatened species such as reef heron, New Zealand dotterel, grey duck) (Jones, 2008). New Zealand dotterel and variable oystercatcher breed along

*Below: Banded Rail,  
Graham's Creek*



Pauanui Beach, within the canal development within Tairua Harbour and the beach to the north of Tairua Harbour (Dowding, 2013). The intertidal flats within Tairua Harbour provide extensive roosting habitat for New Zealand dotterel, banded dotterel and variable oystercatcher.

Whitianga Harbour is the largest on the Coromandel Peninsula and has high wildlife values. The estuary consists of a number of sheltered inlets and bays. Whitianga marina and more recently a canal housing development have been constructed within the harbour (Jones, 2008). Buffalo Beach provides breeding habitat for New Zealand dotterel and variable oystercatcher (Dowding, 2013).

Reef fish species richness between Port Jackson and Tuatēawa varies between 21 and 27. South of Tuatēawa, including Kennedy Bay, Whangapoua and Matarangi to Kuaotunu, reef fish species richness is (lower between 19 and 23 species predicted). Areas around the headlands at Opito Bay, Whitianga and Hahei have approximately 22 to 27 reef fish species present. To the south of Hot Water Beach to Whiritōa, the richness of reef fish is lower (between 18 and 24 species). Off-shore islands, including Cuvier Island, the Mercury Islands, Ohinau island, Castle Island, Shoe and Slipper Islands and the Alderman Islands had the highest species richness of reef fish (between 22 and 30) (Smith et al., 2013, referenced in SeaSketch).

Areas of low demersal fish conservation areas dominate the western coastline of the Coromandel. Areas of moderate to very high conservation value occur within Whangapoua harbour, adjacent to Matarangi Beach, around the Opito Bay headland southward including Whitianga Harbour, adjacent to Hot Water Beach and also in deeper water adjacent to Onemana and Whiritōa (based on predictive modelling in SeaSketch).

Within the Te Whanganui-A-Hei Marine Reserve, species include crayfish, corals, brittle stars, paua, kina, sponges, ascidians, bryozoans, macroalgal species and coastal fish (including black angel fish, red moki and leather jacket).

Orca have infrequently been observed at Poley Bay, adjacent to Lonely Bay and off the southern end of Hahei Beach, whereas common dolphins have been sighted more frequently along the entire eastern coast of the Coromandel. Bottle-nose dolphins have been seen adjacent to Tairua, Cooks Beach, Matapaua Bay and Karaka Bay.

Whale sightings have infrequently been reported on the east coast of the Coromandel. Those sighted include Bryde's, southern right, minke, humpback, pilot, sei and false killer whales.

Saltmarsh and small areas of mangrove are present at the Waikawau stream mouth and at stream mouths within Kennedy Bay. Whangapoua, Tairua, Wharekawa and Whangamata Harbour contains areas of intact estuarine vegetation sequences, from saltmarsh to mangroves to seagrass. Saltmarsh is present at the stream mouth at Otama Beach. Whitianga Harbour and the inlets at Purangi and Parakiwai contain areas of saltmarsh and mangroves, but seagrass is absent.

Oputere sandspit provides breeding habitat for New Zealand dotterel and variable oystercatcher, while a number of shorebird species forage at the mouth of Wharekawa harbour. Banded rail are present at the mouth of Wahitipu Creek, Whangamata and Tairua Harbours and Hikunui Island provides breeding habitat for reef heron, red-billed gull and white-fronted tern (Dowding, 2013).

Whangamata Harbour provides foraging habitat for New Zealand dotterels, variable oyster catchers and bar-tailed godwits (Dowding, 2013). Mangrove habitat has increased significantly in Whangamata Harbour due to rapid sedimentation and in recent years, consented and unconsented mangrove removal has occurred (Jones, 2008).

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New Zealand dotterel breed in the foredunes at Whiritoa and Mataora Bay (Dowding, 2013).

Cuvier Island is a volcanic nature reserve. Tuatara and Pycrofts petrel chicks have been released on the island.

The seven islands that make up the Mercury Islands are home to many threatened bird species, reptiles, and terrestrial invertebrates. Six of the islands (excluding Great Mercury Island) are nature reserves.

Approved marine farms on the east coast of the Coromandel Peninsula include oyster farms within Whitianga Harbour and Whangapoua Harbour, a mussel and rock lobster farm within Kennedy Bay and a mussel farm at Port Charles.

Recreational fishing is commonly undertaken all along the east coast of Coromandel Peninsula. Boat cruising is common to the north of Pauanui including around the Mercury Islands.

*Above: Oyster farming is familiar in many of the enclosed bays in the waters off the western side of the Coromandel*



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## Experiential

The open coastal waters along this extent of coast are largely unmodified with recreational fishing focused along the shoreline of the peninsula and the offshore islands. From Port Jackson to Port Charge the immediate coastal waters remain largely remote, with settlements less frequent and steep rocky shoreline limiting access.

Curvier Island, a DOC reserve, is highly remote with the waters surrounding it remaining unmodified. Its distance from the main coastline reinforces a sense of remoteness in the waters that surround the island.

Some small marine farms are consented and sited within Port Charles, Kennedy Bay, Whangapoua Harbour and Whitianga Harbour. These features create an increased level of human modification to the water body, which in turn, lessens the perceptions of naturalness. Despite these small marine farms, the harbours comprise natural intertidal margins untouched by human activity. The display of the natural vegetation patterns provides an experience of naturalness less modified than the adjoining terrestrial coastal edge.

The waters surrounding the Mercury Islands are frequented by passenger vessels with the commercial shipping movements further offshore. The waters surrounding the islands are frequented by recreational fishing and diving activities. Despite this, the waters surrounding these islands have a high level of visual amenity and the surrounding rocky reefs are visually distinctive.

Cooks Beach and Whitianga Harbour are surrounded by residential and rural residential settlement. The coastal edge on Cooks Beach and Whitianga harbour are subject to modification for coastal erosion protection. Cooks Beach and Whitianga Beach are popular recreational locations for water-based activities including kayaking, swimming, and boating. Whitianga includes a waterways development supporting private boat jetties.

The rocky shoreline that extends from Cooks Beach to Hot Water Beach, has areas of the coastline that are inaccessible from land. A popular iconic Coromandel Peninsula tourist destination is Cathedral Cove and its adjoining marine reserve: Whanganui A Hei. This area is a popular snorkelling, diving, and kayaking location with significant numbers of visitors to the area. The coastal waters display high levels of ecological naturalness and modification is limited. However, the popularity of the natural features increases the presence of human activity and, in turn, it lessens the perceptions of remoteness and isolation.

Similarly, as a result of accessibility, the coastlines of Hahei, Hot Water Beach, Pauanui, Whangamata and Whiritoa are popular visitor destinations. Water - based recreation is supported by Marina in Tairua and Whangamata and the water ways development within Pauanui. The coastal waters are popular locations for recreational boating, jet-skis, waka ama, canoeing, kayaking, swimming, diving, and snorkelling.

Further offshore the Alderman Islands are a popular location for recreational fishing and are relatively remote and inaccessible. The sense of isolation and the marine environment creates a sense of remoteness from the mainland and unmodified environment.

Rating at Level 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			High

Below: Pauanui marina



## Coastal Marine Area C: Eastern Coromandel Characteristics at Level 4

These are mapped with reference to **Map 5 (overleaf)**

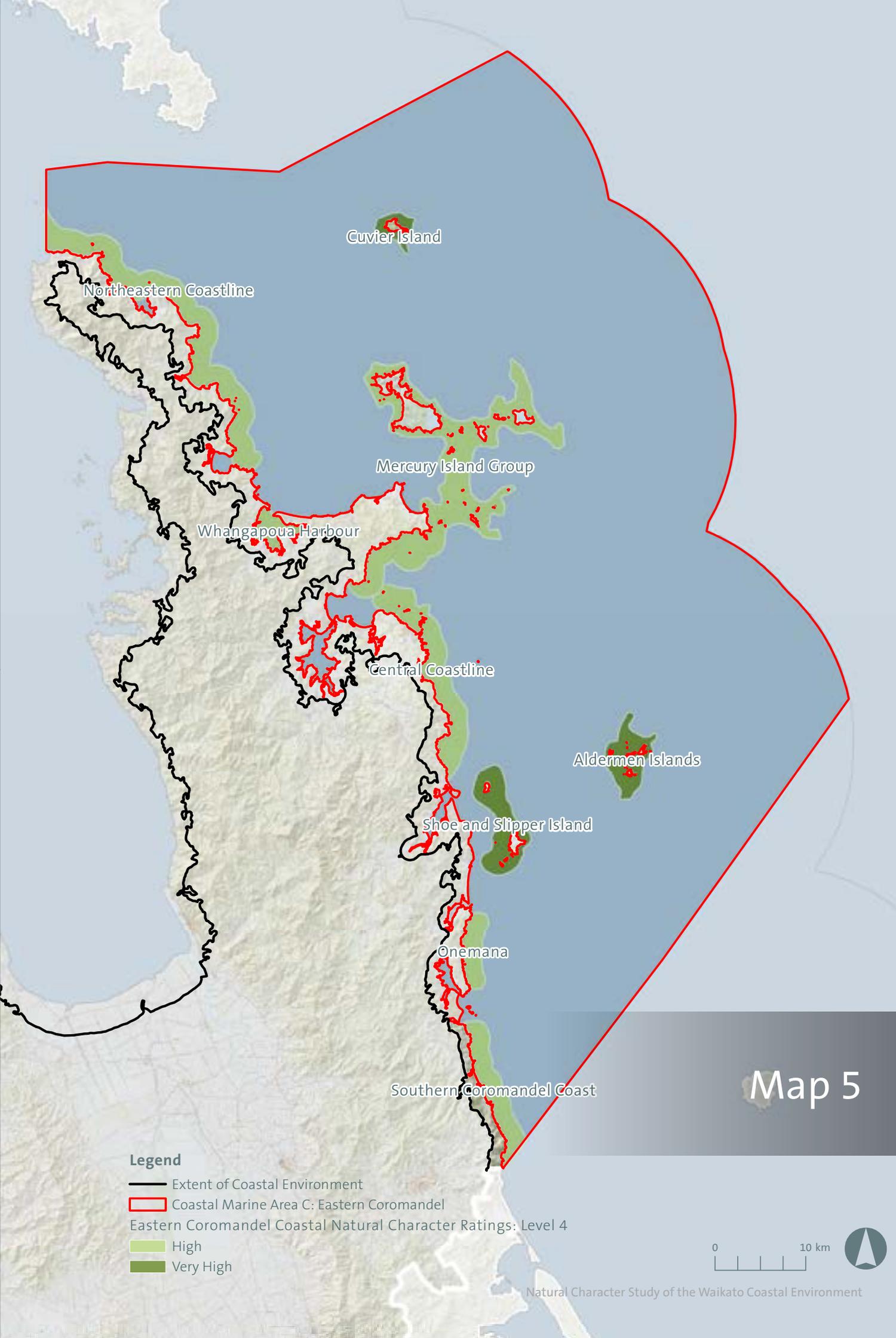
Area	Rating	Key Values	Additional Comments
Northeastern Coastline	High	<ul style="list-style-type: none"> <li>Entire coastal near shore indented coastal waters hold an array of high biotic habitats with limited modification</li> <li>Waikawau Bay comprises breeding areas for New Zealand dotterel and variable oystercatchers. Towards the mouth of the estuary there a wetland that is important habitat for bittern, banded rail and fernbird;</li> <li>High reef fish richness between Port Jackson and Tuatēawa</li> <li>Unmodified coastal edge forms majority of coastline, amplifying perceived naturalness;</li> <li>Wild and remote feel within more open waters.</li> </ul>	<ul style="list-style-type: none"> <li>Recreational use is reasonably low.</li> <li>Areas of aquaculture in Port Charles included within rating</li> </ul>
Whangapoua Harbour	High	<ul style="list-style-type: none"> <li>Whangapoua Harbour is recognised as an area of outstanding wildlife habitat and valued as an Area of Significant Conservation Value with limited modification. This harbour also contains areas of intact estuarine vegetation sequences from saltmarsh to mangroves to seagrass; and a variety of benthic invertebrates, fish and wading birds</li> <li>Experientially, the waters of this harbour are unmodified</li> </ul>	<ul style="list-style-type: none"> <li>Some recreational use in the area</li> </ul>
Central coastline	High	<ul style="list-style-type: none"> <li>Te Whanganui-A-hei (Cathedral Cove) Marine Reserve contains a variety of unmodified habitats including hard rock, soft sediment, caves and arches with high levels of ecological naturalness;</li> <li>South of Cooks Bay to north of Hahei and South of Hot Water Beach to North of Tairua – low level of modification to the Coastal Marine Area.</li> <li>Coastal waters, notably around the nearby offshore islands provides unmodified connections to the land</li> </ul>	<ul style="list-style-type: none"> <li>Popular recreational destination for snorkelling, kayaking and other marine-based activities</li> </ul>

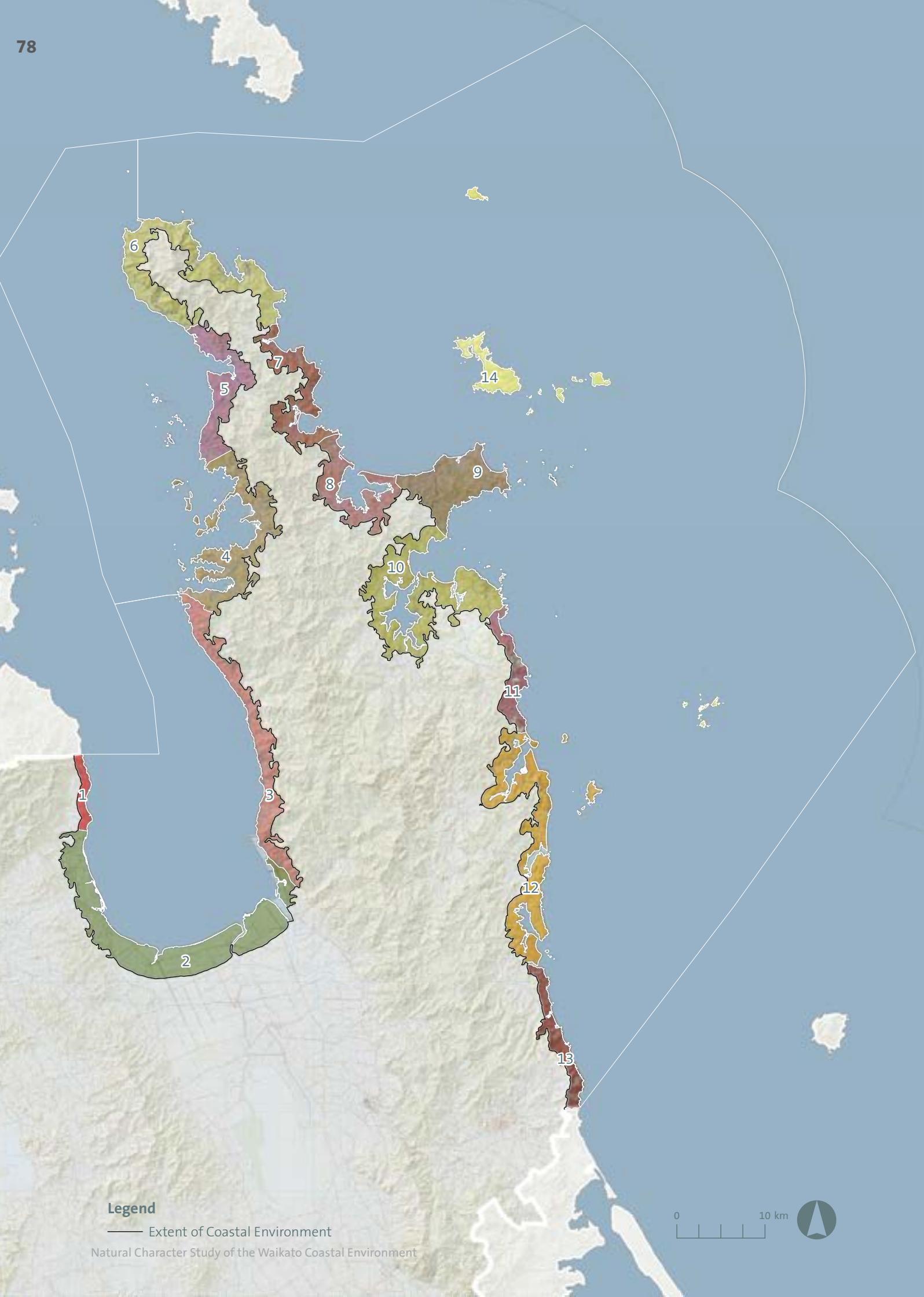
*Table continues overleaf*

## Coastal Marine Area C: Eastern Coromandel Characteristics at Level 4

These are mapped with reference to **Map 5**

Area	Rating	Key Values	Additional Comments
Southern Coromandel Coast	High	<ul style="list-style-type: none"> <li>South of Whangamata to the southern extent of the region – low level of modification to the Coastal Marine Area, which amplifies perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>High level of recreational use within the coast and the shoreline including surfing, boating and kayaking</li> </ul>
Aldermen Islands	Very High	<ul style="list-style-type: none"> <li>The Alderman islands are a nature reserve/wildlife sanctuary comprising five main islands with high reef fish numbers;</li> <li>Very high remote values evident, including darkness of the sky</li> <li>Unmodified bathymetry</li> </ul>	<ul style="list-style-type: none"> <li>Sparsely visited island group, mostly visited for recreational fishing.</li> <li>Coastal waters are free from modification</li> </ul>
Mercury Island Group	High	<ul style="list-style-type: none"> <li>The seven islands that make up the Mercury Islands are home to many threatened bird species with high reef fish richness. Six of the islands (excluding Great Mercury Island) are nature reserves.</li> <li>High perceived naturalness values due to limited modification</li> <li>Unmodified bathymetry</li> </ul>	<ul style="list-style-type: none"> <li>Evidence of recreational boating activity within area reduces perceived levels of naturalness.</li> </ul>
Shoe and Slipper Island	Very High	<ul style="list-style-type: none"> <li>High species of reef fish and intact habitats around islands;</li> <li>High perceived naturalness values due to limited modification</li> <li>Unmodified bathymetry</li> </ul>	
Cuvier Island	Very High	<ul style="list-style-type: none"> <li>High species of reef fish and intact habitats around islands;</li> <li>High perceived naturalness values due to limited modification and remoteness</li> <li>Unmodified bathymetry</li> </ul>	<ul style="list-style-type: none"> <li>Sparsely visited island group, mostly visited for recreational fishing.</li> <li>Coastal waters are free from modification</li> </ul>





**Legend**

— Extent of Coastal Environment

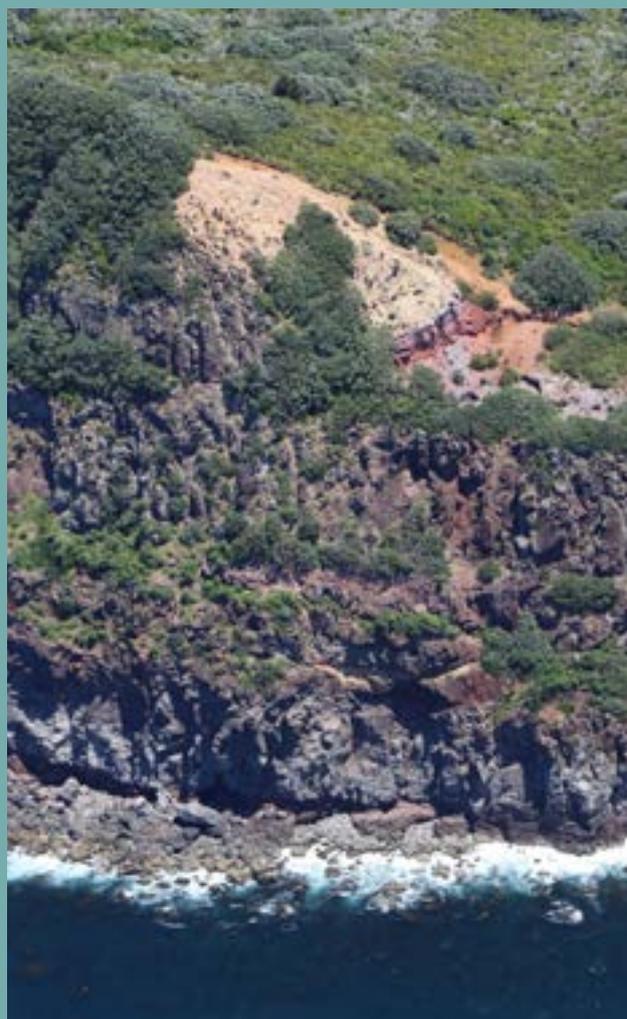
Natural Character Study of the Waikato Coastal Environment

0 10 km



# COASTAL TERRESTRIAL AREAS

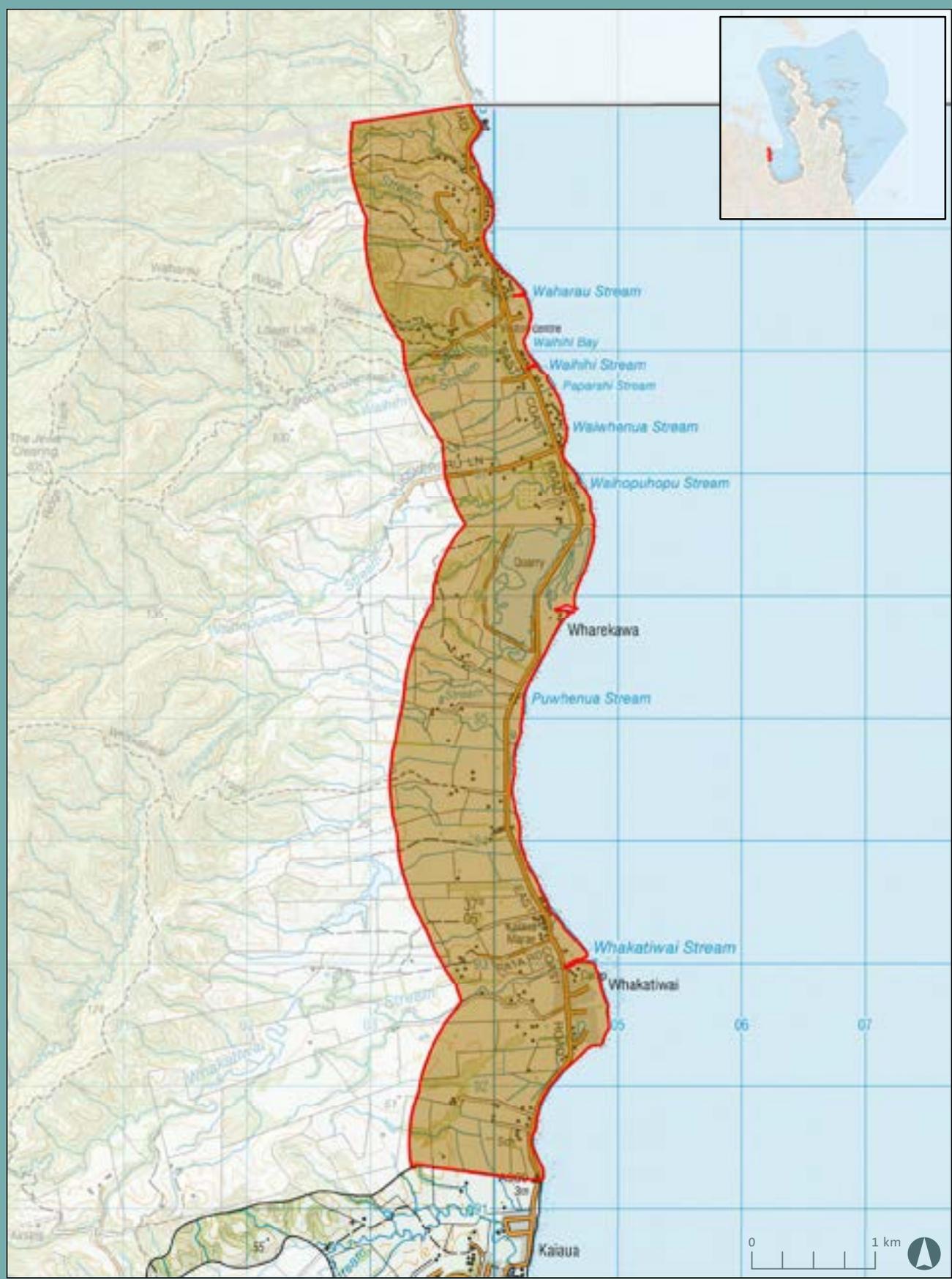
Coastal Terrestrial Areas	
1	Whakatiwai
2	Hauraki
3	Thames Coast
4	Coromandel Harbour
5	Colville
6	Port Jackson
7	Kennedy Bay
8	Whangapoua
9	Opito
10	Whitianga
11	Hot Water Beach
12	Tairua
13	Whiritoa
14	Outer Island Groups



*Below: Exposed geology on Red Mercury Island*

# Whakatiwai

## COASTAL TERRESTRIAL AREA 1:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area is located on the western side of the Firth of Thames from the Auckland Council boundary south, over a distance of some 9km. The area comprises two main landforms. The northern landform portion comprises the steep to rolling Hunua Ranges foothills that slope down towards the coast and end at or close to the coastal margin. They are covered in indigenous shrubland on steeper slopes and gullies. Further south, rural production land is sited on the easier southern landform which comprises flat coastal plains, located between the foot of the Hunua Ranges and the coast.

Key coastal characteristics include: the East Coast Road and small coastal settlements, the expansive rural land with notably depleted indigenous biodiversity, the steep headlands where the Hunua Ranges meet the coast, the Whakatiwai gravel ridges and the gravel quarry lakes.

Beyond this Coastal Terrestrial Area, the Coastal Context land rises into the Hunua Ranges to the Waharau Ridge and the peak at Jews Clearing. This elevated and steep land is predominantly covered in indigenous shrubland and forest and managed by the Department of Conservation and Auckland Council. Two regional parks extend from the Coastal Context land into the Coastal Terrestrial area south of Wharekawa and at Waihihi Bay. On the lower, more accessible slopes, the land use changes abruptly to rural production land with small areas of pine plantation

*Above: Forested hills of the Hunua Ranges flank the most elevated parts of this Coastal Terrestrial Area*



## Abiotic

The principal land form of this Coastal Terrestrial Area comprises the gently undulating low coastal foothills and lowland plain of the Hunua Ranges, where the highest part of this Coastal Terrestrial Area rises to approximately 100 metres above sea level behind the small Waharau settlement. The terrain is dominated by the underlying volcanic rock into which unmodified streams have incised numerous gullies. Streams typically maintain a natural meandering course through the landscape, although many are more heavily modified at lower elevations and dams are a feature of some.

Comprised predominantly of old sea cliff terraces and gravel ridges, the most significant of these is the Whakatiwai gravel ridges, which is also a Geopreservation Site. Much of these ridges have been extensively modified by coastal development and gravel mining.

South of Wharekawa, the 500-750m strip of land adjacent to the coast tends to be the flattest and most highly modified by channelization, land cultivation, roads and structures. North of Wharekawa, this modified strip narrows significantly to only 150-300m from the coastline. The modification is limited to roads and structures because the terrain makes access and modification of landform and watercourses more difficult.

Watercourses in the northern portion are steep and relatively short and water quality is likely to be high due to the extensive riparian cover and forested headwater catchments within the Regional Parks. Watercourses in the southern portion are flatter and longer and water quality is likely to be poorer due to depleted riparian vegetation, channel modification and inputs from rural land use.

*Below: Kaiaua*



## Biotic

Land cover analysis: The total land area of the Whakatiwai Coastal Terrestrial Area is 930 ha. Over 80% of the land cover is rural production land. Of the remainder, 6% is indigenous shrubland, 6% is artificial surfaces, 4% is waterbody, 2% is exotic treeland and 1% of the land cover is indigenous forest. There are only a few hectares of indigenous wetland and no exotic scrub, mangroves or bare surfaces. The total indigenous land cover is 8%.

The entire Coastal Terrestrial Area would originally have been completely covered in indigenous forest. Several shrubland assemblages would have occurred on the steeper faces following slips and in association with natural river erosion processes. Wetlands would have been naturally uncommon due to the fall towards the coast combined with the gravel substrate, although forested gully floor wetlands would have been a feature of streams at lower elevations with poorly drained sediments. Instead of the typical coastal dune environment, the coastal gravel ridges would have supported unique floristic assemblages from the forest margins to the high tide mark.

Much of this Coastal Terrestrial Area is now in rural production land, with indigenous shrubland confined to steep slopes and stream gullies. However, the indigenous shrubland and forest in the northern portion include the Hunua Ranges Recommended Area for Protection and associated SSWI areas, as well as two Regional Park areas. This forest and shrubland can be expected to be modified by past clearance, grazing and weed and pest impacts, but will retain moderate to high ecological values for its biodiversity and habitat. The shrubland is a dominant feature of the northern portion and rural production land is carved into the shrubland between stream gully systems. In the southern portion, rural production land is dominating, with the Hunua Ranges as a more distant backdrop.

Watercourses tend to have steep short gradients until they reach the plains, where channelizing and straightening are more common. Riparian vegetation has been removed across most of the rural production land, but there is substantial riparian vegetation remaining throughout the steeper country and where the gully systems are more deeply incised. Freshwater fish populations can be expected to be diverse. The streams will provide a conduit for migratory species to move to and from the sea. It will also allow those that prefer cool mountain streams with good water quality to move upstream to the Hunua Ranges. Freshwater macroinvertebrate communities will vary depending on location, with diverse communities of sensitive species occurring where riparian vegetation is more extensive, transitioning to less diverse pollution-tolerant communities where land drainage is more common, riparian vegetation depleted and rural production is more intensive.

A reserve covers part of the Chenier Plains, north of which the Whakatiwai Gravel ridges are sited. The area is important for both international and internal migratory birds.

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## Experiential

Residential and rural residential settlement are focused to the coastal edge, following the East Coast Road, with a highly modified rural landscape forming the backdrop to this landscape. The area includes the Whakatiwai Gravel Quarry, which includes man-made quarry pits, now lagoons. These lower foothills and plains of the Hunua Ranges are highly modified displaying low levels of perceived naturalness. Boat access is gained from Wharekawa and just south of Whakatiwai.

One remaining area of high levels of perceived naturalness is the native bush that extends down from the Hunua Ranges, as part of Waharau Regional Park, to meet the adjoining farmland. This remains the only coastal native bush cover within the area and is contiguous with the native bush of the Hunua Ranges, within the coastal context zone beyond the coastal environment.

*Below: Small settlements  
pepper this coastline*



Rating at Level 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			<b>Moderate</b>

*Below: Whakatiwai Gravel Quarry and ponds*



## Coastal Terrestrial Area 1: Whakatiwai Specific Characteristics at Level 4

These are mapped with reference to **Map 6**

Area	Rating	Key Values	Additional Comments
Waharau Stream	High	<ul style="list-style-type: none"> <li>• Unmodified abiotic stream catchment</li> <li>• Large extent of indigenous bush cover around stream, forms part of a continuous extension from Hunua Ranges to the west.</li> <li>• High perceived naturalness due to lack of modification, which is rare in this Coastal Terrestrial Area.</li> </ul>	<ul style="list-style-type: none"> <li>• Includes tracks and small buildings within forested area.</li> <li>• Excludes modified rural land.</li> <li>• Is part of larger Hunua Ranges to the west and represents an important tract of unmodified naturalness in this Coastal Terrestrial Area.</li> </ul>

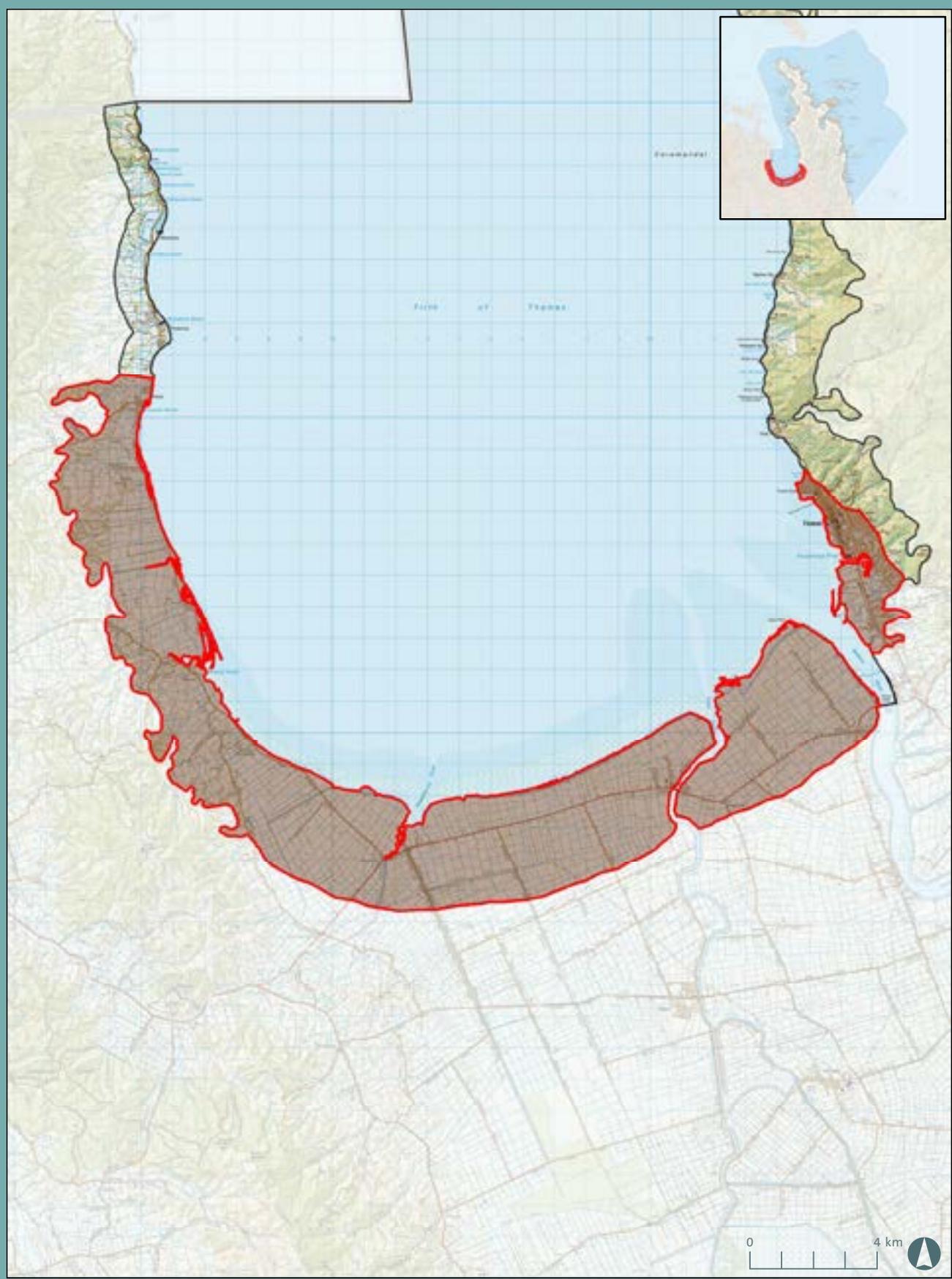
*The forested catchment of Waharau Stream*





# Hauraki

## COASTAL TERRESTRIAL AREA 2:



## Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area forms the northernmost extent of the broader Hauraki Plains that continue to extend southwards, beyond the coastal environment. This broad area encompasses the low foothills to the immediate west of Pūkoro - Miranda as well the flat, modified plains and the large settlement of Thames. There are numerous river mouths that intersect this Coastal Terrestrial Area, including the Waitakaruru, Piako and Waihou Rivers as well as extensive wetlands that support thousands of wading and shorebirds.

Key coastal characteristics include extensive flat and open farmed land, pierced by numerous water channels and irrigation canals, large river mouths draining the inland plains, low-lying land prone to flooding, internationally significant wetland at Pūkoro - Miranda being a seasonal home to thousands of wading and shorebirds, numerous roads and settlements make this Coastal Terrestrial Area very accessible.

As outlined, the extensive farmed lowlands of the Hauraki Plains are beyond the coastal environment. The largest wetland in New Zealand, Kōpuatai Peat Dome (covering nearly 8,800ha), is located centrally within these plains.

*Above: Mangroves line the edges of the Firth of Thames and the mouth of the Piako River*



## Abiotic

The Hauraki Coastal Terrestrial Area includes the northernmost section of the alluvial Hauraki Plains and its small foothills, rising to 136 metres above sea level immediately to the south of Pūkoro - Miranda. The Plains are essentially a downfaulted rift valley extending from the Hauraki lowlands further south, out into the Firth of Thames, with a typical elevation of between 0-6 metres. The Waikato River once flowed northwards to the Firth of Thames, depositing vast quantities of muds, sands and gravels. Volcanic debris from an eruption in Rotorua some 20,000 years ago blocked the river's northerly course and diverted it west towards Hamilton. Recent alluvial deposits are resultant from both the Piako and Waihou Rivers, with much of the land being peat-heavy and partly swampy, most of which has been converted for dairy purposes.

The original flat contours of the plains remain the dominant landform. However, the elevation and natural gentle undulations of the plains have been modified by extensive land drainage and cultivation, resulting in lowering of groundwater and peat shrinkage. Stopbank networks control the movement of water into and over the plains, except during large flood events and extended rainfall, when the larger river systems and high groundwater table cause extensive flooding. The terrain is dominated by the historic coastal and alluvial origins of the Hauraki Basin, with drainage networks replacing the original wetland and river systems.

*Below: Modified land north of the Waihou River, including the Gun Club Aerodrome and settlement of Thames*



Watercourses are typically highly modified by channelisation and stopbanks. Water quality is likely to be ubiquitously poor due to the almost total lack of riparian cover, channel modification and high mass loads of nutrients, and sediment from rural land use and industrial/municipal point sources.

Almost the entire length of what would originally have been “beach”, saltmarsh or mangrove shrubland at the coastal margin, is now a highly modified and straightened coastal edge comprised of a stopbank, access and drain network with pumping stations.

A specific feature of this Coastal Terrestrial Area is a shell barrier beach (or Chenier Plains), which is a prograded coastal plain comprising shell fragments and coarse sand that is moved by longshore drift and carried landwards through wash action to form bars on the foreshore (Woodroffe et al. 1983). This feature is a noted Geopreservation Site. Much of this feature is intact, although small elements have been eroded through the construction of groynes, landfill, and shoreline armouring. Another noted feature is the Pūkorokoro - Miranda Hot Springs.

*Below: The slender wetlands at Miranda are contained by the agricultural land inland and the Firth of Thames*



## Biotic

Land cover analysis: The total land area of the Hauraki Coastal Terrestrial Area is 11,129ha. This includes 2ha of islands. Over 91% of the land cover is rural production land. Of the remainder, 4% is artificial surfaces, 1% is indigenous wetland and 1% is indigenous shrubland. There are very small areas (<1% each) of exotic treeland, indigenous forest, mangroves, bare surfaces and waterbodies, in aggregate covering only 1.29%. There is no exotic scrub cover. The total indigenous land cover is 3%.

The entire Coastal Terrestrial Area would originally have been covered in indigenous wetlands and coastal forest. The wetland species assemblages would have been strongly influenced by sea level, groundwater levels and peat soils which affect salinity, pH and soil saturation. Wetlands would have been the dominant cover with river systems meandering through to the coast. On higher ground, indigenous wetland forest would have formed in relatively localised patches.

Almost all of this Coastal Terrestrial Area is now in rural production land, with indigenous vegetation of any type being almost completely removed. The 2% of indigenous vegetation remaining can be expected to be highly modified.

Watercourses tend to have very flat gradients, where channelising and straightening of even the largest rivers is ubiquitous. Riparian vegetation has been almost completely removed. Fish populations can be expected to be relatively diverse; however, saltwater incursion will allow estuarine and marine species to penetrate some distance inland and migratory species will use the rivers as a conduit to more suitable upstream habitat. Nevertheless, fish passage is generally severely obstructed by flood gates and pumping systems that prevent fish ingress beyond the stopbanks. Resident fish will be limited to those species tolerant of high sediment loads and turbidity and disturbance associated with drain management. Freshwater macroinvertebrate communities can be expected to be dominated by pollution-tolerant communities of low diversity,

The areas with greatest indigenous biodiversity are the Pūkoro - Miranda Wildlife Management Reserve, several small QEII covenants, the Orongo Conservation Area and the remnant areas of coastal flats between the stopbanks and mangroves. These coastal flats are vegetated with a variable community of saltmarsh and mangrove assemblages responding to changes in salinity and water level. These areas are likely to provide notable habitat and food resources for a wide range of marsh and coastal bird species.

*Below: Waihou River*



## Experiential

The natural harbour edge of the Firth of Thames has been modified as a result of historical reclamation and sea wall protection. The sand shoreline form pockets along the coastal edge with the remaining terrestrial extent being a heavily modified pastoral landscape.

The landward extent displays high levels of human modification from land use change, harbour edge modification and dwellings, exotic tree cover and road networks. The natural patterns of this landscape are largely lost to the pattern of paddocks that extend throughout this area.

The township of Thames is included in this Coastal Terrestrial Area and, much like the rural farmland, it too is a heavily modified landscape as a result of reclamation. The natural patterns are not evident, and the extent of human modification is high.

Rating at Level 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			Low

*Below: Thames*



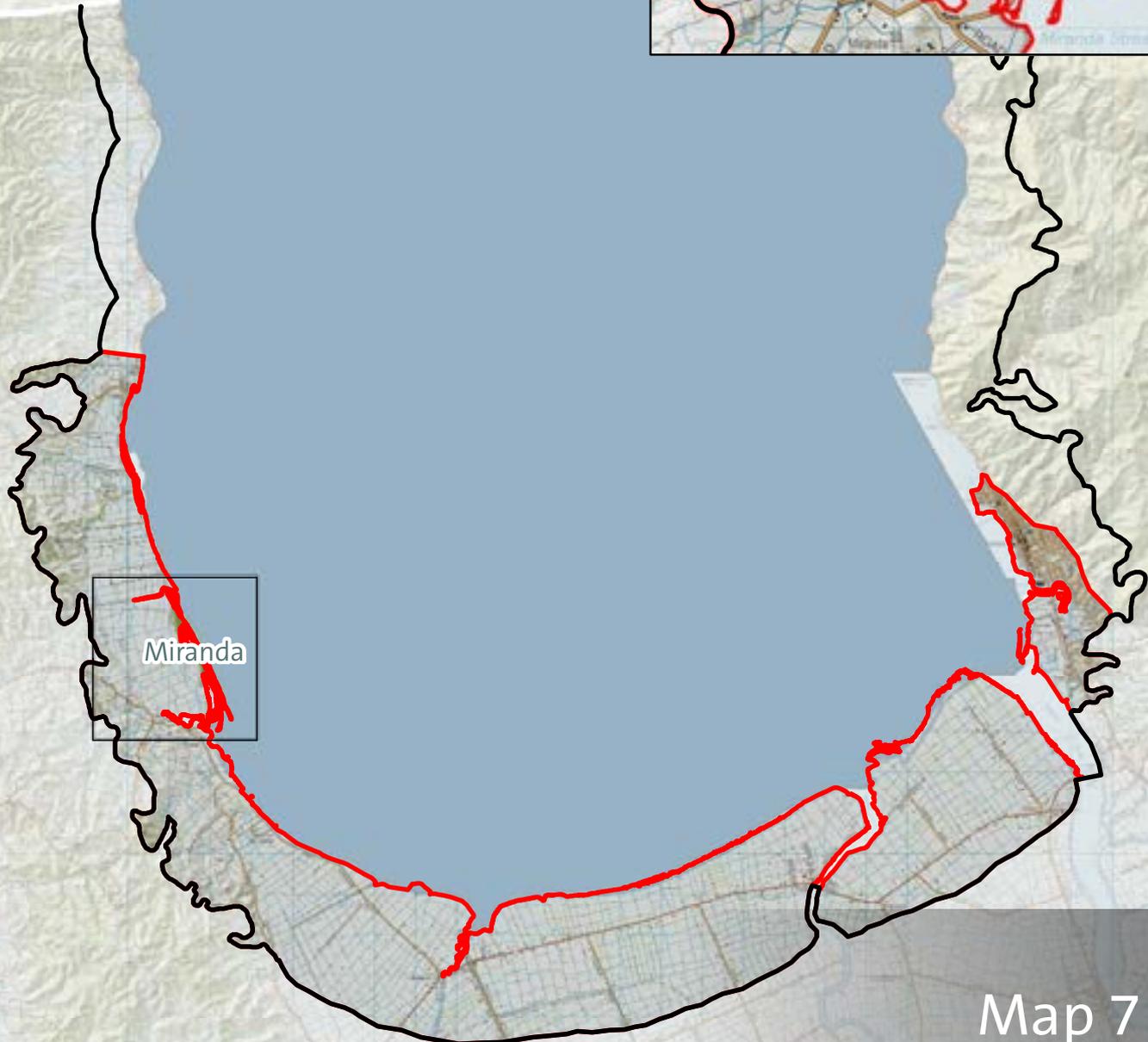
## Coastal Terrestrial Area 2: Hauraki Specific Characteristics at Level 4

These are mapped with reference to **Map 7**

Area	Rating	Key Values	Additional Comments
Miranda	Very High	<ul style="list-style-type: none"> <li>Chenier Plains are an Internationally significant landform at Miranda, with the most unmodified part closest to the Firth of Thames.</li> <li>Saltmarsh and mangrove provide important habitats for wading birds</li> <li>Impressive expansive and open mangrove mudflats</li> <li>Remote-like characteristics due to openness of area and lack of modification. High natural transient values due birdlife.</li> </ul>	<ul style="list-style-type: none"> <li>Area defined by East Coast Road and Coastal Marine Area extent and includes any tracks, boardwalks and bird hides associated with the Miranda Wildlife Reserve.</li> </ul>

*Above: The wetlands and Chenier Plain at Miranda*





**Legend**

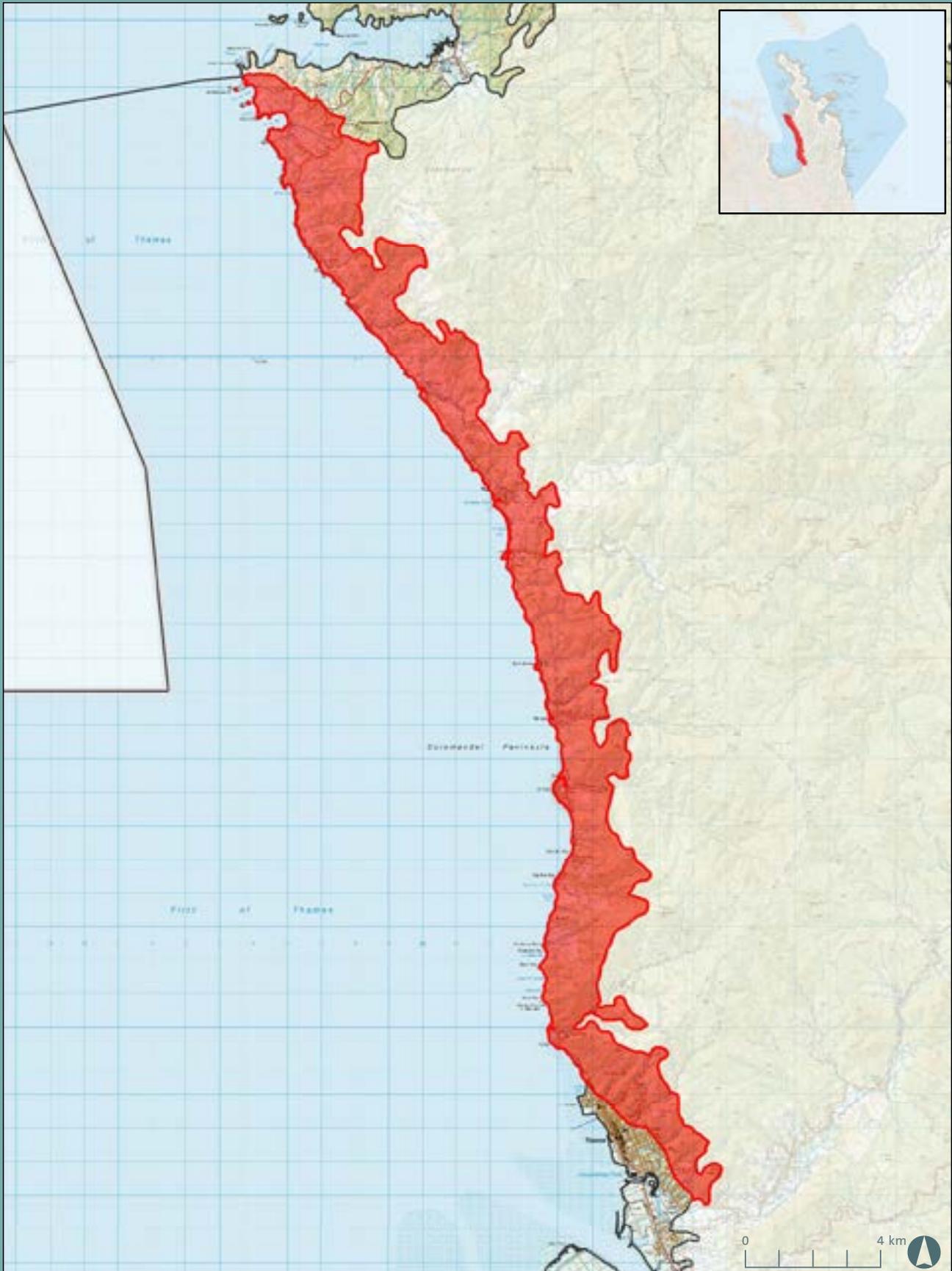
-  Extent of Coastal Environment
-  Coastal Terrestrial Area 2: Hauraki
- Hauraki Coastal Natural Character Ratings: Level 4
  -  High
  -  Very High



Map 7

# Thames Coast

## COASTAL TERRESTRIAL AREA 3:



## Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area extends from Thames in the south to the southern hills associated with Manaia Harbour in the north, and forms the only area that flanks the eastern coastline of the Firth of Thames. This Coastal Terrestrial Area incorporates the steeply sloping, western-facing foothills associated with the Coromandel Peninsula's rugged interior and includes many small bays and streams. These slopes are typically covered in indigenous shrubland or forest, with rural production land and pine plantations on the easier accessible country. From the Tapu settlement north, the Area has comparatively more rural production land than between Tapu and Thames.

The Thames Coast Road extends along the entire length of this Coastal Terrestrial Area, connecting numerous small settlements that pepper this coastal extent.

Key coastal characteristics include relatively straight, narrow stretch of coastline accessed by State Highway 25, deeply incised, forest-clad gullies, numerous small settlements located along the main highway, located on small alluvial plains at river mouths, pockets of cleared land and commercial forestry interspersed along the foreslopes of this coastline, with larger areas of pastoral farming extending eastwards up larger river valleys such as the Waikawau River Valley to the north.

The western facing slopes of the rugged Coromandel Range form a highly legible peninsula landform when viewed against the flat cultivated Hauraki Plains to the south.

Beyond this coastal environment area, the Coromandel Range extends to the east, taking in the Coromandel Forest Park and the many rugged peaks of the Coromandel Peninsula.

*Below: Forested slopes north of Thames*



## Abiotic

The Thames Coast Coastal Terrestrial Area includes the steep and very steep hill footslopes of the Coromandel Range to the east, rising to 594 metres above sea level at Te Ipuomoehau which forms the backdrop to Ngarimu Bay. The coastline is reasonably straight (as opposed to the more indented coastline of the remainder of the Coromandel Peninsula), however there are local variances where steep sided watercourses have created small alluvial pockets in between the larger protruding foothills. The landform of the Coromandel Ranges remains relatively unmodified.

The geology is principally greywacke overlain by volcanic deposits, into which unmodified streams have deeply incised numerous gullies along the entire length of the Area. The Thames Coast Road has created a steeper coastal face where headlands have been truncated to allow road access, but the larger landform of the Peninsula remains intact. There is a Geopreservation Site within the Te Mata Valley and represents a good example of golden orange and red carnelian.

The shoreline is typically very narrow, comprising predominately rocks with areas of cobbles and grey sand.

Streams typically maintain a natural meandering course through the landscape. These watercourses have very steep gradients and are relatively short. The water quality of most streams is likely to be high due to the extensive riparian cover and predominantly forested catchments within the Coromandel Forest Park. Watercourses in the northern half of the Area may have poorer water quality due to depleted riparian vegetation, erosion, and inputs from rural and forestry land use, but channel modification is likely to be relatively minor.

*Below: Matariki Bay and Matariki Islands*



Most of the small coastal settlements are located on debris fans and alluvial fans at the outlet of larger streams. The landform of these fans has been modified to allow urban development and most of the streams are also modified by channelization, diversions, and river training structures.

Where they exist, beaches are dominated by boulders and gravel, rocky headlands, with isolated areas of mud and sand associated with the alluvial fans at stream outlets. However, along much of the coastline there is no real beach and the steep coastal faces drop directly down to relatively deep water at the interface with the Coastal Marine Area.

The area has a windy, strongly maritime climate with warm summers and mild winters.

*Below: Whakatete Bay*



## Biotic

Land cover analysis: The total land area of the Thames Coast Coastal Terrestrial Area is 6,176ha. This includes 0.5ha of islands. Of this, 44% of the land cover is indigenous forest, 25% is rural production land and 22% is indigenous shrubland. Of the remainder, almost 4% is artificial surfaces, 3% is exotic treeland and very small areas (<1% each) of bare surfaces, exotic scrub, mangroves and waterbodies, in aggregate covering only 1.05%. There is no indigenous wetland cover. The total indigenous land cover is 67%.

The entire Coastal Terrestrial Area would originally have been completely covered in indigenous forest. Several shrubland assemblages would have occurred on the alluvial fans and debris fans at stream outlets to the coast. Wetlands would have been naturally uncommon due to the fall towards the coast, although forested riparian wetlands would have been a minor feature of stream floodplains at lower elevations (e.g. Waikawau Stream) and small perched wetlands would have existed on poorly drained gully floors.

Around a quarter of this Coastal Terrestrial Area is now in rural production land, most located north of Tapu. Within this northern half of the area indigenous shrubland and coastal forest, much of it without formal legal protection, occupies the coastal cliffs, steep slopes and stream gullies. The indigenous shrubland is a notable but not dominant feature of the northern half, with rural land uses having more prominence. In the southern half of the Area, indigenous shrubland and forest dominates the landscape, with a high proportion having legal protection as Forest Park, reserves or QEII covenant.

All of this forest and shrubland can be expected to be modified by past logging, clearance, grazing and weed and pest impacts, but will retain moderate to very high ecological values for its biodiversity and habitat.

Watercourses typically have steep short gradients until they reach the alluvial fans, where a flatter gradient and channelizing are more common. Highly modified riparian vegetation is common across most of the rural production land north of Tapu, particularly where the gully systems are more deeply incised. From Tapu south, the riparian forest vegetation is generally intact and extends inland across entire stream catchments. Freshwater fish populations can be expected to be diverse and containing relatively unmodified species assemblages. Native frog populations are also present here.

Freshwater macroinvertebrate communities will vary depending on location. While from Tapu south, the streams will contain diverse communities of sensitive species, from Tapu north, the macroinvertebrate communities will vary based on dominant land use. These transition to less diverse pollution-tolerant communities where land drainage is more common, riparian vegetation depleted and rural production is more intensive.

*Below: Mudflats associated with the Tararu Stream at Tararu*



### Experiential

Boat access is gained from Tararu, Ngarimu Bay, Te Puru, Waiomu, Ruamahunga and Waikawau. Small settlements extend along the immediate coastal edge with the steep coastal ranges extending behind. Pockets of Pohutukawa extends along rocky coastline with sandy beaches often coinciding with small residential settlements. Boat access is also gained from Te Kouma Harbour, Waipapa Bay, Wharf Road (Coromandel), Wyuna Bay, Long Bay and Oamaru Bay. Further north along this area, the open grazed farmland extends to meet the coastal edge. Matariki Bay Islands, despite their predominantly grassy landform, retain high perceptions of naturalness due to their limited modification, eroded form and the presence of a few mature pohutukawa trees.

State Highway 25 follows the coastal edge closely winding amongst the settlements and intervening pockets of native vegetation cover. Pine plantations are evident on the steeper slopes and are an indication of human modification of the once natural vegetation cover.

The extent of modification is balanced with the natural patterns of landform and vegetation. SH25 is a busy highway that services the Coromandel Peninsula and in turn minimising any sense of isolation.

Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High	✓	✓	
Moderate to High			✓
Moderate			
Moderate to Low			
Low			
Very Low			
<b>Overall Natural Character Rating</b>			<b>High</b>

*Below: The coast road (SH25) predominantly follows the coastline*



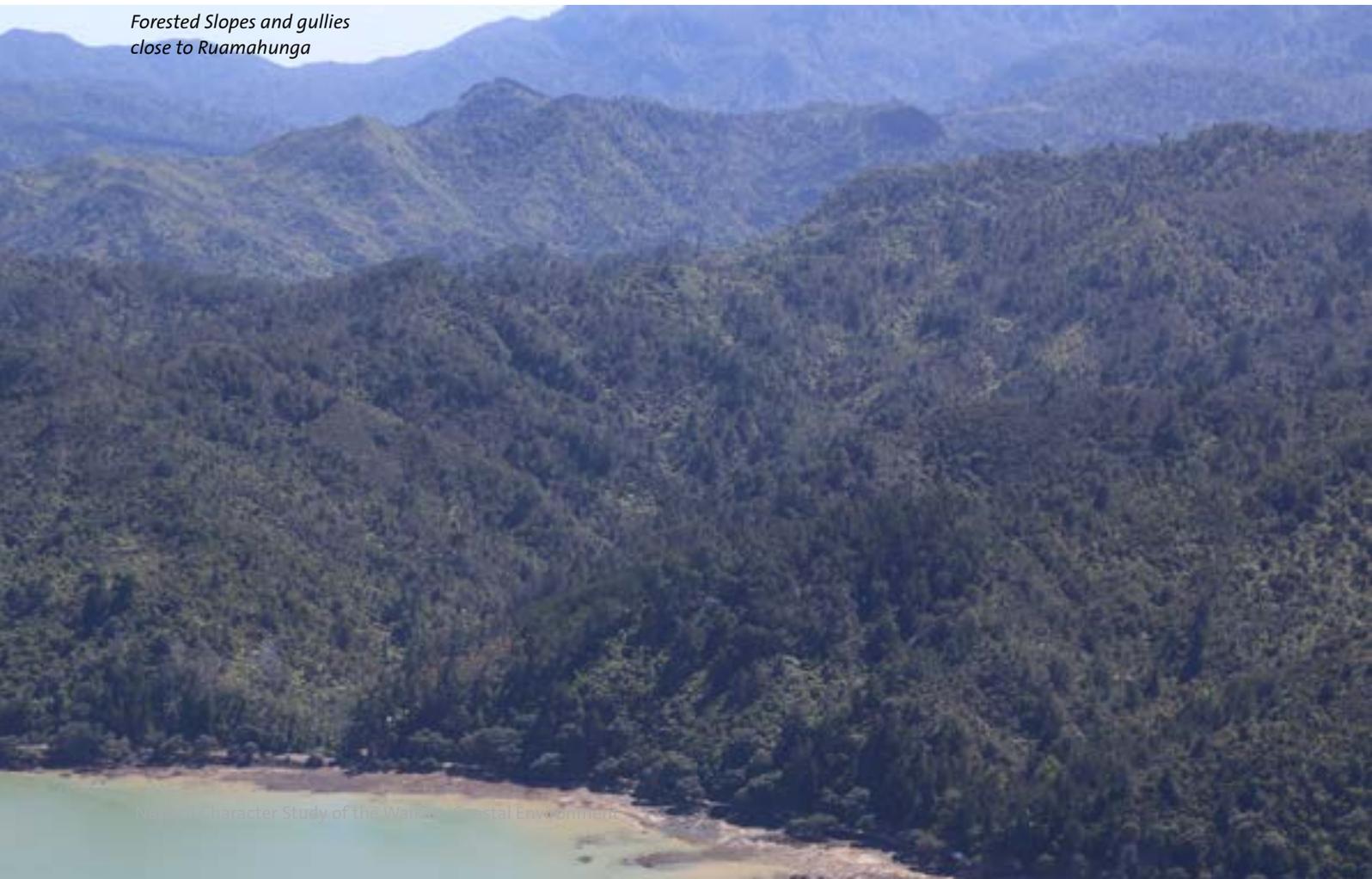
Natural Character Study of the Waikato Coastal Environment

### Coastal Terrestrial Area 3: Thames Coast Specific Characteristics at Level 4

These are mapped with reference to **Map 8**

Area	Rating	Key Values	Additional Comments
Forested slopes and gullies	High	<ul style="list-style-type: none"> <li>Intact indigenous shrubland and coastal forest dominate the southern part of this area, whilst significant areas are noted in the north.</li> <li>Much of this land is protected.</li> <li>Enhances the perceived naturalness due to the lack of modification to these vegetated areas.</li> <li>High experiential values as the area forms a forested eastern backdrop to the Firth of Thames.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified lands, including pasture and those areas retaining concentrations of housing and structures, notably around Thames. May include the road, power lines and tracks where the indigenous vegetation extends to the coastline.</li> <li>The vegetation forms part of the western extent of the broader inland Coromandel Forest Park and the many rugged terrain of central Coromandel Peninsula.</li> </ul>
Matariki Bay Islands	High	<ul style="list-style-type: none"> <li>High experiential values due to separation from mainland, distinctive eroded rock outcrops with limited modification.</li> <li>No abiotic modifications</li> </ul>	<ul style="list-style-type: none"> <li>Includes areas of pasture on islands.</li> </ul>

*Forested Slopes and gullies close to Ruamahunga*



Matariki Islands



Forested Slopes and Gullies

Map 8

Legend

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 3: Thames Coast
- Thames Coast Coastal Natural Character Ratings: Level 4
  -  High
  -  Very High





## Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area is located on the western side of the Coromandel Peninsula and encompasses the lower elevation foothills of the Coromandel Ranges surrounding Manaia Harbour, Coromandel Harbour and the bays to the north. The area comprises three main landforms. The steep to rolling coastal peninsulas jutting out into the harbour and islands have variable cover of either indigenous shrubland or rural production land and access is relatively limited. The eastern extent of the Area abutting the Coastal Context Area consists of steep to rolling Coromandel Range foothills that slope down towards the coast and end at, or close to, the coastal margin. These foothills are covered in indigenous shrubland, indigenous forest or plantation forests on steeper slopes and gullies and isolated pockets of rural production land on the easier country. Between the foothills and the coast, the relatively narrow rolling to flat coastal plains around Coromandel Harbour are dominated by rural production land, lifestyle properties and coastal wetlands/saltmarsh.

Key coastal characteristics include: the steep narrow peninsulas and large islands creating the enclosed harbour environments, the prominent headlands (north of Manaia harbour, Koputauaki east of Oamaru Bay and east of Ngohitanu Bay) covered in indigenous shrubland, the smaller islands covered in indigenous shrubland and the extensive mudflats, saltmarsh and estuary margin areas.

Beyond this Coastal Terrestrial Area, the Coastal Context land rises into the Coromandel Ranges. This elevated and steep land is predominantly covered in indigenous shrubland and forest within the Forest Park and is managed by the Department of Conservation. Large areas east of Te Kouma and northeast of Kikowhakarere Bay are in plantation forestry and the harvesting rotation is visible from the coast.

*Below: Little Passage and northern part of Whanganui Island*



## Abiotic

The overall landform of the Coromandel Ranges remains relatively unmodified and the lower elevation peninsulas, islands and foothills retain natural topography. The terrain is dominated by the underlying volcanic rock, but the lower elevation means streams gullies are not so deeply incised as occurs to the south. Coastal erosion processes have carved headlands and created beaches and bays. On the plains, there is a moderate level of modification of the flatter land for settlement and rural productive land. In a few places, the coast road has created a steeper coastal face where headlands have been truncated to allow road access, but other roads typically follow the landform.

The coastline is severely indented, where long, narrow peninsulas extend seaward, with many islets/ rocks also evident. Large alluvial deposits are concentrated around the mouths of local rivers and are often the most settled areas (the town of Coromandel for instance). The topography is steep to very steep in places and rises to 394 metres above sea level at the Pukewhakatara rock pillars, which straddle the boundary between the Coastal Terrestrial Area to the south. This prominent hilltop is also a Geopreservation Site. Composed of old lahar deposits, this landform represents one of the best examples of rock pillars in the Coromandel Peninsula.

Streams typically maintain a natural meandering course through the landscape. These watercourses have moderate gradients and are relatively short, though the streams exiting over the Plains will have flatter gradients at their outlets. The water quality of streams is likely to be quite variable, reflecting the dominant land use of the catchment. Small streams with catchments located entirely in indigenous shrubland are likely to have very good water quality, diverse fish and macroinvertebrate fauna. Streams with a large proportion of their catchment in rural productive land or plantation forestry are likely to have moderate or poor water quality due to depleted riparian vegetation, erosion and inputs from rural and forestry land use, with moderate diversity of fish and macroinvertebrate fauna. Channel modification occurs where river training works and channelization has been undertaken to enable settlements and productive land development.

Beaches are limited to small bays between rocky headlands, sometimes with sand, but typically with gravel and boulders and rocky outcrops. Where the larger streams discharge onto a coastline with a flatter gradient, there are large areas of mudflats featuring saltmarsh vegetation. However, along much of the coastline, there is no real beach, and the steep coastal faces drop directly down to relatively deep water at the interface with the Coastal Marine Area.

*Below: Papakarahi Bay*



The area has a windy, strongly maritime climate with warm summers and mild winters.

### **Biotic**

Land cover analysis: The total land area of the Coromandel Harbour Coastal Terrestrial Area is 6,667ha. This includes 510ha of islands. Of this, 36% of the land cover is indigenous shrubland, 34% is rural production land, 12% is exotic treeland and 11% is indigenous forest. Of the remainder, 3% is artificial surfaces, with very small areas (<1% each) of bare surfaces, exotic scrub, mangroves, indigenous wetland and water bodies, in aggregate covering only 1%. The total indigenous land cover is 48%.

The entire Coastal Terrestrial Area would originally have been completely covered in indigenous forest. Several shrubland assemblages would have occurred on the steeper faces following slips and in association with natural river erosion processes. Wetlands would have been naturally uncommon due to the fall towards the coast, although forested gully floor wetlands would have been a feature of streams at lower elevations with poorly drained sediments.

Around half this Coastal Terrestrial Area is in rural production land and plantation forestry and half is in indigenous shrubland and forest, with very small areas associated with stream gully systems. This is also true of the islands included in the Area, with some being managed as rural production land for livestock grazing and others regenerating in indigenous shrubland. The Coromandel Ranges are a more distant backdrop in this Area than along the Thames Coast. Despite the relatively high proportion of indigenous vegetation cover, only small areas have formal protection in reserves or QEII covenants.

Watercourses tend to have steep short gradients, except across short areas of the plains where a flatter gradient occurs. Riparian vegetation remains across more than half of the stream reaches, with more substantial riparian vegetation associated with the larger patches of indigenous vegetation. Freshwater fish populations can be expected to be relatively diverse. The streams on the Plains will provide a conduit for migratory species to move to and from the sea, and to allow species that prefer cool mountain streams with good water quality to move upstream to the Coromandel Ranges. Freshwater macroinvertebrate communities will vary depending on location, with diverse communities of sensitive species occurring where riparian vegetation is more extensive, transitioning to less diverse pollution-tolerant communities, where riparian vegetation is depleted and rural production is more intensive.

*Below: Motutapere Island*



## Experiential

State Highway 25 follows the coastal edge, closely winding amongst the settlements before heading steeply inland toward Manaia. The extent of modification is balanced with the natural patterns of landform and vegetation but it is evident throughout the area. SH25 is a busy highway that services the Coromandel Peninsula and in turn minimising any sense of isolation.

Pockets of native vegetation cover extend along the coastal edge and within valleys, providing a sense of what the unmodified landscape may have once been. Small areas of native vegetation extend along the valleys and coastal edge highlighting the natural landform. Interspersed is the agricultural farmland that covers much of this unit.

Between Manaia and Te Kouma Harbour, the State Highway extends through native bush cover. The remainder of the coastal unit is largely modified with forestry and agricultural land use, with similar native bush cover at the northern end of the area, by Koputauaki Bay. Coastal settlements and associated roading dominate Coromandel harbour's coastline with pockets of native vegetation. The backdrop to Coromandel township includes a mix of native bush vegetation and forestry blocks.

The islands surrounding Coromandel harbour are largely modified with those less modified islands extending north of Waimate Island. The largest island, Whanganui Island, supports grazing farmland and housing with tracks throughout the island. The harbour and beaches are occupied regularly for recreational activities by locals and visitors to the area.

Either side of Coromandel township settlement extends in pockets of rural residential housing and residential subdivision. Ruffin peninsula is heavily inhabited and modified along its shoreline with boat access points.

*Below: Wharf at Te Kouma*



Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High			
Moderate to High	✓	✓	✓
Moderate			
Moderate to Low			
Low			
Very Low			
	<b>Overall Natural Character Rating</b>		<b>Moderate to High</b>

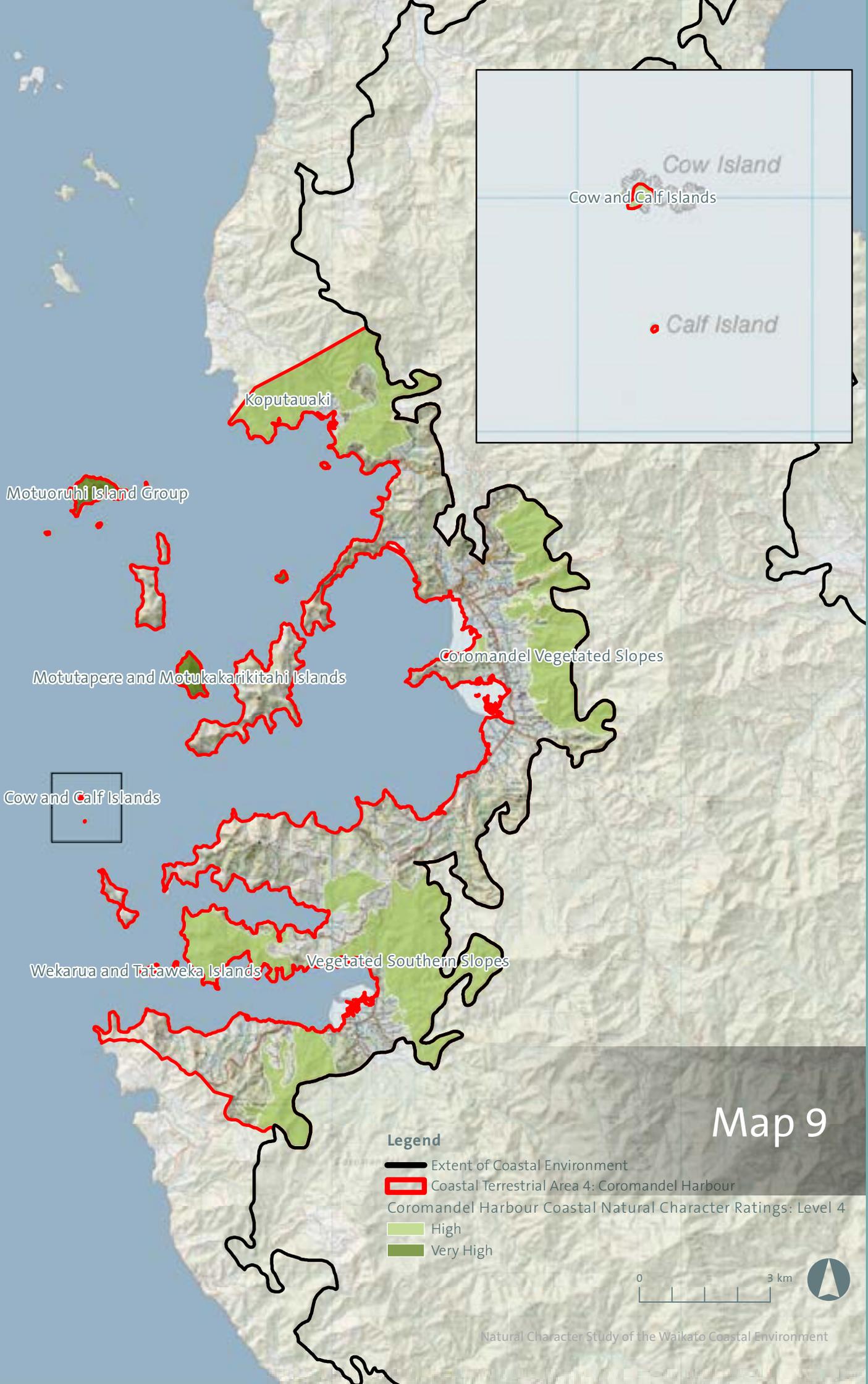
Below: Preece Point



## Coastal Terrestrial Area 4: Coromandel Harbour Specific Characteristics at Level 4

These are mapped with reference to **Map 9**

Area	Rating	Key Values	Additional Comments
Motuoruhi Island Group	Very High	<ul style="list-style-type: none"> <li>Unmodified island group. Intact indigenous forest and manuka/kanuka shrublands cover these islands.</li> <li>High levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Total of four islands: Motuoruhi Island (Goat Island); Motuokino Island (Shag Rock); Motukaramea Island (Kaikai Island) and Motumorirau Island (Pauls Island). Also includes Hautapu Rocks.</li> </ul>
Motutapere and Matukakarikitahi Islands	Very High	<ul style="list-style-type: none"> <li>Protected Islands. Steep faces feature intact native forest and rock shores. Abiotically, unmodified. High experiential values with no perceived modification on either island.</li> </ul>	<ul style="list-style-type: none"> <li>Total of two islands: Motutapere Island and Matukakarikitahi Island (Rat Island). Excludes marine farms off Rat Island.</li> </ul>
Cow and Calf Islands	Very High	<ul style="list-style-type: none"> <li>Unmodified islands containing very high abiotic, biotic and experiential levels of naturalness due to their rocky exposed character and the intact vegetation on the larger Cow Island.</li> </ul>	<ul style="list-style-type: none"> <li>Total of two islands: Cow Island and Calf Island.</li> </ul>
Koputauaki	High	<ul style="list-style-type: none"> <li>Indigenous kanuka manuka shrubland dominates much of the lower slopes terminating at the water's edge. Upper eastern slopes are largely indigenous forest in DOC ownership.</li> <li>High experiential naturalness.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes highly modified coastal flats at Koputauaki Bay and exotic forest. Includes part of road, power lines and occasional house.</li> <li>Connected to broader inland indigenous forest associated with the central peninsula</li> </ul>
Vegetated southern slopes	High	<ul style="list-style-type: none"> <li>Prominent dome shaped headland, the majority of which is manuka kanuka. Scattered exotic wilding pines also present.</li> <li>Forested backdrop to Manaia Harbour amplifies perceived levels of naturalness to bay</li> </ul>	<ul style="list-style-type: none"> <li>Excludes areas of forestry and pastoral land.</li> <li>Includes part of SH25.</li> <li>Forms part of broader inland indigenous forest associated with central peninsula.</li> </ul>
Wekarua and Tataweka Islands	High	<ul style="list-style-type: none"> <li>Regenerating indigenous scrub with no abiotic modification.</li> <li>High levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Total two islands: Wekarua and Tataweka Islands.</li> <li>Aquaculture is present off shore. Refer to Coastal Marine Area B.</li> </ul>
Coromandel Vegetated Slopes	High	<ul style="list-style-type: none"> <li>Indigenous vegetated lower slopes of forest clad hills east of Coromandel settlement.</li> <li>Forested backdrop amplifies perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified pastoral land and house at lower elevations.</li> <li>Forms part of broader inland indigenous forest associated with central peninsula.</li> </ul>



# Map 9

**Legend**

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 4: Coromandel Harbour
- Coromandel Harbour Coastal Natural Character Ratings: Level 4
-  High
-  Very High





## Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

The Colville Coastal Terrestrial Area is a slightly concave, curved section of gently sloping to steep coastline at the north-western edge of the Coromandel Peninsula, extending northwards from the northern extent of the Coromandel Harbour in the south, to the southern base of the steep Moehau Range in the north. This Coastal Terrestrial Area also includes the Motukawao Group, a group of rugged volcanic islands located some two to seven kilometres offshore.

Key coastal characteristics include: narrow, relatively concave stretch of coastline, small sloping highly modified coastal margin and valleys, a portion of the steep forested fore slopes of the Coromandel Range; in places manuka and kanuka extends from ridge tops to the coast; islands associated with the rugged Motukawao Group; rocky coastline of Amodeo Bay; the enclosed Colville Bay.

Eastwards of the coastal environment, the coastal context includes the Colville Road, which extends inland from Amodeo Bay to connect with the head of the Colville Valley. Further east, the mountainous interior of Coromandel Range extends to the eastern coast at Coromandel Peninsula. This elevated and steep land is predominantly covered in indigenous shrubland and forest within the conservation land and is managed by the Department of Conservation, though not all appears to have formal protection.

*Above: Turipeka Point*





*Above: Otautu Bay*

### **Abiotic**

The Colville Coastal Terrestrial Area includes the steep and moderately steep foothills of the higher range to the west, rising to 511 metres above sea level, above Ngohitanu Bay. Similar to other Coastal Terrestrial Area's, the geology of this Coastal Terrestrial Area is principally greywacke, overlain by prolific volcanic material. The coastline is reasonably straight, with Colville Bay being the principal inlet of this Coastal Terrestrial Area. This Coastal Terrestrial Area also includes the cluster of conspicuous and prominent volcanic island landforms.

A Geopreservation Site of Waitete Bay Oligocene sediments represents the best exposure of the Te Kuiti Group sequence on the Coromandel Peninsula.

River valleys extend inland behind the volcanic headlands to a longer distance on the western coast of the peninsula. The principal river is the Umangawha Stream which flows in a northerly direction to Colville Bay. At its mouth, there are extensive alluvial deposits, much of which have been converted to farmland and is the location for the small settlement of Colville. Wetlands would have been originally associated with these poorly drained river valleys. Other watercourses tend to be short and steep and drain directly into the sea.

The coast in this area is characterised by a rocky coastal interface and in places rock platforms with a rapid decent in depth. Flatter gradient beaches associated with coastal plains are muddy with little sand.



## Biotic

Land cover analysis: The total land area of the Colville Coastal Terrestrial Area is 4,517ha. This includes 79ha of islands. Of this, 38% of the land cover is indigenous shrubland, 34% is rural production land, 16% is indigenous forest and 10% is exotic treeland. Of the remainder, there are very small areas (<1% each) of artificial surfaces, bare surfaces, exotic scrub, mangroves, indigenous wetlands and waterbodies, in aggregate covering only 1.4%. The total indigenous land cover is 55%.

The entire area would have once been completely covered in Indigenous forest with shrubland occurring on steeper faces where erosion would have occurred. Indigenous shrubland now covers steeper land and in gully headwaters, with the remaining land forming rural production land of either pasture or exotic pine forestry.

The catchment is steep and water courses have created deeply incised gullies that support fingers of native shrubland species with Colville's southern peninsula support regenerating native shrubland.

Valley floors support productive pasture with modified drainage patterns supporting minimal indigenous vegetation. The streams on the Plains will provide a conduit for migratory species to move to and from the sea and to allow species that prefer cool mountain streams with good water quality to move upstream to the Coromandel Ranges.

The estuarine reaches of Colville Bay and Waiaro have drained wetlands with some remnants of saltmarsh near Colville. There continues to be a small amount of saltmarsh with good sequences that transition through to shrubland at higher elevations.

Motukaramarama Island is one of the Motukawao Islands group. It lies some 3.5 km off the coast and is uninhabited. It provides a nesting site for about 3500 pairs of Australasian Gannets along with its neighbouring islands in the cluster.

Some of the indigenous shrubland in the ranges is protected in Conservation area and by QEII Covenants.

*Above: Motukaramarama Island (Bush Island), part of the Motukawao Island Group*



### Experiential

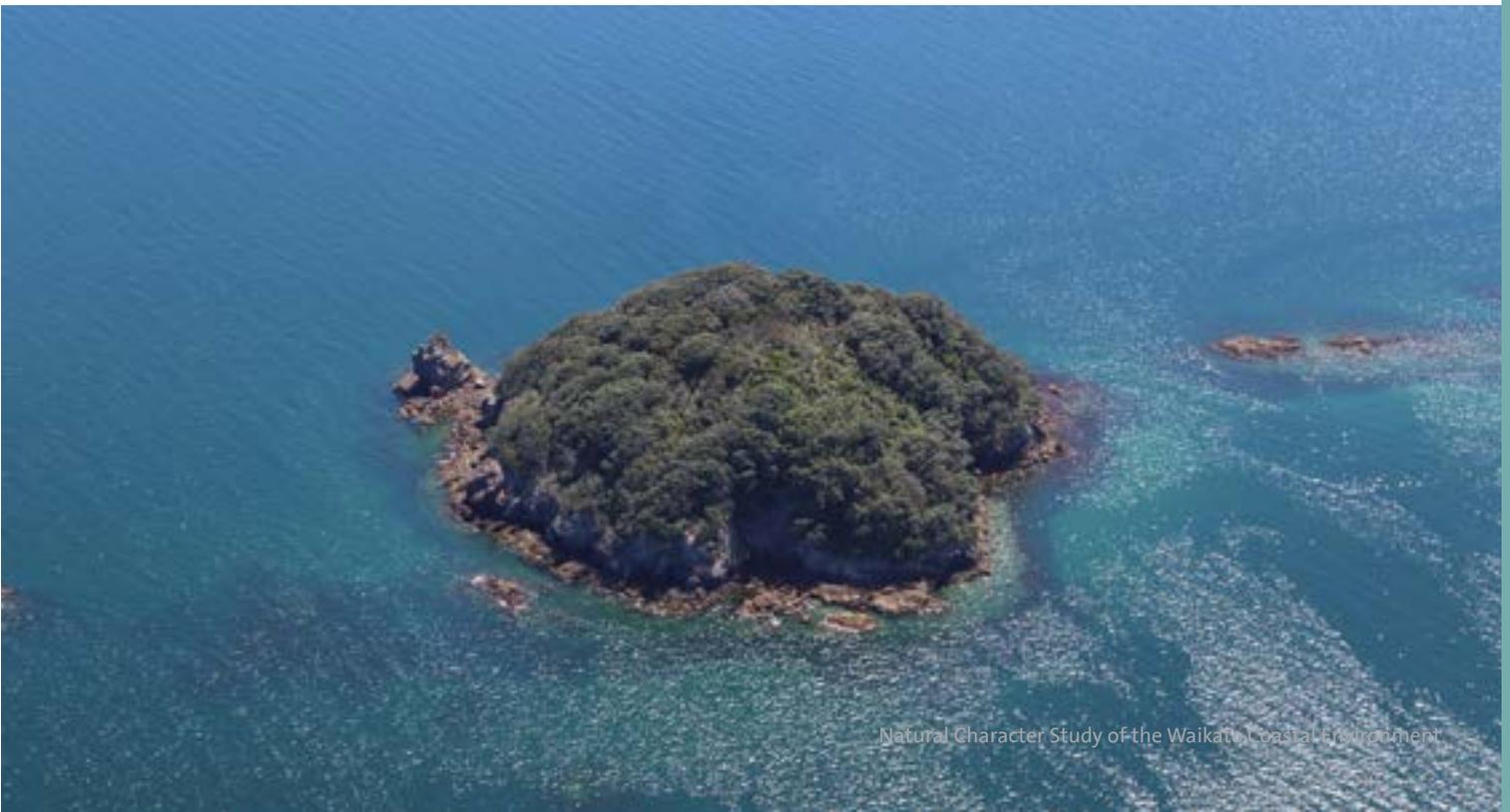
Boat access is gained from Papaaroha, Amodeo Bay, Waitete Bay and Otautu Bay. Settlements are sited around these areas and are largely devoid of native vegetation cover. Fingers of native vegetation cover extend up the valleys behind the settlements and along the Colville Peninsula. A large portion of the coastal land is rolling and steep farmland, with steeper slopes still containing within native bush vegetation. The estuaries of Colville Bay and Waiaro are remote and largely unoccupied along the margins. Beyond Colville access is more remote along the coastline with less occupation and visitors, creating a strong sense of isolation.

This Coastal Terrestrial Area includes the Motukawao Island Group, a remote and intact group of rugged and exposed islands. These islands are uninhabited and retain very high levels of perceived naturalness through their wild and rugged nature.

Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High			
Moderate to High	✓	✓	✓
Moderate			
Moderate to Low			
Low			
Very Low			
<b>Overall Natural Character Rating</b>			<b>ModerateHigh</b>

Left: Colville Bay

Below: Motumakareta Island, north of Elephant Cove, Motukawao Island Group



## Coastal Terrestrial Area 5: Colville Harbour Specific Characteristics at Level 4

These are mapped with reference to **Map 10**

Area	Rating	Key Values	Additional Comments
Paeroa Slopes	Very High	<ul style="list-style-type: none"> <li>• These elevated and steep upper slopes are covered in indigenous forest and shrubland. Upper eastern parts of the area is within conservation land.</li> <li>• No modification evident.</li> </ul>	<ul style="list-style-type: none"> <li>• Excludes pastoral land</li> <li>• Forms southern part of indigenous-clad Moehau Range</li> </ul>
Motukawao Island Group	Very High	<ul style="list-style-type: none"> <li>• Conspicuous, prominent and unmodified volcanic island group. Very high levels of perceived naturalness due to their intact vegetation and rocky, exposed character.</li> <li>• The islands are home to many threatened bird species</li> </ul>	<ul style="list-style-type: none"> <li>• Aquaculture located off Moturua Island (Rabbit Island) - Refer to Coastal Marine Area B</li> <li>• Collectively, naturalness is amplified due to the lack of modification</li> </ul>
Colville Bay slopes	High	<ul style="list-style-type: none"> <li>• Modified Manuka kanuka dominated headland.</li> <li>• High abiotic, biotic and experiential degrees of naturalness</li> </ul>	<ul style="list-style-type: none"> <li>• Scattered with dwellings and associated clearings of exotic grassland. Contained by pastureland. Excludes forestry.</li> </ul>
Papaaroha	High	<ul style="list-style-type: none"> <li>• Indigenous kanuka manuka shrubland dominates much of the lower. Upper ridges are largely indigenous forest in DOC ownership.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not include extensively modified lower slopes and valley floor.</li> <li>• Forms part of broader indigenous vegetation cover of central peninsula.</li> </ul>



# Port Jackson

## COASTAL TERRESTRIAL AREA 6:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

The Port Jackson Coastal Terrestrial Area encircles the narrow rugged peaks of the Moehau Range which makes up the northern tip of the Coromandel Peninsula, extending northwards into the Hauraki Gulf. Immediately north of Waiaro, the coastal terrestrial area extends in a clockwise direction around the tip of the Peninsula. The area encompasses the coastal tips of the long ridges and steep, narrow valleys radiating outwards from the Moehau Range, ending at Te Karaka Bay on the east coast of the Coromandel Peninsula. The landform is very intact.

Key coastal characteristics include: the Port Jackson Road extends at the foot of gently sloping ridgelines; lower slopes of the range are largely cleared of vegetation, in areas native forest extends from the upper reaches of the range down gullies and in places meets the coastline; many ridges and hillsides are steep with slipping and some erosion evident; two settlements, the sandy embayment of Port Jackson at the tip of the Peninsula and the larger harbour of Port Charles to the south; scattered small islands, including Square Top Island in the north and Motukokopu Island, a small sea stack off the coast of the eastern headland of Port Charles.

Inland of this Coastal Terrestrial Area, the coastal context includes the Moehau Range which climbs to 1,341 metres above sea level. Colville Channel extends northwards of the Port Jackson Coastal Terrestrial Area, between Coromandel Peninsula and Great Barrier Island. South eastward of this Coastal Terrestrial Area are several island archipelagos including the Cuvier, Mercury and Ohinau Islands.

*Below: The agricultural lower slopes of the Moehau Range, just south of Port Jackson*





*Above: Stony Bay*

### **Abiotic**

The Port Jackson Coastal Terrestrial Area includes the steep and very steep foothills of the Moehau Range, rising to 653 metres above sea level on the western coastline. This Coastal Terrestrial Area represents the northerly tip of the peninsula and includes a complex sequence of dramatic exposed cliffs, headlands, indented bays, and inlets. Beaches are predominantly white sand, although gravelly/ stony beaches are also common.

The geology is principally greywacke overlain by prolific volcanic deposits. Geopreservation Sites in this Coastal Terrestrial Area include a concentration on the western side of the peninsula around Fantail Bay and include the Fantail Bay, Paritu hornfels, which represent the best and most easily accessible example of the Paritu Pluton and contacts with greywacke, which has metamorphosed to hornfels. Other sites here include the Paritu granite quarry areas and the Darkie Stream tourmaline. At Ka-iti Point, west of Port Jackson is the Ka-iti porphyrite, a well exposed coastal section of this hydrothermally altered intrusion. Further east is the Fletchers Bay Waitemata Group sediments and the Sugar Loaf volcanic sequence, a series of spectacular stone pinnacles.

Landforms are relatively unmodified apart from small areas on valley floors, especially at Port Charles. There are extensive steep rocky coastal faces as well as flatter gradient beaches.

Like other areas on the peninsula, watercourses here are often short and steep with the longer watercourses associated more on the easterly side of this Coastal Terrestrial Area, draining into the deeper bays, including Stony Bay and Port Charles and including Stony Bay Creek, Okahutahu Stream and Tangiaro Stream. Wetlands would have originally been associated with these poorly drained river valleys.

The area receives strong winds due to its isolated location.



*Left: Moehau Stag Beetle*

## Biotic

Land cover analysis: The total land area of the Port Jackson Coastal Terrestrial Area is 8,429ha. This includes 5.6ha of islands. Of this, 37% of the land cover is indigenous shrubland, 32% is rural production land and 28% is indigenous forest. Of the remainder, 1% is exotic treeland and there are very small areas (<1% each) of artificial surfaces, bare surfaces, exotic scrub, mangroves and indigenous wetlands, in aggregate covering only 1.4%. There are no waterbodies. The total indigenous land cover is 65%.

The entire area would have once been completely covered in Indigenous forest with shrubland occurring on steeper faces where erosion would have occurred. Indigenous shrubland now covers steeper land and in gully headwaters with the remaining land dominated by indigenous shrubland and forest. This unit covers the top of the Coromandel Peninsula with a mountain range extending steeply to the coastal edge. Coromandel Forest Park extends over this range with much of the indigenous land cover contained within this Conservation Area and other QEII Covenants.

The lower foothills continue with deeply incised gullies that support fingers of native shrubland species and productive pasture which is clustered around Port Jackson, Fletcher Bay and Port Charles.

Valley floors support productive pasture with modified drainage patterns supporting minimal indigenous vegetation. The streams on the plains will provide a conduit for migratory species to move to and from the sea and to allow species that prefer cool mountain streams with good water quality to move upstream to the Coromandel Ranges.

Wetlands are naturally uncommon in this area, except poorly draining gully systems on flatter land, mainly around Fletcher Bay, Sandy Bay and Port Charles. The coastal areas from Cape Colville to Sandy Bay, support rare and threatened wading and coastal bird species. The native Pateke, or Brown Teal, is an endangered duck species found in the Port Charles and Waikawau area along with endangered invertebrate Moehau Stag Beetle.

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## Experiential

The most remote areas of the Coromandel Peninsula, Port Jackson, Fletcher Bay and Port Charles providing small settlement areas with boat access. The steep terrain supports grazing farmland with more frequent pockets of native bush cover that extend down from the central range. Steep coastal edges and isolated embayments have limited access with some areas completely inaccessible by road. Sugar Loaf and Square Top Island (including The Pinnacles) are remote areas exemplifying high levels of perceived naturalness.

Numerous walks within this Coastal Terrestrial Area enable people to experience remote-like characteristics, notably on Muriwai Walk, Coromandel Walkway and Stony Bay Track.

From Fletcher Bay to Port Charles and south of Port Charles, the coastal environment is dominated with native bush cover, with some narrow road access from Port Charles to Stony Bay. The natural environment dominates with limited modification increasing the perception of naturalness in this area.

*Below: Forested slopes above  
Shag Bay*



Rating at Level 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			<b>Moderate to High</b>

Below: Kaiiti Point, Port Jackson



## Coastal Terrestrial Area 6: Port Jackson Specific Characteristics at Level 4

These are mapped with reference to **Map 11**

Area	Rating	Key Values	Additional Comments
Moehau Vegetated Slopes	Very High	<ul style="list-style-type: none"> <li>An intact sequence of native forest extends down the short, steep ridgelines from the top of the Moehau Range to the waters edge in this area.</li> <li>Unmodified abiotic and biotic tract of land.</li> <li>Very high experiential naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Includes parts of the Fantail Bay Recreation Reserve and Coromandel Forest Park.</li> <li>Part of Moehau Range. Provides critical vegetation link to coast at Fantail Bay.</li> <li>Upper slopes are part of DOC recreation reserves.</li> <li>Excludes pastoral farmland and modified lower slopes.</li> </ul>
Stony Bay Forest	Very High	<ul style="list-style-type: none"> <li>Steep valleys and spurs contain a mixture of unmodified native shrub land and forest.</li> <li>Extensive areas under formal protection in Conservation Areas, QEII covenants. The Moehau ecological area in particular, supports an almost complete altitudinal sequence of plant and animal communities from near sea level to sub-alpine conditions. It is home to a number of rare or endangered endemic species (e.g. land snails, Archey's frog). An exceptional tract of naturalness.</li> </ul>	<ul style="list-style-type: none"> <li>Entirety of the area under DOC management. Include QEII land to south.</li> <li>Includes power line, Stony Bay Track, Road, walkway and Coromandel Walkway. Excludes the modified lower slopes fringing Stony Bay Beach. All these are subservient to the extent of forest.</li> <li>Forms part of inland Moehau Range.</li> </ul>
Puroa and Onekura slopes	Very High	<ul style="list-style-type: none"> <li>Unmodified indigenous bush and shrubland extends from the first ridgeline to the coast. Highly natural and relatively inaccessible.</li> <li>Very High perceived level of naturalness due to the rugged and exposed character of the coastal ridgelines and remote inner valleys. Manuka kanuka dominates. Scattered wilding pines, native forest on ridge tops at the north and south of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Regenerating areas of bush. Does not include the modified lower slopes to the north and east.</li> <li>Excludes the small modified coastal fringe of Potiki Bay.</li> <li>Forms part of inland Moehau Range.</li> </ul>
Sugar Loaf and Square Top Island	Very High	<ul style="list-style-type: none"> <li>Exposed island and headland, extenuating experiential characteristics including remoteness</li> <li>Dramatic eroding cliffs and rocky foreshore with indigenous scrub.</li> </ul>	<ul style="list-style-type: none"> <li>Sugar Loaf part of Stony Bay Recreation Reserve.</li> </ul>



Map 11

**Legend**

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 6: Port Jackson
- Port Jackson Coastal Natural Character Ratings: Level 4
-  High
-  Very High







*Above: Development within the bush at Tuatēawa*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

Located on the eastern coast of the Coromandel Coastline, this Coastal Terrestrial Area extends from Waikawau Bay in the north to the coastal peak of Pukenui, immediately south of Kennedy Bay in the south. The area includes the forest clad slopes of the southern parts of the Moehau Range and northern parts of the Coromandel Range and includes the embayments of Waikawau Bay and Kennedy Bay. This undulating, predominantly modified Coastal Terrestrial Area contains a number of small settlements and road access to the majority of the coastline, although it is very intact as a landform.

Coastal characteristics include the uninterrupted slopes extending from the coastline up to the ridgelines and peaks; the enclosed bays at Waikawau and Kennedy Bay; the extensive tracts of very steep rocky shoreline with continuous indigenous shrubland/forest up to ridgeline; the barrier dune at Kennedy Bay and relic dune ridges behind; steep coastal faces dropping down to the ocean; the rear dune saltmarsh and wetlands at Waikawau and Kennedy Bay and the prominent headlands on either side of Kennedy Bay and Waikawau.

Beyond the coastal environment, the coastal context comprises elevated and forest clad peaks and ridges associated with the Coromandel Forest Park.



*Below: Waikawau River draining into Waikawau Bay. The Waikawau dunes are evident at the bottom of the photograph*

### **Abiotic**

The Kennedy Bay Coastal Terrestrial Area includes the steep and very steep foothills and escarpments of the westerly located inland hills, rising to 364 metres above sea level at Hapapawera, as well as including the broad sandy, predominantly flat embayments of Waikawau Bay and Kennedy Bay. The heads of the bays are an accumulation of alluvial deposits comprising mud, sand, dunes and gravels and typical of other Coastal Terrestrial Areas, is the main focus of settlement. Coastal cliffs and weathered bluffs characterise the coastline north of Kennedy Bay. This Coastal Terrestrial Area also includes the series of small yet prominent offshore volcanic island platforms.

There is one Geopreservation Site within this Coastal Terrestrial Area, and it is located at Kennedy Bay, known as the 'Tumbledown Rocks' rock fall.

Landforms are largely unmodified except on valley floors at Waikawau and Port Kennedy and rural residential development at Tuatawa. There are extensive steep rocky coastal faces and rocky headlands with small, sometimes sandy, mainly rocky bays in between.

Watercourses are short and steep along the headlands, due to their small catchments. However they tend to be longer where they drain into the embayments, due to the catchments being broader. Some longer watercourses include Harataunga Stream and Kopurukaitai Stream which drain into Kennedy Bay and the Waikawau River which flows into Waikawau Bay.

Extensive wetlands would originally have existed in the poorly drained flat-gradient river valleys, with extensive rear dune and river valley wetlands located behind the barrier dune ridge at Port Kennedy and Waikawau Bay, many now drained.

### **Biotic**

Land cover analysis: The total land area of the Kennedy Bay Coastal Terrestrial Area is 4,070ha. This includes 0.6ha of islands. Of this, 61% of the land cover is indigenous shrubland, 20% is indigenous forest and 13% is rural production land. Of the remainder, almost 4% is exotic treeland, 1% is indigenous wetlands and there are very small areas (<1% each) of artificial surfaces, bare surfaces, mangroves and waterbodies, in aggregate covering only 1.5%. There is no exotic scrub. The total indigenous land cover is 82%.

Coromandel Forest Park dominates the area with some of it extending from the ranges to the coast

at Waikawau Bay. The vegetation patterns continue to follow the landform with steep and deeply incised valleys supporting indigenous shrubland and forest. Waikawau Bay wetland supports a number of rare and endangered wading birds, including the Pateke and invertebrate populations.

Watercourses tend to have steep short gradients, except across short areas of the plains at Waikawau and Kennedy Bays, where a flatter gradient occurs. Riparian vegetation remains across most of the stream, where freshwater fish populations are expected to be relatively diverse. Freshwater macroinvertebrate communities will vary depending on location, with diverse communities of sensitive species occurring where riparian vegetation is more extensive, transitioning to less diverse pollution-tolerant communities where riparian vegetation depleted and rural production is more intensive.

Coastal wetland and saltmarsh are found at Kennedy Bay with vegetation sequence extending to the indigenous shrubland around the coastal edges. The productive rural land is limited to river valleys at Kennedy and Waikawau Bays with small pockets of open pasture found along coastal edge of Tuataewa.

**Experiential**

Boat access is gained from Tuataewa, Little Bay and Kennedy Bay. Access is gained from both the east and west coast roads to these areas. Waikawau Bay is less populated than its neighbouring Little Bay, which includes residential subdivision and rural residential subdivision.

The wide unmodified dune system along Waikawau Bay provides a strong visual indicator of the natural processes and patterns. Grazing farmland extends immediately behind and along the valley and lower slopes of the area. Further south and into the ranges behind, natural regenerating bush is interspersed with blocks of forestry plantations.

Between Little Bay and Tuataewa, the coastline is relatively unmodified and the native bush cover dominates. Access through this area is gained only via the coastal road and Taiharuru Bay is remote with either side completely covered in native bush. Modification to this area is limited and visually unapparent. Further south at Tuataewa and Kennedy Bay, human modification is visually apparent. Whilst native vegetation cover dominates at Tuataewa, the cover is less cohesive and the visual indicators of human modification are apparent. This is with the exception of Tokangawha Point which is covered in regenerating coastal native bush cover and includes the historic features of a shipyard and whaling station.

From Motukuku Point to Anarake Point, the coastline returns to its more highly natural state with no visually apparent modification and it is dominated by native bush cover.

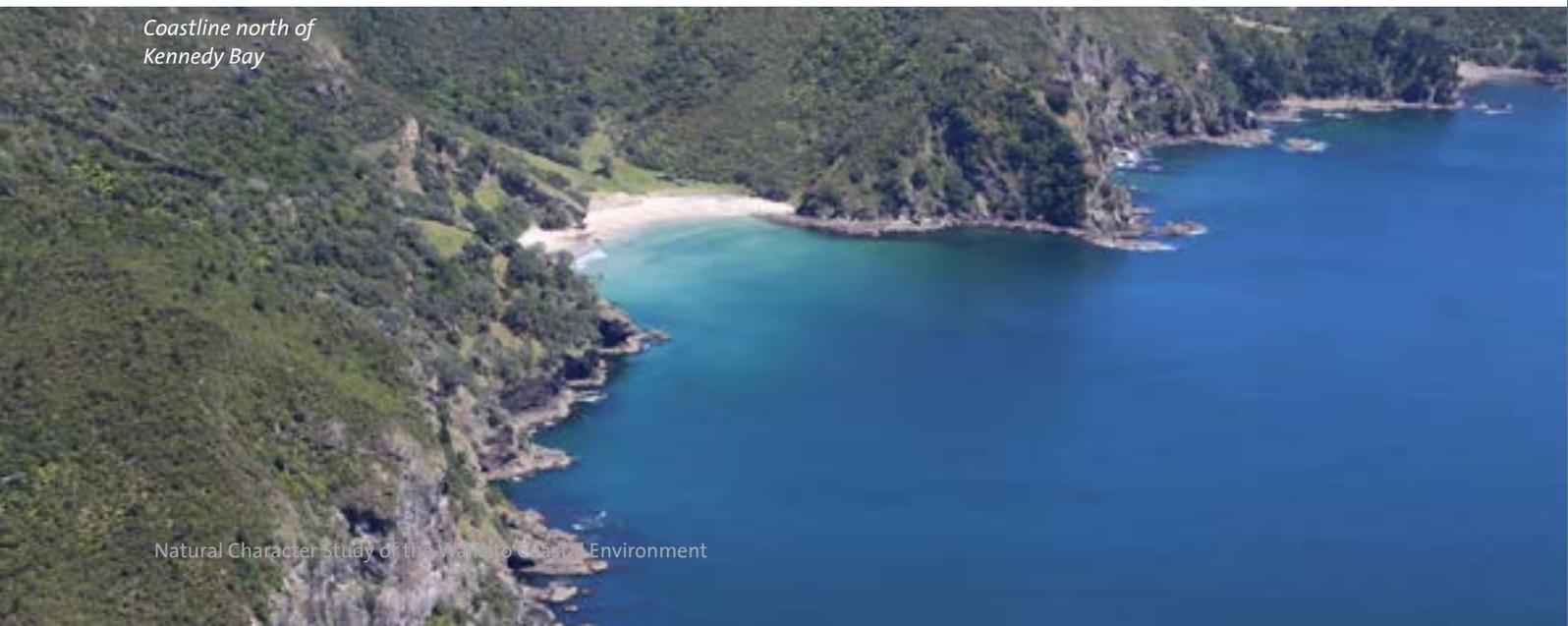
Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High		✓	
High	✓		✓
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating			High

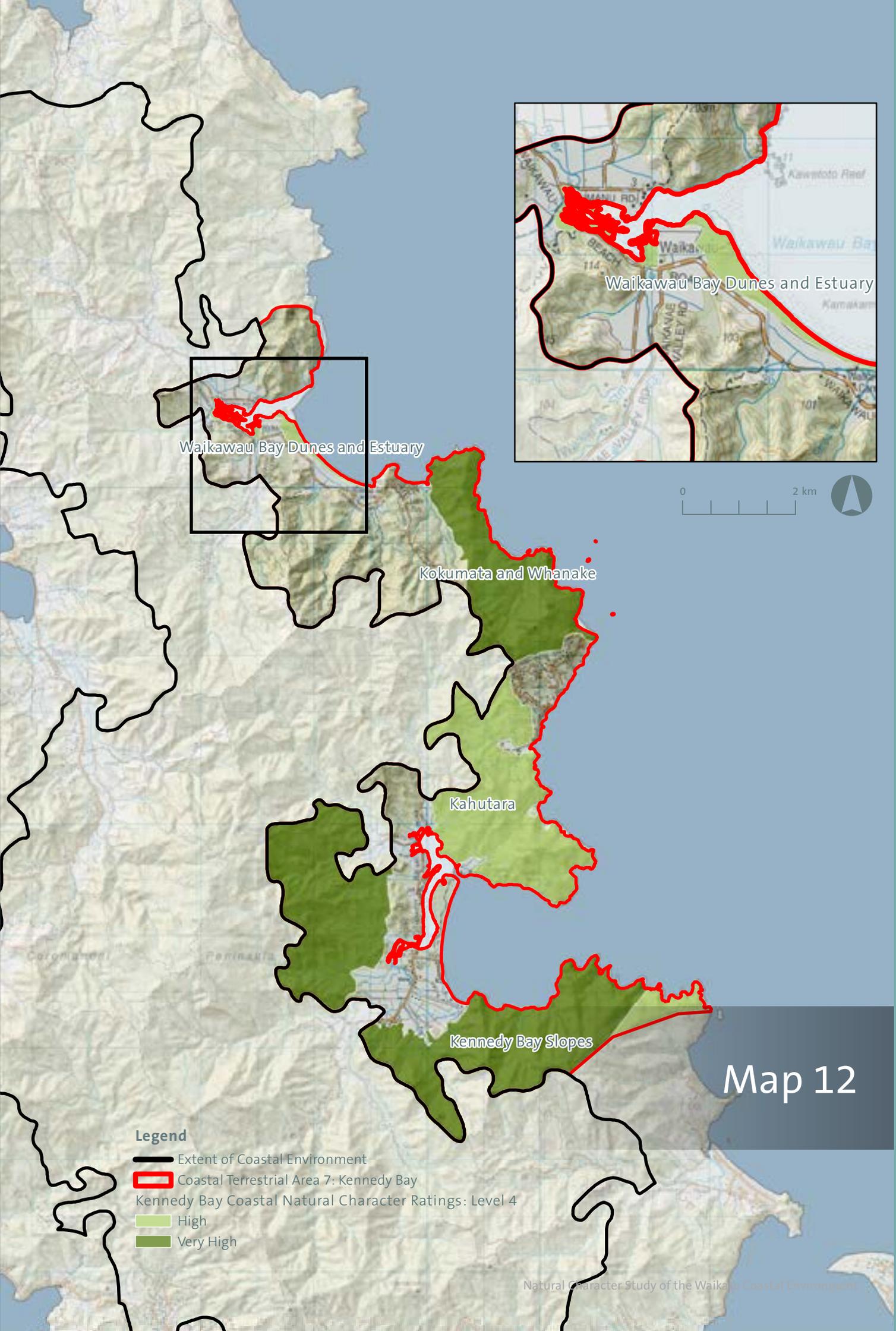
## Coastal Terrestrial Area 7: Kennedy Bay Specific Characteristics at Level 4

These are mapped with reference to **Map 12**

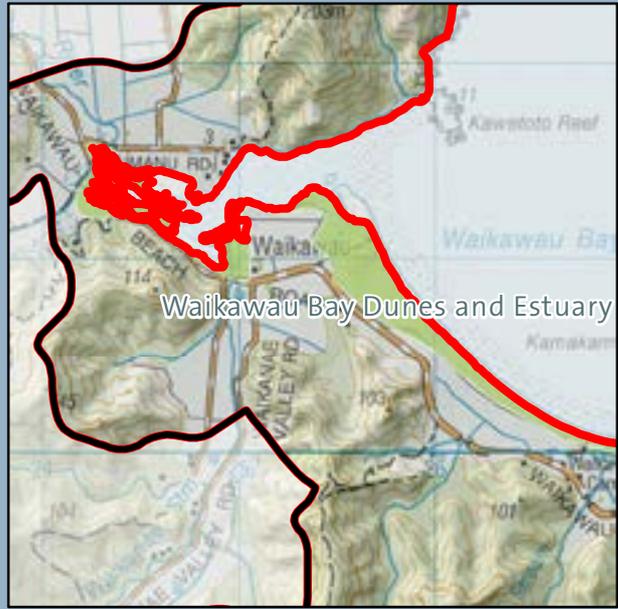
Area	Rating	Key Values	Additional Comments
Waikawau Bay Dune and Estuary	High	<ul style="list-style-type: none"> <li>• Extensive dune system, small patches of indigenous vegetation including pingao and spinifex.</li> <li>• Abiotically, unmodified.</li> <li>• Experiential naturalness amplified due to lack of structures and modification.</li> </ul>	<ul style="list-style-type: none"> <li>• Part of Waikawau Bay farm park and recreation area managed by DOC.</li> <li>• Excludes pastureland and Waikawau Beach Road.</li> </ul>
Kokumata and Whanake	Very High	<ul style="list-style-type: none"> <li>• Unmodified indigenous forest covers this headland.</li> <li>• Cliffed head, rocky shore platforms, offshore rock stacks, alongside native vegetation contributes to a remote and untouched character.</li> </ul>	<ul style="list-style-type: none"> <li>• Includes track, part of Tuatēawa Road and small buildings in Taiharuru Bay. Excludes housing at Tuatēawa.</li> <li>• Part of central spine of indigenous vegetation cover. Critical vegetation sequence from mountains to sea.</li> </ul>
Kahutara	High	<ul style="list-style-type: none"> <li>• Steep, craggy and unmodified weathered coastal cliffs and bluffs.</li> <li>• Large intact area of broadleaved indigenous hardwoods.</li> <li>• Provides northern vegetated backdrop to Kennedy Bay.</li> </ul>	<ul style="list-style-type: none"> <li>• Includes tracks, part of Tuatēawa Road and occasional isolated small buildings.</li> </ul>
Kennedy Bay Slopes	High (southern tip), Very High (remainder)	<ul style="list-style-type: none"> <li>• Precipitous, exposed sea cliffs, small sandy embayment's and rock platforms.</li> <li>• Area of native shrubland with pockets of native forest.</li> <li>• Provides southern vegetated backdrop to Kennedy Bay.</li> </ul>	<ul style="list-style-type: none"> <li>• Evidence of wilding pine, reduces levels of naturalness.</li> <li>• Part of central spine of indigenous vegetation cover. Critical vegetation sequence from mountains to sea.</li> </ul>

Coastline north of Kennedy Bay





Waikawau Bay Dunes and Estuary



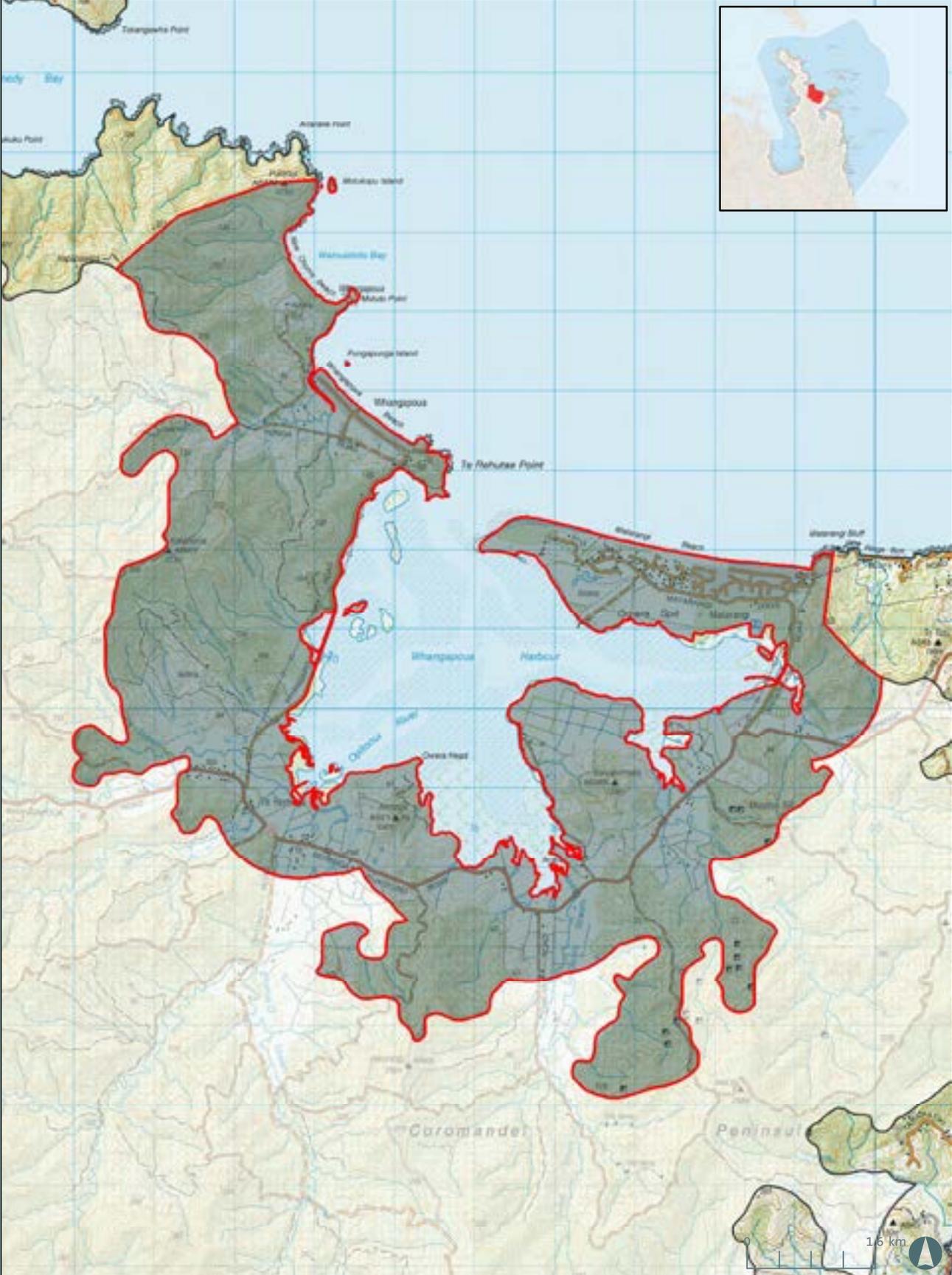
Kokumata and Whanake

Kahutara

Kennedy Bay Slopes

# Whangapoua

## COASTAL TERRESTRIAL AREA 8:





*Above: Omara Spit and Matarangi Beach*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area is central to the Whangapoua Harbour and includes the highly modified alluvial valley floor, the Omara sand spit and settlement of Matarangi Beach.

Key coastal characteristics include; developed settlements of Whangapoua and Matarangi, which are situated on a barrier beach separating the shallow harbour from the ocean; gently sloping ridges, highly modified cleared valley floors and coastal margins; largely vegetated hill country, the majority of which is exotic forestry and or manuka/kanuka with small patches of native forest; Whangapoua Harbour is a large estuarine environment featuring remnant terrestrial plant communities on its fringe; small ephemeral streams drain the valleys and coastal margins surrounding the Harbour; the Opitonui River, the Owera Stream and other smaller watercourses drain into the Harbour from the south; features the undeveloped and relatively inaccessible Wainuiototo Bay or New Chums Beach, the beach is famous for its 'untouched' character and features a white sand beach backed by native bush and coastal hill country.

Beyond the coastal environment, the coastal context contains the foreslopes of the Coromandel Range and encircle Whangapoua Harbour and its small plains. Largely cloaked in native forest and forestry plantations, the foothills extend westwards to meet the Coromandel Ranges.

### **Abiotic**

The Whangapoua Coastal Terrestrial Area is centred on the Whangapoua Harbour and associated watercourses draining the land. The topography is predominantly low lying and flat, with small foothills rising to 273 metres above sea level at Kakahoroa. Alluvial soils predominate the lowlands, especially around the harbour, while sand and silt accumulations form the most populated part of this Coastal Terrestrial Area at Matarangi.

There are two Geopreservation Sites: Whangapoua columnar jointed basalt, a very impressive example of a prominently located feature of basalt and the developed Omara spit.

The Waitekuri River, Opitonui River, Owera Stream, Otanguru Stream and many other smaller watercourses meander through the alluvial flats and extensive wetlands and flow directly into the harbour.



*Above: Omara Spit*

*Below: Banded kokopu  
(Photograph: Department of  
Conservation)*



## Biotic

Land cover analysis: The total land area of the Whangapoua Coastal Terrestrial Area is 4,064ha. This includes almost 6ha of islands. Of this, 38% is rural production land, 27% is exotic treeland and 22% is indigenous shrubland. Of the remainder, almost 7% is artificial surfaces, 2% is indigenous forest, almost 2% is indigenous wetlands and 1% is exotic scrub. There are very small areas (<1% each) of bare surfaces, mangroves and waterbodies, in aggregate covering only 0.6%. The total indigenous land cover is 26%.

The less steep landform supports more productive land use with productive forestry and pasture dominating the land cover. The indigenous land cover is largely focused to south of Whangapoua and Matarangi settlements in the form of regenerating native shrubland. Matarangi Bluff Scenic Reserve supports a 276 hectare area of secondary growth native forest including kanuka and kauri with a 4.5 hectare centrally located wetland. (Clarkson, Tyrell, 2012). Threatened species include fernbird and invertebrates, such as weta, giant centipede and cockroach. Banded kokopu, red finned bully and koura are found in streams in the Matarangi Bluff Scenic Reserve and potentially the wider area.

Other protected areas include the QEII covenants on the large area of indigenous shrubland on the northern side of Whangapoua Harbour.

Extensive land drainage and stream modification occur on the plains around Whangapoua Harbour with riparian cover largely removed, except in indigenous shrubland on the ridgeline to the north of Whangapoua Harbour.

## Experiential

Boat access is gained into the harbour from Whangapoua Road and from Omara Spit. With the exception of the northern extent of the area at Wainuiototo Bay, comprising dominant native vegetation cover, the remainder of the area returns to a mix of rural farmland, pockets of native bush in steeper areas and residential settlements along the coast. Whangapoua and Matarangi include residential settlement that has removed any indicators of the natural dune processes

and vegetation patterns. Whangapoua Harbour is surrounded by rural farmland that extends to the coastal edge, with productive forestry, interspersed with native bush cover, forming the coastal backdrop. Human activity dominates this area as it is a popular visitor destination with an airstrip, boat access and recreational activities occurring throughout the area.

Rating at Level 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 Low

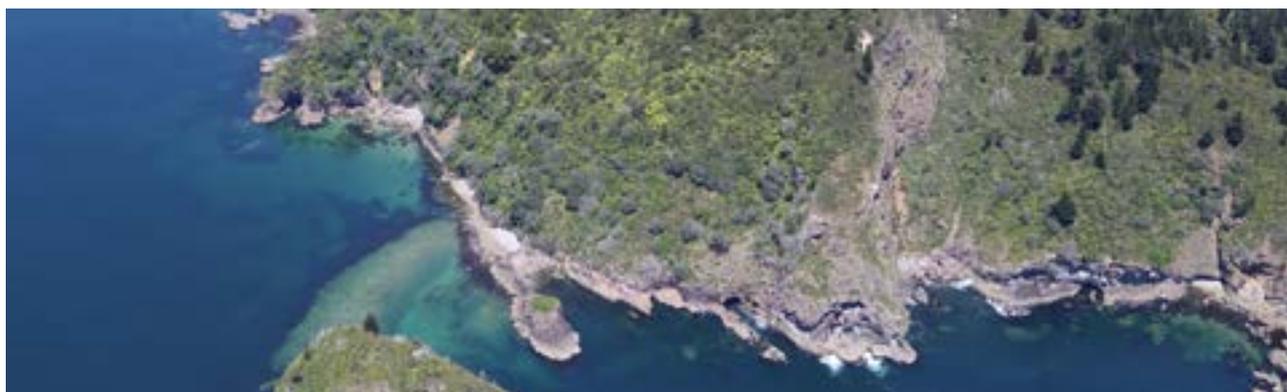
Above: Owera Stream draining into Whangapoua Harbour



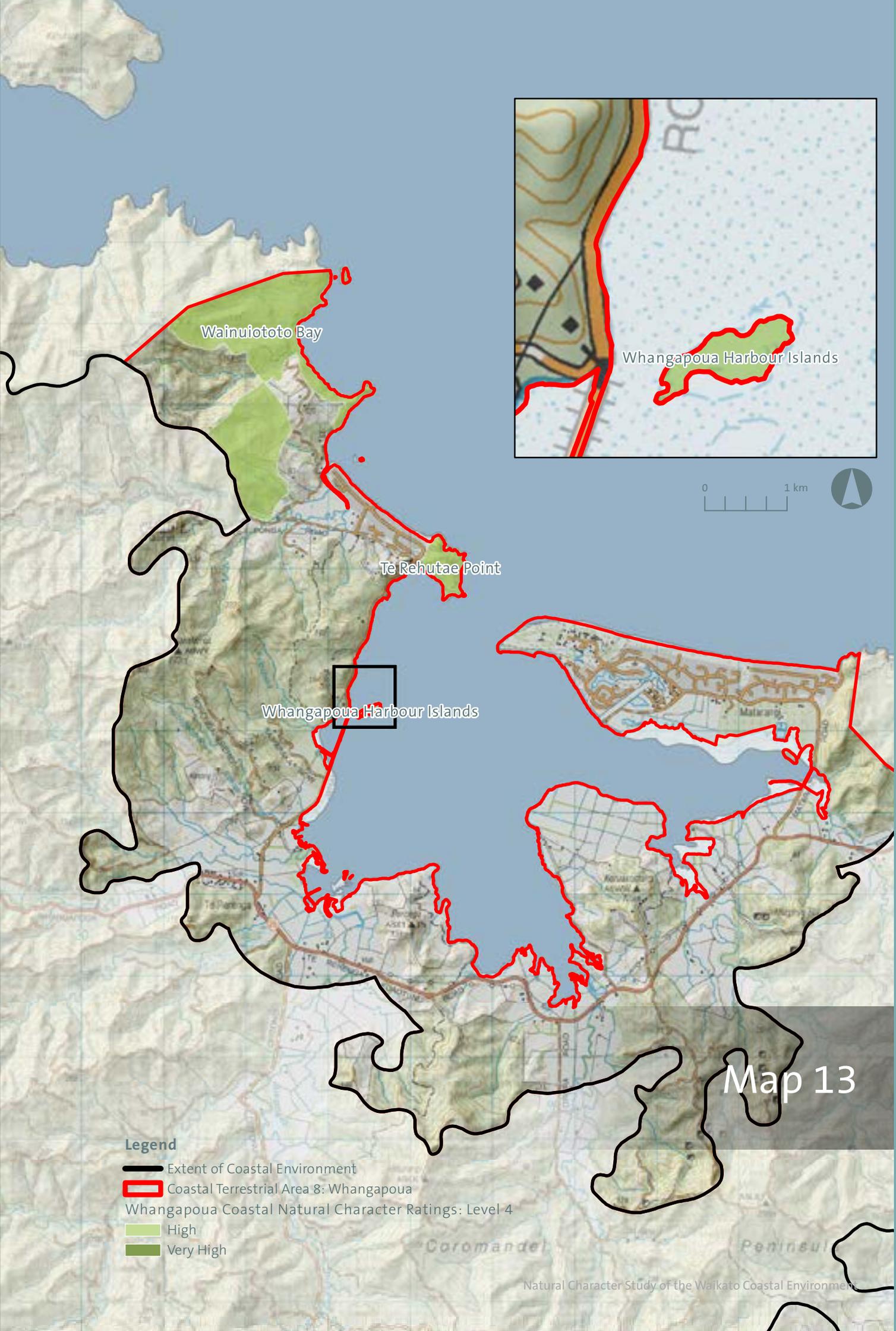
## Coastal Terrestrial Area 8: Whangapoua Specific Characteristics at Level 4

These are mapped with reference to **Map 13**

Area	Rating	Key Values	Additional Comments
Wainuiototo Bay	High	<ul style="list-style-type: none"> <li>• Abiotically unmodified with Whangapoua columnar jointed basalt geopreservation site, an indented headland between Whangapoua and Wainuiototo Bay/ New Chums Beach.</li> <li>• Small ribbon of native shrub lining the undeveloped New Chums Beach and large area of native vegetation to the north of the beach including rocky, exposed Anarake Point and Motukopu Island.</li> <li>• High experiential values due to its 'untouched' character.</li> </ul>	<ul style="list-style-type: none"> <li>• Access via DOC track from Whangapoua, no road access to Wainuiototo Bay/ New Chums Beach. Small parts of the coast included in New Chums Recreation Reserve.</li> <li>• Part of central spine of indigenous vegetation cover. Critical vegetation sequence from mountains to sea.</li> </ul>
Te Rehutae Point	High	<ul style="list-style-type: none"> <li>• Significant vegetated headland feature provides entrance to Whangapoua Harbour.</li> <li>• Biotically retains a large stand of native forest.</li> <li>• Small embayments, rocky coastal cliffs. Abiotically unmodified.</li> </ul>	<ul style="list-style-type: none"> <li>• Te Rehutae Point is under DOC management as Opera Point Historic Reserve.</li> <li>• Does not include houses to western side of the Point.</li> </ul>
Whangapoua Harbour Islands	High	<ul style="list-style-type: none"> <li>• Small islands at the west side of the Harbour retain areas of native herbaceous saline vegetation.</li> <li>• Abiotically unmodified.</li> <li>• Recognised in the Waikato Regional Coastal Plan as an area of outstanding wildlife habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Wider harbour is part of Coastal Marine Area C: Eastern Coromandel.</li> <li>• Comprises a group of approximately four islands.</li> </ul>



Above: Motukopu Island



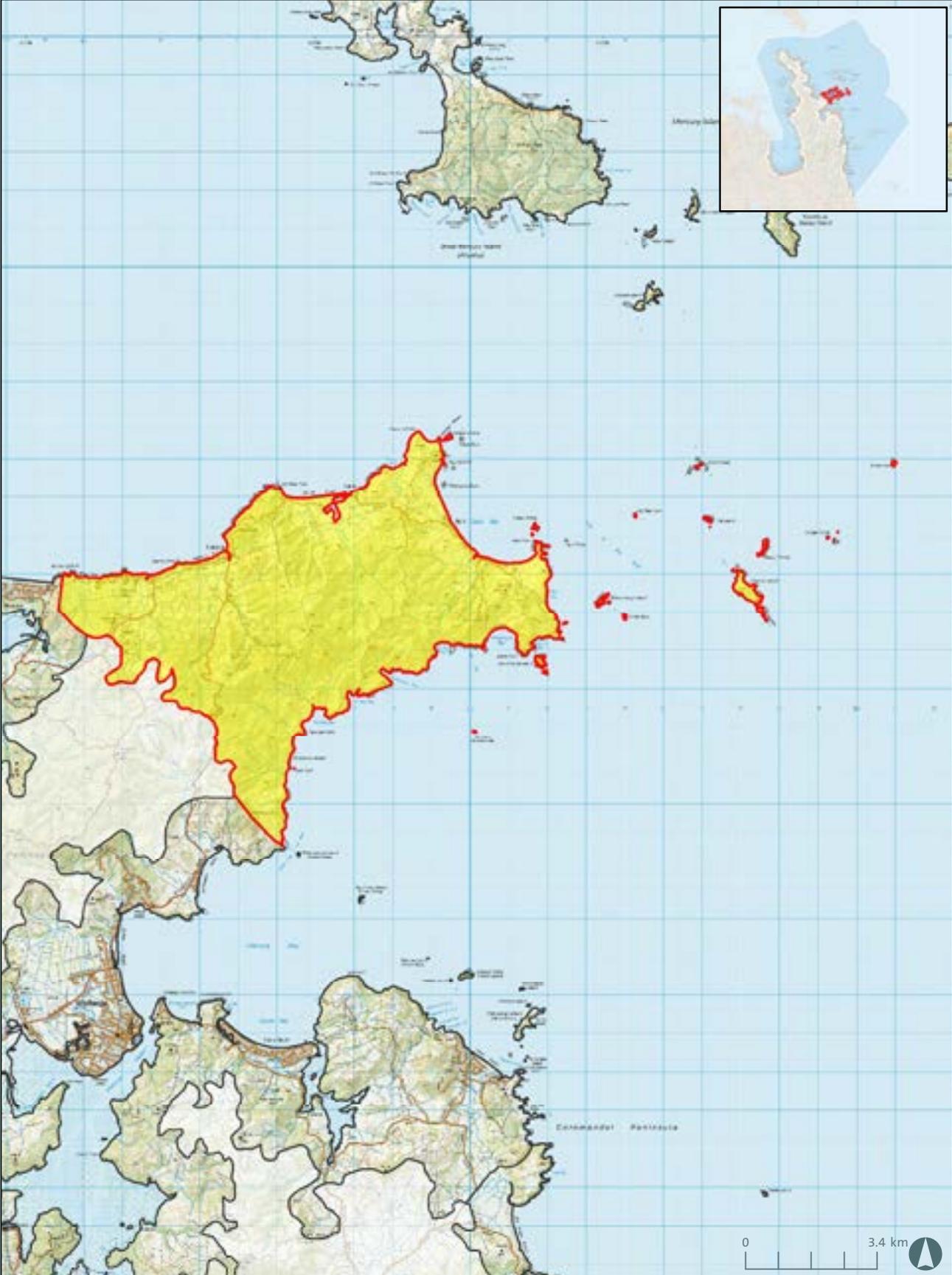
**Legend**

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 8: Whangapoua
- Whangapoua Coastal Natural Character Ratings: Level 4
-  High
-  Very High

Map 13

# Opito

## COASTAL TERRESTRIAL AREA 9:





*Above: Kuaotunu Beach*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area comprises the Kuaotunu peninsula which extends eastwards from the central Coromandel Ranges. This Coastal Terrestrial Area includes the Ohinau Island group, situated offshore of the eastern tip of the Peninsula. Its northern and eastern beaches and shores are mostly modified and the most accessible, whilst its southern shores are more remote and contain this Coastal Terrestrial Area's greatest concentration of indigenous flora, protected by the Coromandel Forest Park.

Key coastal characteristics include: highly modified and farmed coastal fringe at the northern and eastern coasts; areas of manuka/ kanuka vegetation populate the southern extents; small coastal bach settlements are located adjacent to white sandy beaches at the western to north-eastern sides, which extend alongside the Te-Rerenga-Kuaotunu Road; the Coromandel Forest Park Coastline which is inaccessible by road where sequences of native bush from hilltop to coast thrive; Ohinau Island group comprising many small scattered rock stacks with three larger islands cliffed islands; Motukoruenga Island, Ohinau Island and Flat Island.

The inland coastal context comprises of large areas of exotic forestry, with patches of pasture and native forest. State Highway 25 winds its way south, through the hills of the western side of the peninsula to the developed coastal settlement of Whitianga, on Mercury Bay.

### **Abiotic**

The Opito Coastal Terrestrial Area encompasses the entire Kuaotunu Peninsula of steep and very steep topography rising to 311 metres above sea level at Waitaia. Numerous offshore islets and rocks are also associated with this Coastal Terrestrial Area. There are numerous watercourses that drain this rugged peninsula which in turn have created alluvial deposits around the river mouths. Notable alluvial flats within this undulating terrain include the area close to Kuaotunu and that of Otama.

Formed of ancient volcanic activity, this Coastal Terrestrial Area retains many noted Geopreservation Sites. The Waitaia Ridge sinter; Otama abandoned beach ridges; East Otama basalt; Opito Point basalts and Tahanga Basalt prehistoric quarry, which all celebrate the peninsulas active and dynamic past. Many of these sites have been modified through human occupation of the area.



*Above: North Island  
Brown Kiwi (Photograph:  
Department of Conservation)*

*Main Image: Exotic forestry  
above Matapaua Bay*

There are extensive, very steep rocky coastal faces along the southern side of the peninsula that are largely unmodified. There are also lower elevation rocky headlands northeast of Kuaotunu, at the northern and eastern extents of Opito Bay and either side of Humbug Bay with near-shore islands. These landforms are relatively unmodified; however, they have highly modified land cover.

Offshore, Geopreservation Sites include the Hole in the Wall at Needle Rock and the Ohinau Island columnar rhyolite. Again, the principal focus is centred on the area's volcanic past.

Watercourses are either steep and short off the ridgelines, or long and meandering across valley floors. Wetlands would have originally been associated with these poorly drained river valleys, but these areas are now extensively drained, and the watercourses channelized. Road modifies water movement and wetlands in some places and some stream channels are modified.

### **Biotic**

Land cover analysis: The total land area of the Opito Coastal Terrestrial Area is 5,435ha. This includes almost 54ha of islands. Of this, 42% of the land cover is indigenous shrubland, 26% is rural production land, 16% is exotic treeland and 12% is indigenous forest. Of the remainder, almost 2% is artificial surfaces and there are very small areas (<1% each) of bare surfaces, indigenous wetlands and waterbodies, in aggregate covering only 0.6%. There is no exotic scrub or mangroves. The total indigenous land cover is 55%.

There is a higher proportion of indigenous forest compared with native shrubland comprising the indigenous cover. This vegetation cover is the dominant cover of the south-western quarter of the peninsula. The very steep stream catchments on the southern side but less steep river valleys sloping down to flat valley floors on the northern and eastern sides, result in more productive land use around Kuaotunu, Rings Beach and Opito Bay. As a result, substantial land drainage and stream channelization in the river valleys with limited riparian cover exist on the northern side of this peninsula.

Fauna in the area is significant with roosting and breeding sites for migratory birds and small populations of threatened wildlife, including the NZ dotterel and variable oyster catcher. North Island Brown Kiwi are managed under Project Kiwi in the Coromandel Forest Park.

Extensive areas under formal protection in Conservation Areas, Forest Park and QEII covenants



Above: Opito Point

**Experiential**

Settlements on this peninsula are focused on the lower lying plains associated with the bays of Kuaotunu, Kuaotunu West and Opito Bay. Associated with these areas is the rural farmland and orchards that line the valleys and lower slopes. Human modification is apparent, along with the recreational activity associated with water-based recreation. Boat access is gained from Kuaotunu West and Opito.

The central range contains the kiwi sanctuary and is dominated with native bush cover providing a sense of naturalness. Some productive forestry is interspersed with linear shapes and road access that are visually apparent.

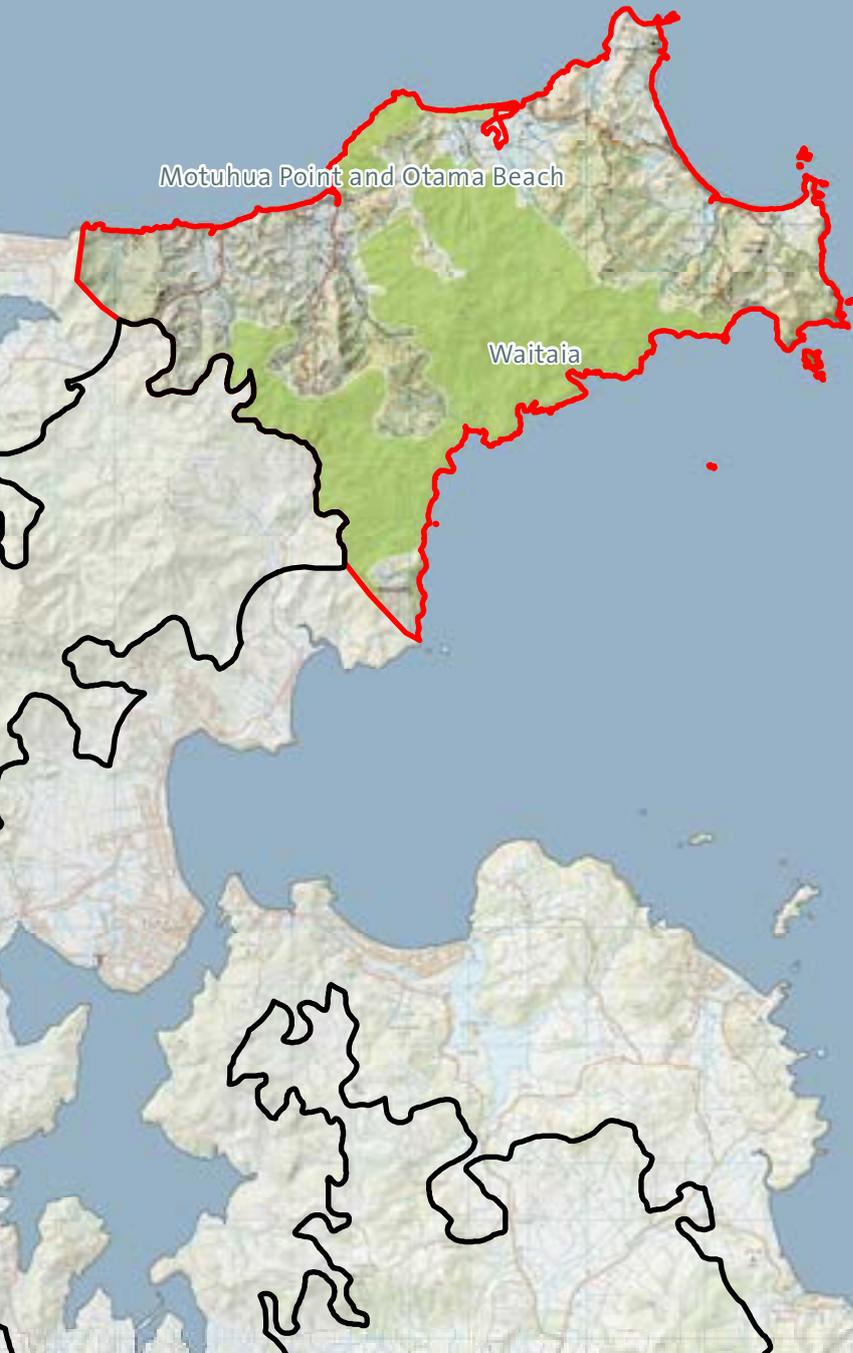
A strong sense of naturalness is gained from Sandy Bay to Waitaia Bay where access is limited, and native bush cover dominates the hill slopes right to the coastal edge.

Rating at Level 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			<b>ModerateHigh</b>

## Coastal Terrestrial Area 9: Opito Specific Characteristics at Level 4

These are mapped with reference to **Map 14**

Area	Rating	Key Values	Additional Comments
Motuhua Point and Otama Beach	High	<ul style="list-style-type: none"> <li>• Long, shallow headland, steep weathered seacliffs with rock platforms below.</li> <li>• Manuka/ Kanuka with interspersed wilding pines.</li> <li>• Some abiotic modification evident including Black Jack Road.</li> <li>• Otama Beach barrier dune with associated saltmarsh</li> <li>• Limited modification at Otama Beach holding high levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporates Black Jack point at 212masl. Majority of the headland landform is incorporated in Black Jack Scenic Reserve.</li> <li>• Otama Sand Dunes Recreation Reserve and backed by Conservation area around Otama River.</li> </ul>
Offshore Islands	Very High	<ul style="list-style-type: none"> <li>• Abiotically unmodified and noted for their Geopreservation site status, including: the Hole in the Wall at Needle Rock and the Ohinau Island columnar rhyolite.</li> <li>• Ohinau and smaller surrounding islands are an important wildlife habitat and breeding site for birds.</li> <li>• Larger islands feature unmodified native forest and shrubland.</li> </ul>	<ul style="list-style-type: none"> <li>• Comprises 10 islands: Sunk Rock; Motukoruenga Island; Needle Rock; Ohinau Island; Ohinauiti Island; Flat Island; Old Man Rock; Black Rocks; Whale Rock and Danger Rocks.</li> <li>• Ohinau Island is owned by Ngati Hei.</li> <li>• Excludes Rabbit Island due to pastoral modification on that island.</li> <li>• Naturalness increases due to grouping of islands.</li> </ul>
Waitaia	High	<ul style="list-style-type: none"> <li>• Unbroken sequence of native shrubland with pockets of bush from Waitaha Peak and associated ridges seaward to a steep, short coastline.</li> <li>• Largely inaccessible, isolated sandy beaches at the head of small Bays.</li> <li>• High experiential values.</li> </ul>	<ul style="list-style-type: none"> <li>• Large area under DOC management including Horseshoe Bay Scenic Reserve and Coromandel State Forest Park. Access via walking tracks only.</li> <li>• Some evidence of wilding pines.</li> </ul>



# Map 14

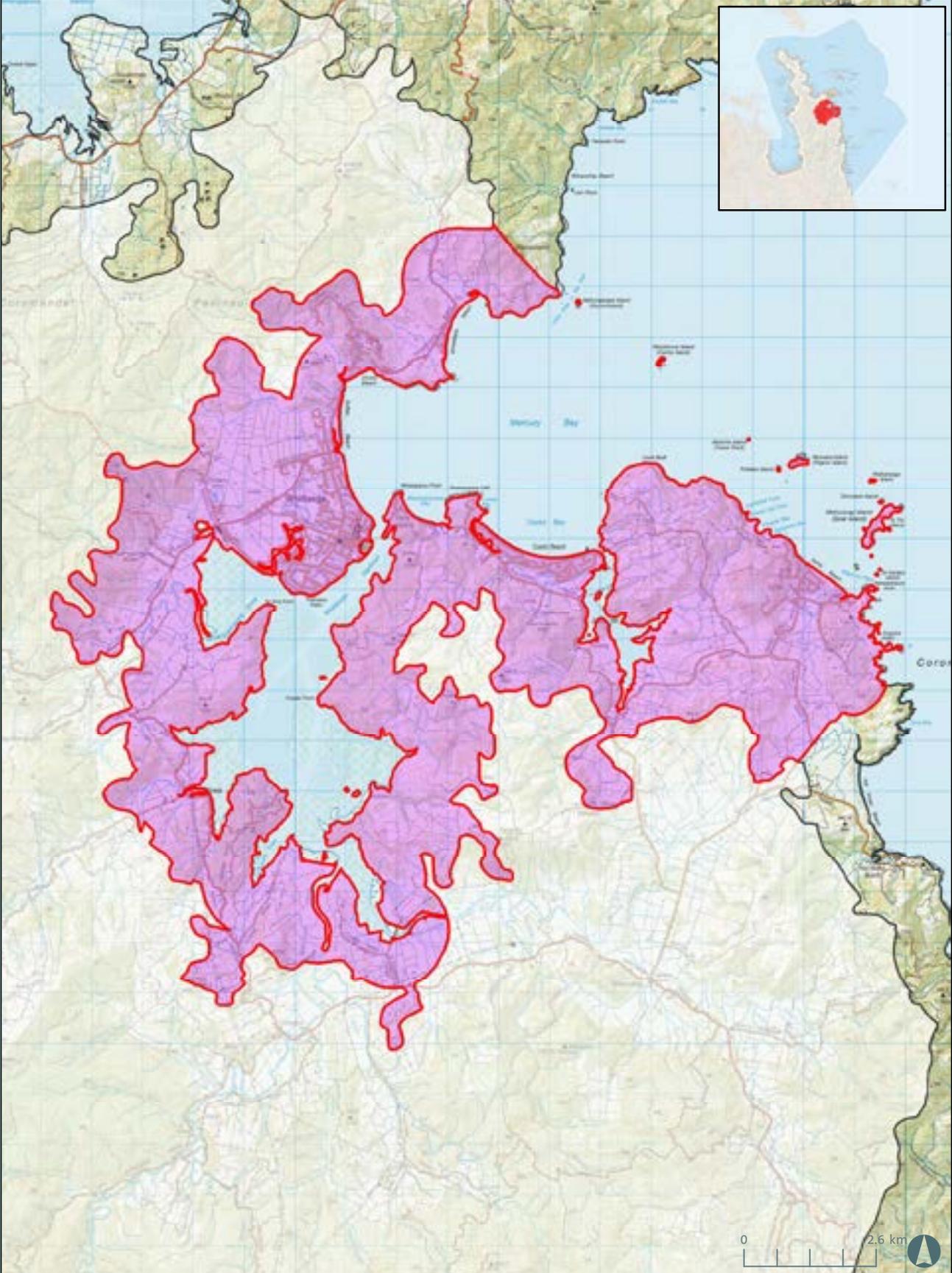
### Legend

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 9: Opito
- Opito Coastal Natural Character Ratings: Level 4
-  High
-  Very High



# Whitianga

COASTAL TERRESTRIAL AREA 10:





*Above: Hereheretaura Point at the southern part of Hahei Beach*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area is centred on the Whitianga Harbour and surrounding land to Mercury Bay. It includes the peninsula's largest town, Whitianga, as well as many well-known and picturesque destinations, including the white sand beaches of Mercury Bay and Hahei Beach, and the coastal rock formation Cathedral Cove.

Key coastal characteristics include: undulating low modified coastal foothills; large scale and open rolling hill farmland; small coastal plains and small vegetated peninsulas extending into estuarine harbours; round, cliffed headlands and numerous small bays; offshore islands and islets, including Mahurangi Island (Goat Island); settlements of Whitianga and the large bach settlements of Cooks Beach and Hahei Beach; Waiwawa and Whenuakite Rivers drain into the larger Whitianga Harbour; Purangi River drains the Purangi Estuary behind the township of Cooks Beach; protected areas of native vegetation at Kaitoke on the eastern side of the Whitianga Harbour, at the coastal bush at Cathedral Cove and the Mahurangi Island Group off Hahei Beach.

Beyond this Coastal Terrestrial Area, the Coastal Context land consists of lower elevation headlands and ridgelines with extensive low-lying river valleys in the land systems extending south and east from the principal ridges of the Coromandel Ranges. To the north, the more elevated and steep land is predominantly covered in indigenous shrubland. To the west and south, the land is predominantly rural production land with some plantation forestry.

### **Abiotic**

The Whitianga Coastal Terrestrial Area forms part of the Whitianga Group of Late Miocene – Early Pleistocene age of volcanic rocks and associated features. It includes many of the Coromandel's most recognisable landforms, including Cathedral Cove and the volcanic remnants associated either end of Hahei Beach. Offshore, there are many small volcanic islands, islets, and semi-submerged rock reefs.

Central to this Coastal Terrestrial Area is Whitianga Harbour, one of the largest harbours on the peninsula. The topography is reasonably flat, due principally to the build-up of alluvial deposits of the radiating catchment that drains into the harbour. The largest rivers are the Whangamaroro and Waiwawa. Beyond the flats of the harbour edge are the undulating low foothills of the inland Coromandel Range, the highest of which reaches 316 metres above sea level directly west of Whitianga.

The spectacular coastal arch, isolated stack (Te Horo Rock) and impressive cliffs of white ignimbrite at Cathedral Cove cumulatively read as an extremely well-defined set of landforms



*Above: Whitianga and Whitianga Harbour*

of scientific and educational value. Formed from volcanic eruptions approximately eight million years ago, these features are etched into the psyche of New Zealanders.

Other Geopreservation Sites include the Whitianga Ferry Landing ignimbrites; Maramaratotara Bay coastal features; the Whitianga (Shakespeare Cliff) ignimbrite with clastic dikes, the Hahei rhyolite dome, the Wigmore rhyolite dome and the Big Bay blowhole.

Dune systems have been generally modified by settlement and small rocky headlands between the sandy bays are often present, with a relatively flat gradient off the beaches.

Watercourses are either steep and short off the ridgelines, or long and meandering across valley floors. Artificial waterways have been constructed into the low-lying land immediately west of Whitianga for a marina.

Extensive wetlands and saltmarshes would originally have existed in the poorly drained flat-gradient river valleys, many now drained and modified by road development

### **Biotic**

Land cover analysis: The total land area of the Whitianga Coastal Terrestrial Area is 9,101ha. This includes 31ha of islands. Of this, almost 57% of the land cover is rural production land, 17% is indigenous shrubland, 8% is artificial surfaces, almost 8% is exotic treeland and 6% is indigenous forest. Of the remainder, almost 2% is exotic scrub and there are very small areas (<1% each) of bare surfaces, mangroves, indigenous wetlands and waterbodies, in aggregate covering only 1.5%. The total indigenous land cover is 25%.

Extensive rural production land dominates the land cover with some plantation forestry on rolling to steep land around the Harbour. Pockets of indigenous shrubland exist around the margins of Whitianga Harbour and Purangi Estuary, with more intact indigenous forest outcrops found around the coastal edges of Cathedral Cove and Hahei.

Steep catchments in the Coastal Context Zone dropping to the very flat gradient and low elevation land around the harbour with wetlands and saltmarsh more common throughout the plains area of Whitianga Harbour. However, much of the wetlands and indigenous cover have been lost to extensive land drainage, infill and stream modification including at the harbour margins.

Public conservation is minimal with larger areas around the Whitianga Harbour and QEII covenants along the coastal edge of Cooks Bay.



Above: Wharekaho

**Experiential**

Much of this Coastal Terrestrial Area retains high levels of modification, notably around the Whitianga, Cooks Beach, Cathedral Cove and Hahei Beach areas. These are popular holiday and residential spots, where often large numbers of people are present, notably during the summer months. Due to the popularity of these areas, remote-like characteristics are difficult to come by.

Boat access is gained into Mercury Bay from Ohuka Beach and into the harbour from several locations along the urban edge of Whitianga. Boat access is also obtained from Cooks Beach and Hahei Beach. Pockets of native bush extend along the steeper coastal edges, where access is difficult and limited.

Within the harbour, the adjacent land is mostly modified with areas of once cut-over land regenerating. Access to much of this Coastal Terrestrial Area is reasonably easy, which reduces wildness and remote values.

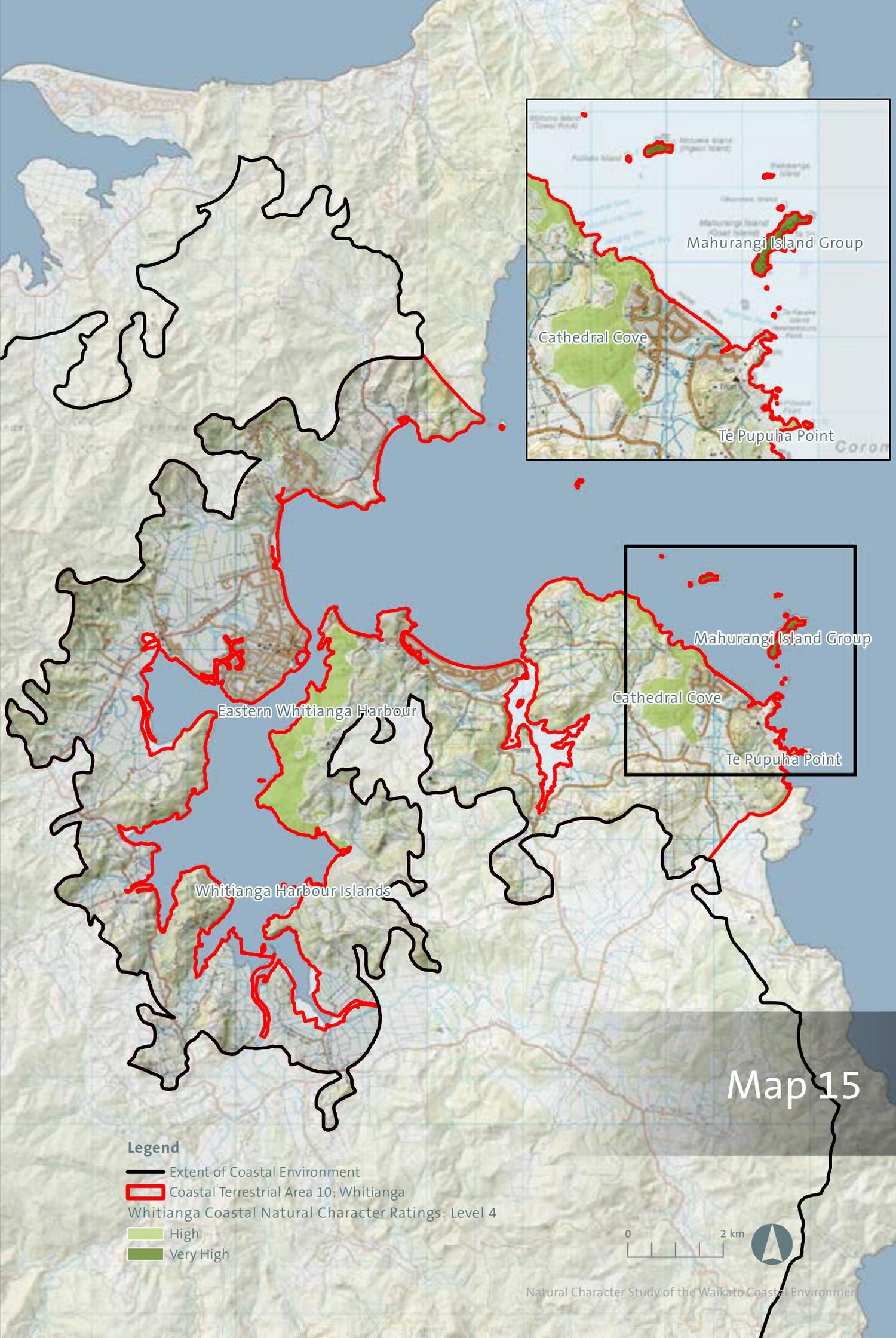
The offshore islands and rocks hold the highest degree of perceived naturalness, due to their lack of modification and relative isolation.

Rating at Level 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			<b>Moderate</b>

## Coastal Terrestrial Area 10: Whitianga Specific Characteristics at Level 4

These are mapped with reference to **Map 15**

Area	Rating	Key Values	Additional Comments
Mahurangi Island Group	Very High	<ul style="list-style-type: none"> <li>Offshore Islands and rocks, retain very high levels of naturalness due to their lack of abiotic and biotic modification.</li> <li>Windswept and eroded offshore island group. Exposed rocky shores and headlands and associated islets and semi-submerged reefs.</li> </ul>	<ul style="list-style-type: none"> <li>Comprises 10 islands: Te Karaka Island; Mahurangi Island (Goat Island); Te Tio Island; Okorotere Island; Waikaranga Island; Motueka Island (Pigeon Island); Poikeke Island; Moturoa Island (Tower Island); Motukorure Island (Centre Island) and Mahungarape Island (Round Island).</li> <li>Naturalness is amplified by grouping.</li> </ul>
Eastern Whitianga Harbour	High	<ul style="list-style-type: none"> <li>Regenerating harbourside hills, largely manuka kanuka with some wilding pines.</li> <li>Forms immediate south eastern backdrop to township of Whitianga, therefore has high experiential values.</li> </ul>	<ul style="list-style-type: none"> <li>Majority of Kaitoke Scenic Reserve included and QEII lands in the northernmost part</li> </ul>
Cathedral Cove	High	<ul style="list-style-type: none"> <li>Spectacular coastal arch, isolated stack (Te Horo Rock) and impressive cliffs of white ignimbrite at Cathedral Cove.</li> <li>Ribbon of indigenous bush skirts the steep coastal fringe. Includes vegetated hill west of Haihei.</li> <li>High experiential values due to the bush lined white sands and recognisable landforms of Te Horo Rock and Cathedral Cove.</li> </ul>	<ul style="list-style-type: none"> <li>Some modification evident, including track and car parking area. Very popular beach which reduces experiential naturalness</li> </ul>
Whitianga Harbour Islands	High	<ul style="list-style-type: none"> <li>Small, low-lying islands within the harbour covered with indigenous vegetation.</li> <li>Abiotically and biotically, unmodified</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Coastal Marine Area C for further description of this estuary</li> </ul>
Te Pupuha Point	High	<ul style="list-style-type: none"> <li>Forest clad island and peninsula with dramatic cliffs and rocky shores. Abiotically, unmodified;</li> <li>Part of Te Pupuha Recreation Reserve</li> <li>High experiential values due to remote-like qualities and limited modification</li> </ul>	<ul style="list-style-type: none"> <li>Includes small area of modification on point and track</li> </ul>



**Legend**

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 10: Whitianga
- Whitianga Coastal Natural Character Ratings: Level 4
-  High
-  Very High

Map 15



# Hot Water Beach

COASTAL TERRESTRIAL AREA 11:





*Above: Hills south of the settlement of Hot Water Beach*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area includes the broad northerly located sandy bay of Hot Water Beach and a steep and rocky coastline further south. The land use around the beach is highly modified pastoral plains, while further south, the more rugged terrain is more remote in character, backed by kanuka/manuka coastal hills which are sparsely inhabited.

Key coastal characteristics include: popular natural hot water springs at Hot Water Beach; inaccessibility to the central rugged coastline; gently sloping ridgelines tending eastwards; small stony beaches with rocky, exposed sea cliffs with rock platforms; short, steep streams draining the narrow gullies; manuka/ kanuka which extends from the tops of ridgelines to the coast in some areas, two small vegetated islands, Castle Island approximately 6km off Hot Water Beach and Waipapa Island, 400m off the rugged mid-section of the coast.

Beyond the coastal environment, the coastal context land rises into the Coromandel Ranges to the southwest and the Whenuakite River valley to the north-west, the former predominantly covered in indigenous shrubland and forest within the conservation land, managed by the Department of Conservation and the latter predominantly in rural production land and plantation forestry.

#### **Abiotic**

The Hot Water Beach Coastal Terrestrial Area includes rhyolitic and dacitic volcanic rocks and landforms that characterise this coastline, rising to 277 metres above sea level at Tapuaetahi.

Comprising predominantly of volcanic material that erupted from massive calderas around eight million years ago, the rocks have been sculpted both tectonically and through fluvial, climatic and marine forces to create a unique area that comprises probably the Coromandel's best known Geopreservation Site: the popular Orua Hot Springs (or Hot Water Beach). This one of the very few hot springs at sea level in New Zealand.

This Coastal Terrestrial Area is rocky, with sides and small catchments, where many of the watercourses are ephemeral and typically steep and short. Some small river valleys extend inland

behind the volcanic headlands at Tairua and Hot Water Beach. Wetlands would have originally been associated with these poorly drained river valleys, which are now drained.

Landforms are relatively unmodified except in valley floors. There are steep to very steep rocky coastal faces with rocky outcrops and reefs. In some places, roads truncate the slope to gain access to the sea. Beaches tend to be sandy.

### **Biotic**

Land cover analysis: The total land area of the Hot Water Beach Coastal Terrestrial Area is 2,326ha. This includes 3.8ha of islands. Of this, 55% of the land cover is indigenous shrubland, 23% is rural production land and 16% is indigenous forest. Of the remainder, almost 4% is exotic tree land and there are very small areas (<1% each) of artificial surfaces, bare surfaces and waterbodies, in aggregate covering only 1.7%. There is no exotic scrub, mangroves or indigenous wetlands. The total indigenous land cover is 72%. Extensive indigenous forest/shrubland and extensive riparian cover except in the river valleys

Rural production land dominates the northern extent of this area where the land is accessible and rolling country. Pockets of indigenous cover exist along the coastal edge and notably the Hot Water Beach Dunelands. Some modification of dune systems at Hot Water Beach has occurred and rear dune wetlands drained. However, indigenous coastal forest extends right to the dunes at Te Karo Bay and Otara Bay.

Generally steep catchments and incised stream gullies dominate the land form south of Hot Water Beach, supporting indigenous shrubland regeneration. Further south toward Te Ororoa Point, the vegetation cover becomes dense and connects to Coromandel Forest Park conservation land.

North Island Brown Kiwi are present in increasing numbers in the Whenuakite area, and these provide a population to migrate landward and recolonize indigenous shrubland in the Coastal Context Zone.

Formal protection of larger areas of shrubland and forest in Forest Park and QEII covenants

*Below: Rugged and remote coastline south of Hot Water Beach*



### Experiential

Much of this Coastal Terrestrial Area is relatively isolated, rocky, and remote with access restricted to only a few points in the north and south. The most popular of these is Hot Water Beach in the north, where access is provided by Hot Water Beach Road. A small settlement is nestled at the southern end of the beach. During the summer, this beach becomes extremely busy, eroding remote-like qualities. The beach holds higher experiential values to the north, away from the modifications and people to the south.

Road access is provided to the southern half of this Coastal Terrestrial via Sailors Grave Road and Pumpkin Hill Road. Walking access is available by the Lynch Stream Track, which leads people through a community-based kiwi restoration project.

High perceived naturalness values are present where modifications are low, which include part of the dramatic Orua Bay cliffs and those to the south around Tapuaetahi and Lynch Stream.

Rating at Level 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			<b>Moderate to High</b>

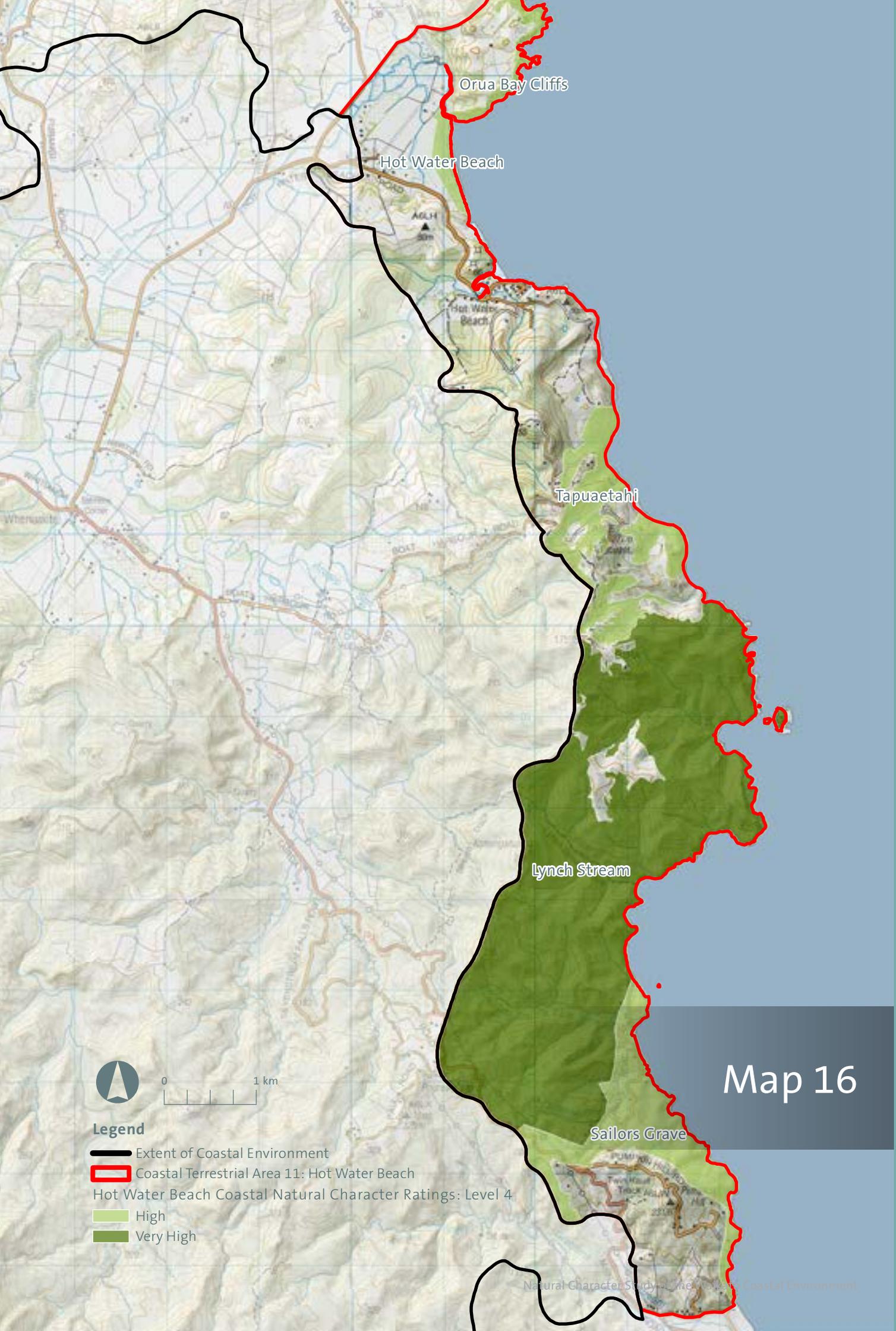
Below: Waipapa Island



## Coastal Terrestrial Area 11: Hot Water Beach Specific Characteristics at Level 4

These are mapped with reference to **Map 16**

Area	Rating	Key Values	Additional Comments
Hot Water Beach	High	<ul style="list-style-type: none"> <li>Geothermal hot springs at the southern end of Hot Water Beach.</li> <li>Hot Water beach has a largely intact dune system featuring a large area of spinifex.</li> <li>Virtually no abiotic or biotic modifications.</li> </ul>	<ul style="list-style-type: none"> <li>Very popular beach due to the hot springs and surf break.</li> <li>Hot Water Beach dune system is a DOC recreation reserve.</li> </ul>
Lynch Stream	Very High	<ul style="list-style-type: none"> <li>Wildness and remote experiential values along the rocky and indigenous bush-clad coastline.</li> <li>Exposed rocky cliffs, shores and beaches</li> <li>Exceptional vegetation sequence from ridge to shore</li> </ul>	<ul style="list-style-type: none"> <li>Areas of development to the north and south of this area are excluded. Includes the Lynch Walking Track. Which along with several other smaller tracks, form the only access to this coastline.</li> <li>Comprised mainly of Coromandel State Forest Park (notably southern sections) and an area of QEII land in Otara Bay.</li> </ul>
Tapuaetahi	High	<ul style="list-style-type: none"> <li>Although patchy, regrowth vegetation retains high levels of natural character.</li> <li>Numerous QEII covenants occupy this area</li> <li>Isolated and remote coastal area</li> </ul>	<ul style="list-style-type: none"> <li>Excludes areas of pasture</li> <li>Occasional track evident.</li> </ul>
Orua Bay Cliffs	High	<ul style="list-style-type: none"> <li>Narrow, cliffed headlands with rocky shores, semi submerged reefs and rock outcrops protrude from the mainland. Abiotically, unmodified.</li> <li>High experiential values due to low levels of modification.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified pasture beyond</li> </ul>
Sailors Grave	High	<ul style="list-style-type: none"> <li>Indigenous vegetation with limited modification</li> <li>High experiential values due to low levels of modification.</li> </ul>	<ul style="list-style-type: none"> <li>Includes Sailors Grave Road and the sporadically located house. Forms small part of DOC land.</li> </ul>

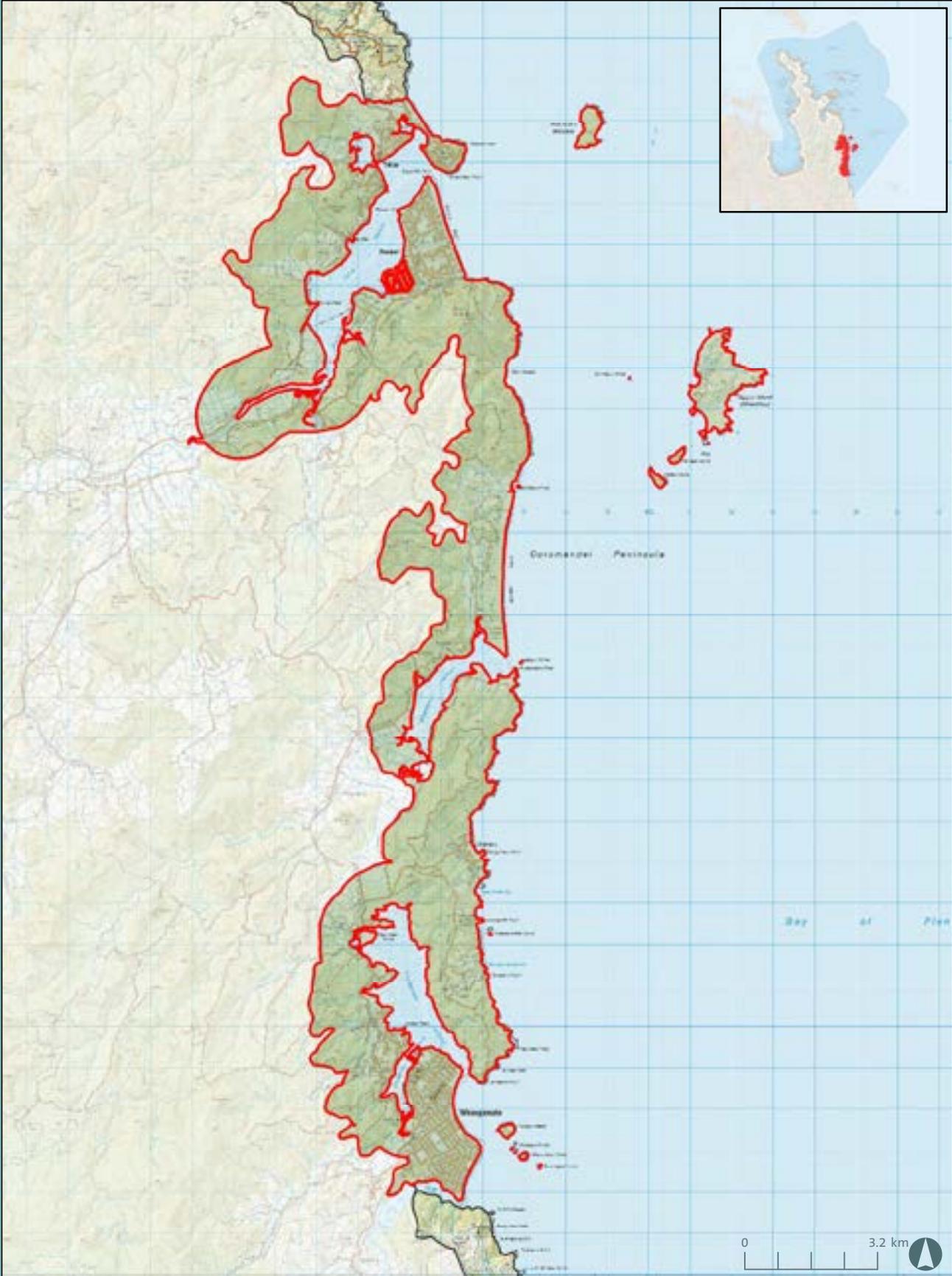


Map 16

- Legend**
-  Extent of Coastal Environment
  -  Coastal Terrestrial Area 11: Hot Water Beach
  - Hot Water Beach Coastal Natural Character Ratings: Level 4
  -  High
  -  Very High

# Tairua

## COASTAL TERRESTRIAL AREA 12:





*Above: Houses dominate Paku and is part of the settlement of Tairua*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area extends from the township of Tairua in the north to Whangamata in the south. The Coastal Terrestrial Area includes the harbours of Pauanui in the north and Whangamata in the south, and is generally modified for farming and commercial forestry use, although some large areas are protected for conservation purposes.

Coastal characteristics include: eastern facing hill country interspersed with small gullies, short streams and shallow indented rocky bays at the coast; generally a highly modified and easily accessible coastline, with planted in exotic forestry, patches of manuka/kanuka and pasture; long white sandy beaches; settlements of Tairua, Pauanui, Opoutere and Whangamata; Tairua River and Harbour; Wharekawa River and Harbour; Whangamata Harbour; small vegetated offshore islands groups including Shoe and Slipper Islands and the small group off the coast by Whangamata.

Beyond the coastal environment, the coastal context extends westwards slowly gaining in elevation to the rugged, forest clad Coromandel Range.

### **Abiotic**

The Tairua Coastal Terrestrial Area forms part of the Whitianga Group of Late Miocene – Early Pleistocene age of volcanic rocks and associated features. The Paku rhyolite dome (located at the northern entrance to Tairua Harbour) and perlite locality includes exposures of a multistage eruptive complex. It is mostly modified due to housing and roads, however, it forms a significant local feature in this part of the Coastal Terrestrial Area.

The topography is steep, rising to 387 metres above sea level at Pauanui; however, there are large areas of alluvial deposits and coastal sands which, like other Coastal Terrestrial Areas, support the main areas of settlement.

Immediately south of this are the Geopreservation Sites of Pauanui barrier spit (a superb example of a large barrier spit) and Pauanui eroded columnar jointing, an example of progression of different stages of erosion of a columnar jointed lava flow.

Further inland and adjacent to the Tairua Harbour is the Woody Hill Forest rhyolite, a well exposed volcanic neck and dike system. To the south, there is the modified Whangamata cusped foreland that contains the whole township.

Offshore are the Geopreservation sites of Slipper Island boulder barrier and the Slipper Island scoria cone. Of the numerous small islands off Whangamata, Whenuakura Island has a large collapsed blow hole which has formed a small beach inside the island.

Tairua Harbour is a barrier enclosed river estuary, 6 km<sup>2</sup> in area, 51 per cent of which is intertidal.



*Above: Shoe Island (Motuhoa)*

It is sheltered from the sea by the Pauanui sand spit and Paku Mountain. Sediment has built up over time creating sand banks, especially at low tide. Modification to this catchment has altered natural patterns and processes to varying extents, resulting in sedimentation issues and increased erosion in some places.

Other key harbours in this Coastal Terrestrial Area include Wharekawa Harbour and Whangamata Harbour.

### **Biotic**

Land cover analysis: The total land area of the Tairua Coastal Terrestrial Area is 8,030ha. This includes 288ha of islands. Of this, almost 42% of the land cover is exotic treeland, 20% is rural production land, 14% is artificial surfaces, 11% is indigenous shrubland and 10% is indigenous forest. Of the remainder, almost 1% is indigenous wetland and there are very small areas (<1% each) of bare surfaces, exotic scrub, mangroves and waterbodies, in aggregate covering only 1.3%. The total indigenous land cover is 22%.

The indigenous land cover is mainly concentrated in the area of the Coromandel Forest Park that extends into the Area and the Pauanui Conservation Area that extends around the headland south of Pauanui. There are also small areas of QEII covenants and scenic reserves. Otherwise, the Area is dominated by plantation forestry on most rolling to steep land and rural production land, generally located on the flatter and more accessible land in the river valleys. Where it exists, the fringe of coastal forest on the steep rocky faces from Tairua to Ohui and from Ruahiwihiwi Point to Whangamata, are very narrow and highly modified.

Although most waterways comprise short, steep catchments, they discharge into the larger Tairua and Wharekawa Rivers and the Tairua, Wharekawa and Whangamata Harbours. Most waterway and wetland habitats are associated with the harbours and their associated plains with high groundwater and flat poorly drained soils. Moderate areas of mangrove and saltmarsh vegetation remain but are much reduced from the historic extent and natural sequences to freshwater wetlands and riparian forest have been lost. The same is true of Slipper Island which has been subject to extensive drainage.

Channel modification, land drainage and infilling are common to facilitate both rural production and settlement. There are artificial waterways at Pauanui.

There is extensive modification of dune systems at Whangamata and Pauanui and the few remnants of coastal forest vegetation that would originally have existed are highly modified.

Most riparian cover is provided by plantation forestry. Indigenous riparian vegetation is limited and highly modified, except where indigenous shrubland creates full cover on the ridgeline to the south of Pauanui. Aquatic macroinvertebrate communities are likely to be relatively diverse and comprised of sensitive species after plantation canopy closure is achieved; however, they will be affected by the increased light penetration and increased erosion induced by harvesting. In rural production areas, aquatic macroinvertebrate communities are likely to be less diverse and be dominated by pollution-tolerant fauna.

Whereas Slipper Island is almost entirely rural production land, Shoe (Motuhoa), Hauturu, Whenuakura, Rawengaiti, Penguin and Rabbit islands are fully vegetated with indigenous forest or shrubland cover. Tuatara roamed on Whenuakura Island until fairly recently.

**Experiential**

Boat access is gained into Tairua Harbour from a number of locations, including Tairua, Pauanui and from off Tangitarori Lane. Further south, boat access is also gained into Whangamata Harbour from Whangamata.

Associated with these areas is the rural farmland and orchards that line the valleys and lower slopes. Human modification is apparent along with the recreational activity associated with water-based recreation and the residential settlements of Tairua, Pauanui, Opoutere, Onemana and Whangamata.

Between Tairua and Opoutere the coastline is dominated by native vegetation cover on steep terrain at the edge, with the remainder dominated by pine forestry plantation and associated access. Access is limited and there is a strong sense of remoteness in this area at the coastal edge only.

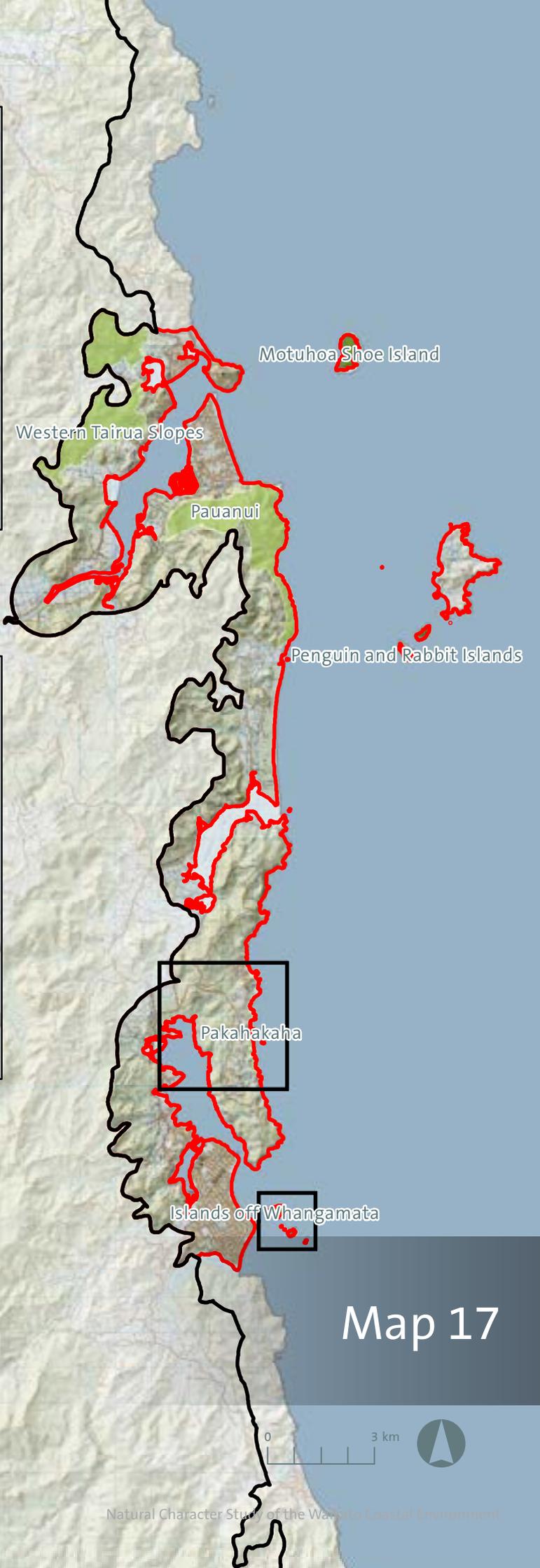
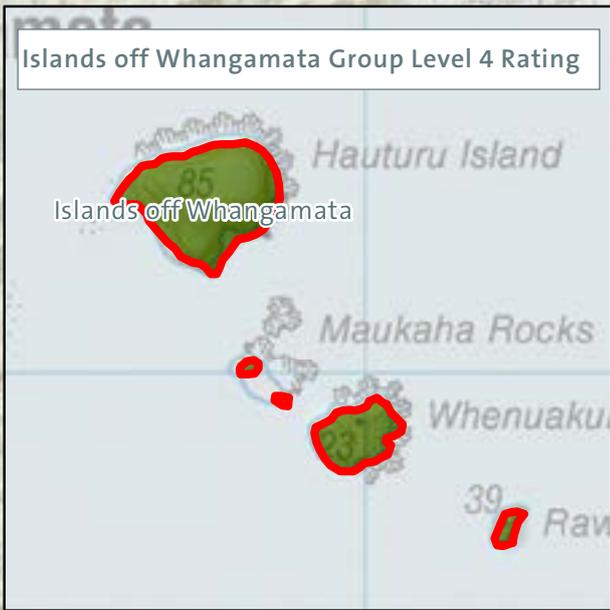
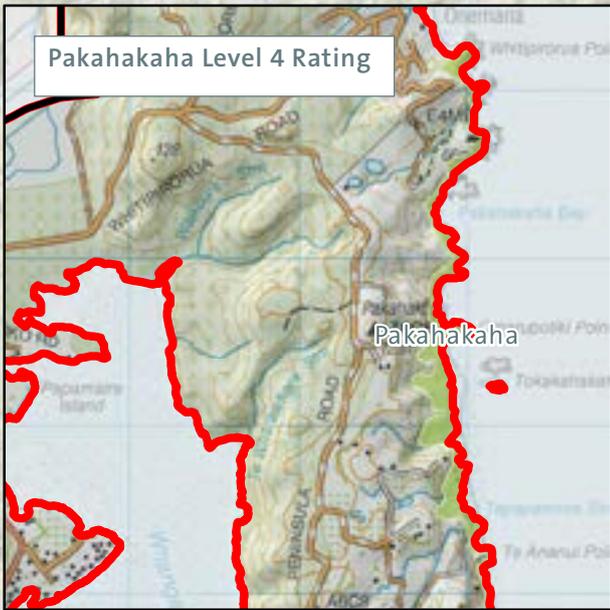
Offshore, the small group of remote and unmodified islands off Whangamata (Hauturu Island, Maukaha Rocks, Whenuakura Island and Rawengaiti Island) hold very high perceived naturalness values. It is possible to wade out to Hauturu Island at low tide which is popular for rock-pool fossickers and kayakers.

Rating at Level 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			High

## Coastal Terrestrial Area 12: Tairua Specific Characteristics at Level 4

These are mapped with reference to **Map 17**

Area	Rating	Key Values	Additional Comments
Motuhua Shoe Island	Very High	<ul style="list-style-type: none"> <li>Indigenous forest clad unmodified vegetation cover.</li> <li>Abiotically unmodified.</li> </ul>	<ul style="list-style-type: none"> <li>Includes entire Island.</li> </ul>
Western Tairua Slopes	High	<ul style="list-style-type: none"> <li>Large area of indigenous vegetation on the slopes directly west of Tairua.</li> <li>High experiential values;</li> <li>Provides vegetated western backdrop to Pauanui and Tairua.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes houses at lower elevations</li> <li>Forms part of the broader central indigenous vegetation cover of central peninsula</li> <li>Managed as part of Coromandel State Forest Park and includes Red Bridge Walk.</li> </ul>
Penguin & Rabbit Islands	Very High	<ul style="list-style-type: none"> <li>Exposed Islands retaining intact indigenous vegetation. Abiotically unmodified.</li> <li>Very high experiential naturalness.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified Slipper Island</li> <li>Naturalness amplified due to small grouping.</li> </ul>
Pakahakaha	High	<ul style="list-style-type: none"> <li>Fringe of coastal forest on the steep rocky faces from Tairua to Ohui and from Ruahiwihiwi Point to Whangamata, hold high levels of abiotic and biotic naturalness.</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified land further inland</li> </ul>
Islands off Whangamata	Very High	<ul style="list-style-type: none"> <li>Indigenous forest clad and unmodified islands.</li> <li>Spectacular, unmodified blow-hole on Whenuakura Island</li> <li>All islands collectively amplify experiential naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Comprises: Hauturu Island; Maukaha Rocks; Whenuakura Island and Rawengaiti Island.</li> <li>All four islands are part of the Whangamata Islands Wildlife Sanctuary.</li> </ul>
Pauanui	High	<ul style="list-style-type: none"> <li>Pauanui Conservation Area</li> <li>Regenerating forest covered slopes with unmodified slopes.</li> <li>High levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Includes Pauanui Summit Walk, however excludes areas of settlement above Hikuai Settlement Road</li> </ul>



**Legend**

- Extent of Coastal Environment
- Coastal Terrestrial Area 12: Tairua
- Tairua Coastal Natural Character Ratings: Level 4
- High
- Very High

Map 17







*Above: Southern part of Whiritoa*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

Extending from the southern banks of the Otahu River at Whangamata in the north to the region's boundary with the Bay of Plenty, this Coastal Terrestrial Area occupies the southernmost extent of the Coromandel Peninsula's Eastern Coast. The coastline is relatively straight and in rugged places.

Key coastal characteristics include: Gentle ridgelines and spurs that terminate at coastal cliffs; narrow, linear rocky beaches; small sandy embayments boarded by narrow rock outcrops; small areas of native forest that extend from the ridge summits to the coast at Homunga Bay and Otonga Point, near Whiritoa; pastoral farming; blocks of exotic forestry dotting the hillsides; regenerating scrub contained to gullies and hilltops; inaccessible coastline by vehicle; and a bach settlement located behind the white sandy Whiritoa Beach.

Inland of this coastal environment, the coastal context contains pastoral farming land which extends on the elevated hill country and narrow valleys beyond the first coastal ridge. Further beyond this, is the Coromandel Forest Park and Coromandel Range.



*Above: Mataora Bay*

### **Abiotic**

The Whiritoa Coastal Terrestrial Area forms part of the Whitianga Group of Late Miocene – Early Pleistocene age of volcanic rocks and activity. It includes steep and in places very steep terrain, rising to 324 metres above sea level just north of Homunga Bay, although areas of alluvial flats (notably around Whiritoa) are also evident. Most of these steep coastal faces drain directly to the coastal marine area.

Of particular note is the Tunaiti caldera geology section, a well-exposed sequence of rhyolite domes and flows, deformed sediments andesite and dacite lava flows, ignimbrites and pyroclastic fall deposits, which are interpreted as a section across a caldera structure.

Other Geopreservation Sites include the Whiritoa blowhole, which is considered the most spectacular active blowhole on the Coromandel Peninsula and Mataora Beach and abandoned beach ridges which is classified as an extremely well-defined landform of scientific and educational value.

The coastline is rocky, with steep impressive coastal cliffs and short beaches, many of which are unmodified. Rocky outcrops are particularly noticeable, especially in the northern part of this Coastal Terrestrial Area. Alluvial deposits are concentrated at the mouths of the numerous watercourses that drain this Coastal Terrestrial Area, the longest of which is the Ramarama Stream.



*Above: Rugged southern coastline. Pohutukawa coming into flower*

## Biotic

Land cover analysis: The total land area of the Whiritoa Coastal Terrestrial Area is 2,384ha. This includes 1.2ha of islands. Of this, 31% of the land cover is rural production land, 26% is exotic treeland and almost 15% is indigenous shrubland. 11% and 10% is indigenous forest. Of the remainder, 2% is artificial surfaces, 2% is exotic scrub and there are very small areas (<1% each) of bare surfaces, indigenous wetlands and waterbodies, in aggregate covering only 0.8%. There are no mangroves. The total indigenous land cover is 38%.

The indigenous shrubland and forest cover is mainly concentrated on the headlands south of Whangamata (around Tunaiti and Opitoiti) and Whiritoa (around Te Keho) and the Orokawa Bay Scenic Reserve. These large patches frame the vegetation patterns in this Area. Elsewhere, the coastal forest and shrubland is generally present as very narrow/small, fragmented with and highly modified vegetation. In between the large patches, there is land cover dominated by rural production and large patches of plantation forestry.

Most waterways comprise short, steep catchments draining directly to the coast in narrow valleys where the streams discharge at small beaches. As a result, there is often a small area of saltmarsh modified by infilling and land drainage at Whiritoa, Waimana Bay and Mataora Bay. Historic sequences to freshwater wetlands and coastal forest have been lost. Channel modification, land drainage and infilling are common to facilitate both rural production and settlement. There are artificial waterways at Pauanui.

There is extensive modification of dune systems at most beaches due to settlement and rural production. All natural sequences from dunes to coastal forest have been lost and the very small areas with coastal forest adjacent to the beach are highly modified.

Riparian vegetation cover varies substantially through the area. Good riparian cover is provided in the three main patches of indigenous shrubland. However, where the land cover is rural production, most riparian vegetation has been removed. Where riparian cover is provided by plantation forestry, the extent and quality of cover will depend on harvest cycles. Likewise, aquatic macroinvertebrate communities will vary depending on land cover, with relatively diverse communities of sensitive species in permanent shrubland and after plantation canopy closure is achieved. Aquatic macroinvertebrate communities that are less diverse and dominated by pollution-tolerant fauna will occur with increased light penetration, erosion, and inputs from rural production.



**Experiential**

Whiritoa settlement remains the only residential settlement in this area. The remainder of the land is dominated by grazing farmland on the plains and rolling foothills with the steeper slopes dominated by productive forestry. Remnant pohutukawa outcrops provide subtle and intimate places high in perceived naturalness but overall, this area is largely modified by human land use change and recreational activity. Access to this Coastal Terrestrial Area is limited to a few areas (such as at the settlement of Whiritoa) so the remaining coastal areas retain high levels of remoteness.

Two offshore rocks, one at Waimama Bay and one south of Mataora Stream hold very high levels of perceived naturalness due to their unmodified and eroded forms.

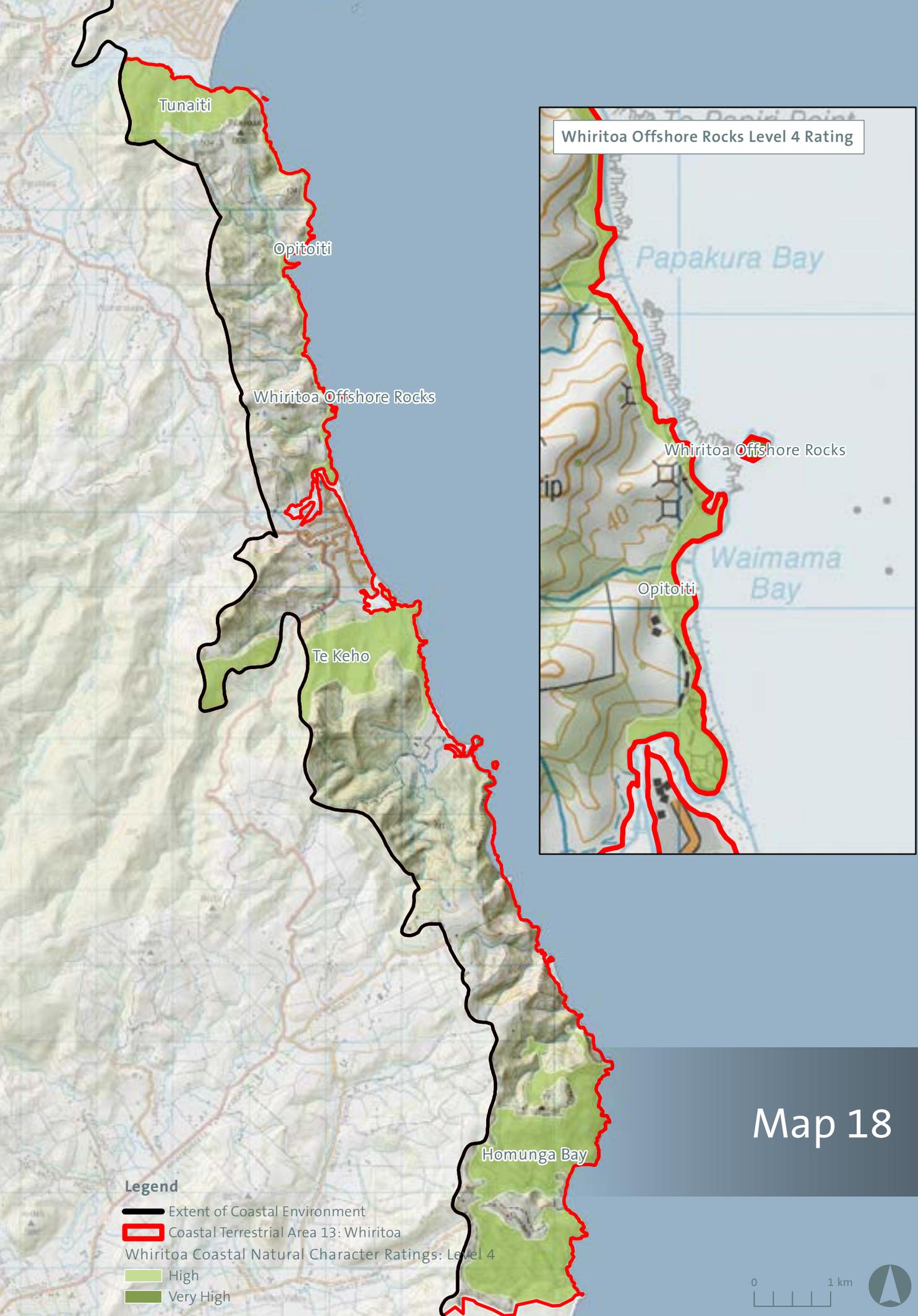
Natural processes are prevalent at the Blowhole at the southern end of Whiritoa Beach.

Rating at Level 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			<b>Moderate</b>

## Coastal Terrestrial Area 13: Whiritoa Specific Characteristics at Level 4

These are mapped with reference to **Map 18**

Area	Rating	Key Values	Additional Comments
Opitoiti	High	<ul style="list-style-type: none"> <li>Steep, unmodified rocky cliffs, rocky outcrops and beaches, including the Whiritoa Blow Hole.</li> <li>Remnant pohutukawa outcrops provide subtle and intimate places high in perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>The area is demarcated by the top of the ridge or where the cliffs interface with modified areas such as commercial forestry or pasture.</li> </ul>
Homunga Bay	High	<ul style="list-style-type: none"> <li>Headlands and hillsides framing Homunga Bay form a modified sequence of indigenous coastal bush which in places stretches from the first ridge to the coast.</li> </ul>	<ul style="list-style-type: none"> <li>Falls into part of Orokawa Bay Scenic Reserve.</li> <li>Scattered wilding pines present. Interspersed by pastoral farmland</li> </ul>
Tunaiti	High	<ul style="list-style-type: none"> <li>Regenerating forest covered slopes</li> <li>High levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Extends to Otahu River</li> </ul>
Whiritoa Offshore Rocks	Very High	<ul style="list-style-type: none"> <li>Indigenous forest covered rocky islets</li> <li>Very high levels of perceived naturalness due to their unmodified and eroded forms.</li> </ul>	<ul style="list-style-type: none"> <li>Includes entire rock group</li> </ul>
Te Keho	High	<ul style="list-style-type: none"> <li>Regenerating forest covered slopes</li> <li>High levels of perceived naturalness</li> </ul>	<ul style="list-style-type: none"> <li>Excludes modified lower lands and landfill. Includes tracks.</li> </ul>



Whiritoa Offshore Rocks Level 4 Rating

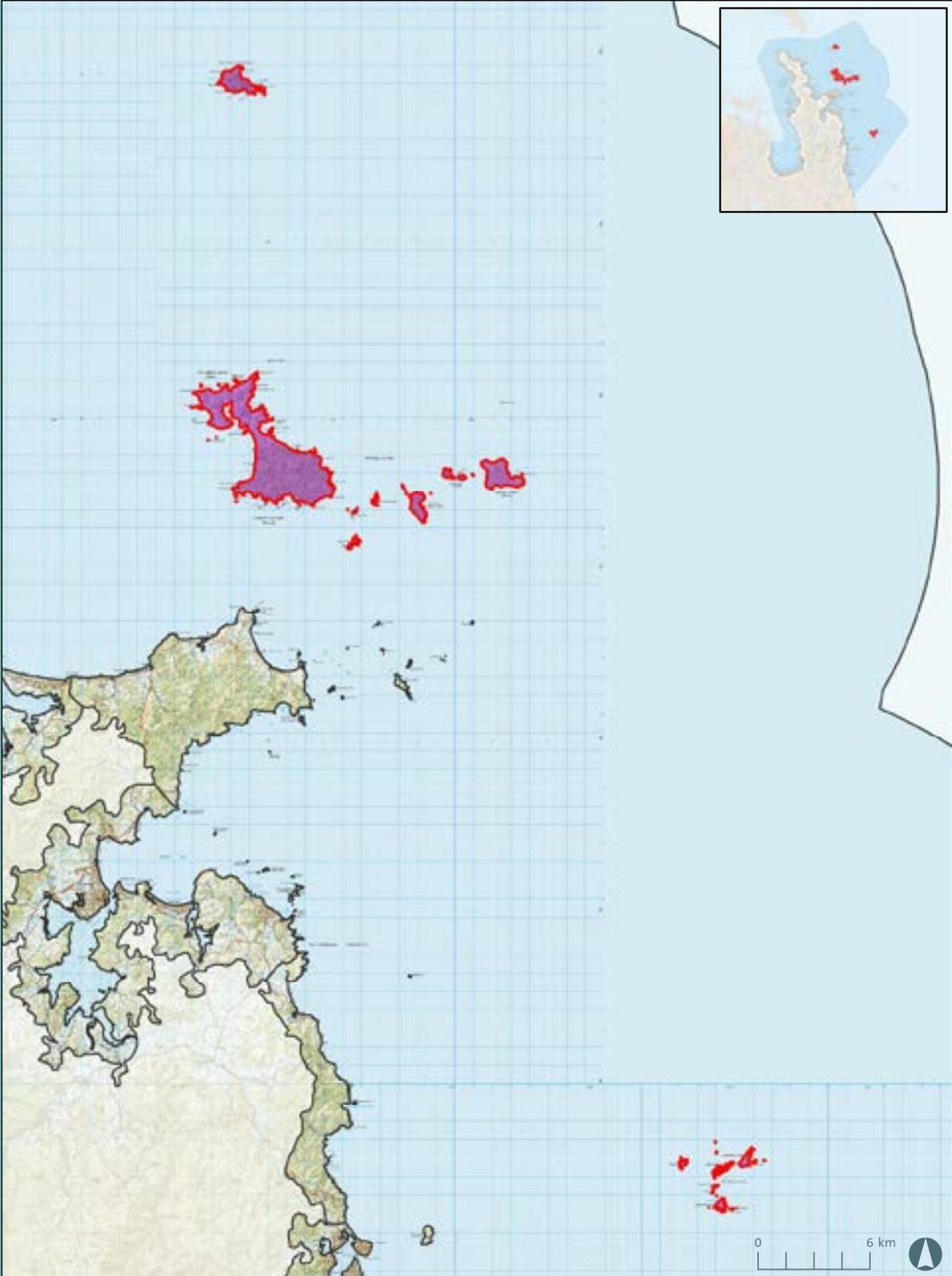
Map 18

- Legend**
- Extent of Coastal Environment
  - Coastal Terrestrial Area 13: Whiritoa
  - Whiritoa Coastal Natural Character Ratings: Level 4
  - High
  - Very High



# Outer Island Groups

COASTAL TERRESTRIAL AREA 14:





*Above: Great Mercury Island (Ahuahu)*

### **Coastal Characteristics, Coastal Environment Extent and Coastal Context Area**

This Coastal Terrestrial Area comprises the outer island groups, which are located offshore of the Coromandel's eastern coastline. The islands include Cuvier (Repanga) Island, the Mercury Island group, and the Alderman Island group. These islands vary in size, complexity and shape; however, they form an important identity to Coromandel.

Situated at southern end of the Colville Channel between the Coromandel Peninsula and Great Barrier Island, Cuvier Island is a Department of Conservation managed wildlife sanctuary and is now largely vegetated in regenerating indigenous forest cover. The island is fringed by steep sea cliffs and rocky shores with several prominent narrow headlands and steep peninsulas.

The Mercury Islands are further south, located approximately 6km east of the Kuaotunu Peninsula, and they comprise of some seven principal islands which include Great Mercury Island (Ahuahu), Green Island, Atiu or Middle Island, Korapuki Island, Kawhitu or Stanley Island, Double (Moturehu) Island and Red Mercury Island. The islands are of volcanic origin and are largely fringed by rocky shores and small, shallow bays. Great Mercury Island is the only island where people reside.

The Aldermen Island archipelago, located offshore from Pauanui comprises five main islands which include Hongiora, Ruamahuanui, Nga Horo, Half and Ruamahuaitei Island. The islands form a DOC managed nature reserve/wildlife sanctuary and are covered with regenerating native bush. The islands are fringed with steep sea cliffs with rocky shores. Ridgelines rise to 100masl at the middle of the larger islands.

Key coastal characteristics of these islands include: remote, mostly inaccessible islands with modified vegetation that is recovering.



*Above: Giant weta  
(Photograph: Department  
of Conservation)*

*Main Image: Exposed cliffs on  
Red Mercury Island (Whakau)*

## Abiotic

The Outer Island Groups Coastal Terrestrial Area are principally remnants from former volcanic activity. All island groups form part of a gently arcuate line of offshore rhyolite centres, extending from the Poor Knight Islands in the north, through to Mayor Island in the south. A particular focus is on the central group comprising Cuvier, Mercury and Aldermen Islands that fall within this study area.

Due to exposure from the sea as well as other tectonic and fluvial forces, the islands have been sculpted over time to hold an array of notable geological features, many of which are listed as geopreservation sites. Most have steep rock coasts, with cliffs, rocky outcrops, and numerous islets. The highest point is on Great Mercury Island of 231 metres above sea level at Mohi Mountain.

Specifically, the Cuvier Island tourmalinised rocks represent a good example of exposed large black crystals of tourmaline evident from the shoreline.

On the Mercury Islands, there are several noted features, including the White Cliffs on Great Mercury Island; the Korapuki Sea Arch; the Stanley Island basalt vents and cone; and Red Mercury Island basalt.

The exposed parts of the Aldermen Islands form part of a larger submarine platform that has been eroded almost entirely by wave action. Steep rhyolite features, including the Aldermen Islands coastal features (a range of spectacular rocky coastal landforms such as spires, needles and vertical bluffs that extend through the archipelago); and the Ruamahuaitei andesite flow on Ruamahuaitei Island.

Due to the exposed location of these islands, very few frost. Also some experience lower rainfall, if any, than the mainland.



*Above: Coralie Bay on Great Mercury Island (Ahuahu)*

## **Biotic**

Land cover analysis: The total land area of the Outer Island Groups Coastal Terrestrial Area is 2,384ha which is entirely comprised of islands. Of this, 32 % of the land cover is exotic treeland, 29% is rural production land, 20% is indigenous shrubland, 14% is indigenous forest. Of the remainder, 4% is bare surfaces, 2% is exotic scrub and there are very small areas (<1% each) of bare surfaces and there are no artificial surfaces, exotic scrub, mangroves, indigenous wetlands, or water bodies. The total indigenous land cover is 35%.

The larger Great Mercury Island has one sheltered inlet, Home Bay, and is the only inhabited island of the group. Great Mercury is highly modified with exotic forest covering the majority of the southern end of the island, and rural production land covering the northern half of the island. Although the short waterways and small wetlands on Great Mercury are relatively unmodified in terms of drainage and channels, riparian cover has largely been removed on the northern half and is comprised of plantation forestry on the southern half. The unique aquatic macroinvertebrate fauna that could have existed in this combination of volcanic soils and coastal environment here are likely to be largely lost.

The remainder of the islands form a DOC managed nature reserve and are important wildlife habitats, largely covered in unmodified or regenerating native vegetation. The few small waterways on these islands have full riparian cover.

Threatened and endangered species include tutatara, giant centipedes, lizards (geckos and skinks) and tussock weta and giant weta. These islands also support large populations of seabirds, notably petrels, storm petrels and shearwaters.



### Experiential

With the majority of the offshore islands being managed by DOC, including the Mercury Group (although excluding Great Mercury Island), Cuvier Island and the Aldermen Islands, these all hold very high degrees of perceived naturalness values due to their lack of modification and remoteness from the mainland. Many of these islands hold endangered fauna, including tuatara, Middle Island tusked weta and the Duvaucel gecko. Due to these very high biotic values, people are not permitted access to most of these islands.

Ephemeral activity, such as the changing seasons and presence of wildlife, amplifies the natural processes of these islands which are accentuated by the lack of human presence. Overall, these islands hold very high levels of perceived naturalness.

Rating at Level 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			Very High

Image below: Cuvier Island

Inset below: Castle Island

Left: White cliffs of Great Mercury Island



## Coastal Terrestrial Area 14: Outer Island Groups Specific Characteristics at Level 4

These are mapped with reference to **Map 19**

Area	Rating	Key Values	Additional Comments
Cuvier Island	Very High	<ul style="list-style-type: none"> <li>Cuvier Island is a nationally significant Geopreservation Society feature;</li> <li>Impressive tourmalinised rocks evident;</li> <li>Endangered flora and fauna evident on island and a DOC sanctuary;</li> <li>Very high degrees of perceived naturalness values due to the lack of modification and remoteness from the mainland</li> </ul>	<ul style="list-style-type: none"> <li>Includes entire island.</li> </ul>
Eastern Mercury Islands	Very High	<ul style="list-style-type: none"> <li>Stanley Island and Red Mercury Island are regionally significant Geopreservation Society features;</li> <li>Endangered flora and fauna evident on islands and a DOC sanctuary;</li> <li>Very high degrees of perceived naturalness values due to the lack of modification and remoteness from the mainland</li> </ul>	<ul style="list-style-type: none"> <li>Island include: Korapuki Island; Green Island; Atiu or Middle Island; Kawhitu or Stanley Island; Double Island (Moturehu) and Red Mercury Island (Whakau).</li> <li>The modified parts of Great Mercury Island are excluded from this rating</li> <li>Collectively these islands amplify abiotic, biotic and experiential naturalness.</li> </ul>
Aldermen Islands	Very High	<ul style="list-style-type: none"> <li>The Aldermen Island Group are a regionally significant Geopreservation Society's feature;</li> <li>Endangered flora and fauna evident on islands and a DOC sanctuary;</li> <li>Very high degrees of perceived naturalness values due to the lack of modification and remoteness from the mainland</li> </ul>	<ul style="list-style-type: none"> <li>Islands include: Hongiora; Middle Island; Ruamahuanui Island; The Spire; Nga Horo Island; Half Island; Ruamahuaitei Island and Big and Little Hump.</li> <li>Collectively these island amplify abiotic, biotic and experiential naturalness.</li> </ul>

Legend

-  Extent of Coastal Environment
-  Coastal Terrestrial Area 14: Outer Island Groups
- Outer Island Groups Coastal Natural Character Ratings: Level 4
-  High
-  Very High

Cuvier Island

Eastern Mercury Islands

Aldermen Islands

Map 19



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## Overall Evaluation – Level 4

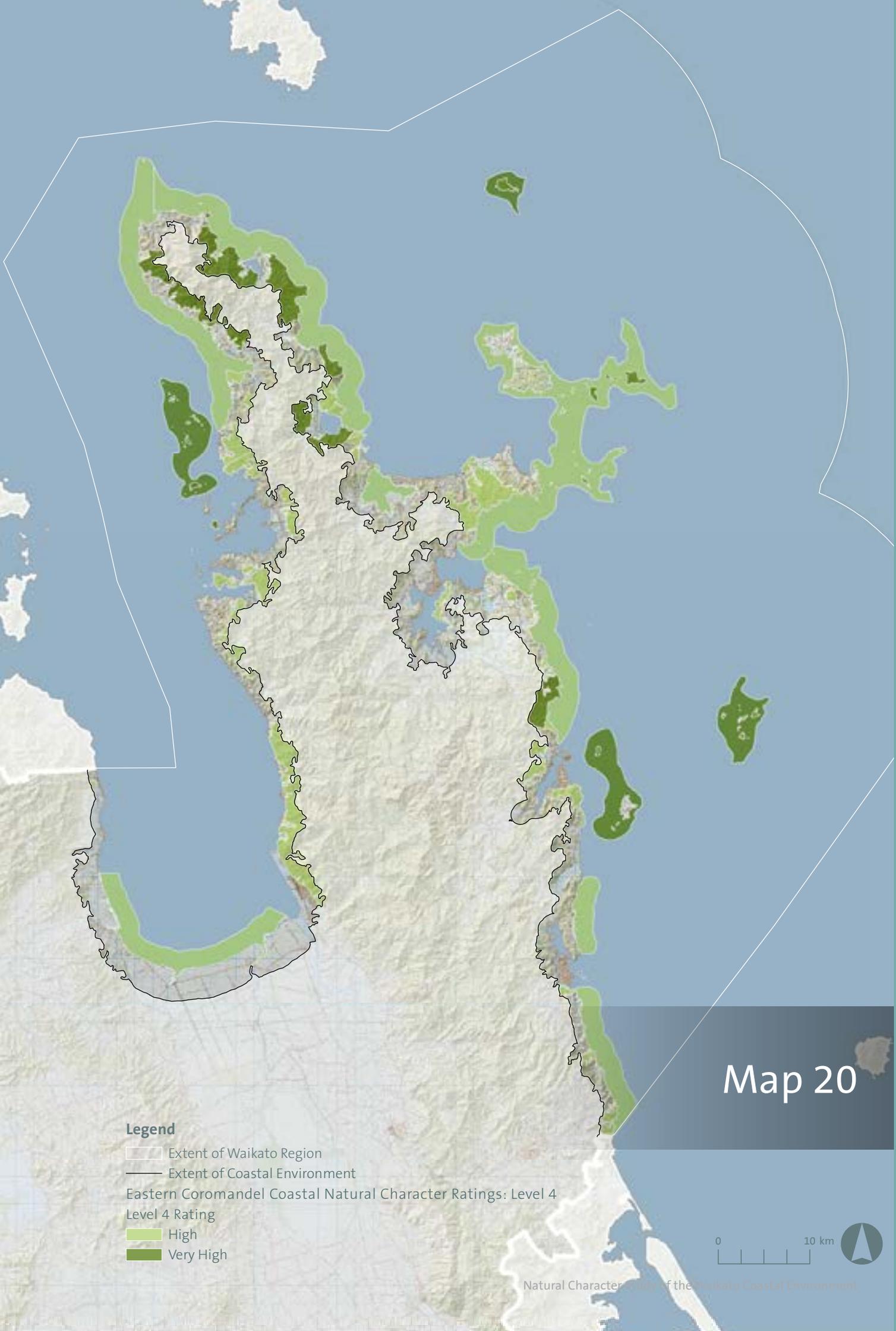
At the more specific Level 4 scale, individual bays, estuaries, headlands and islands have been mapped to illustrate those areas holding high or very high levels of natural character. This more detailed mapping has only been undertaken where specific mention or detail has been included about a smaller area within the broader 'Area' of Level 3 descriptions and evaluations. For example, specific mention is made of the Chenier Plains and RAMSAR site at Pūkorokoro - Miranda within both the Hauraki Coastal Terrestrial Area and the Firth of Thames Coastal Marine Area. Despite much of the Chenier Plain being modified, the Outstanding Natural Character Area has been carefully delineated to capture the most unmodified parts, along with the entire RAMSAR site.

Within some of the least modified areas, the extent of the high and very high mapped areas has been more straight forward. For example, the island group of Motukawao, just north of Coromandel Town within the Coastal Terrestrial Area of Colville, retains mature indigenous bush which has to all intents and purposes avoided the impact of humans. The coastal waters around these islands also retain very high levels of naturalness, again due predominantly to the lack of human change and the resultant high ecological habitats. All of the areas that are mapped as high or very high natural character within the 17 different Level 3 'Areas', at the Level 4 scale, are shown collectively on the map (Map 20) opposite.

Refer to Section E of this study for the separate mapping of the Outstanding Natural Character Areas, which used this Level 4 mapping as a basis for further consideration.

*Above: The indigenous, forest-clad islands of the Motukawao Group retain very high levels of natural character at the Level 4 scale*





**Legend**

- Extent of Waikato Region
- Extent of Coastal Environment

**Eastern Coromandel Coastal Natural Character Ratings: Level 4**

- Level 4 Rating
- High
  - Very High

Map 20



# SECTION D: WAIKATO'S WEST COAST MARINE AND TERRESTRIAL AREAS

## Coastal Marine and Coastal Terrestrial Areas

The Study Team determined that within the West Waikato Region there are three Coastal Marine Areas and seven Coastal Terrestrial Areas. These are identified in the tables overleaf, illustrated on Map 21 and described in this section of the report. These Coastal Marine and Coastal Terrestrial Areas are essentially mapped at the Level 3 scale, as outlined within Section A of this report.

For each of the Coastal Marine and Coastal Terrestrial Areas the collective characteristics of the Areas' abiotic, biotic, and experiential attributes are described first. Following this, an explanation around the size of the Area is given. A description of the adjacent Coastal Context follows which will provide relationships associated with the Areas' broader setting.

Further to this, each specific Area is discussed and evaluated. Freshwater aspects are covered within the Coastal Terrestrial Areas. An evaluation table at the end of each Area subsection summaries the values and ratings at the Level 3 scale for Coastal Marine and Coastal Terrestrial Areas. Finally, any specific values within the 'Area' are listed, mapped, and rated at the Level 4 scale (or local/specific scale). Refer to Figure 2 for an explanation of the Levels. An overall evaluation map is provided at the end of this section, illustrating the ratings for the Level 3 and Level 4 areas (refer again to Figure 2)

An overall summary of all values is presented at the end of this Section.

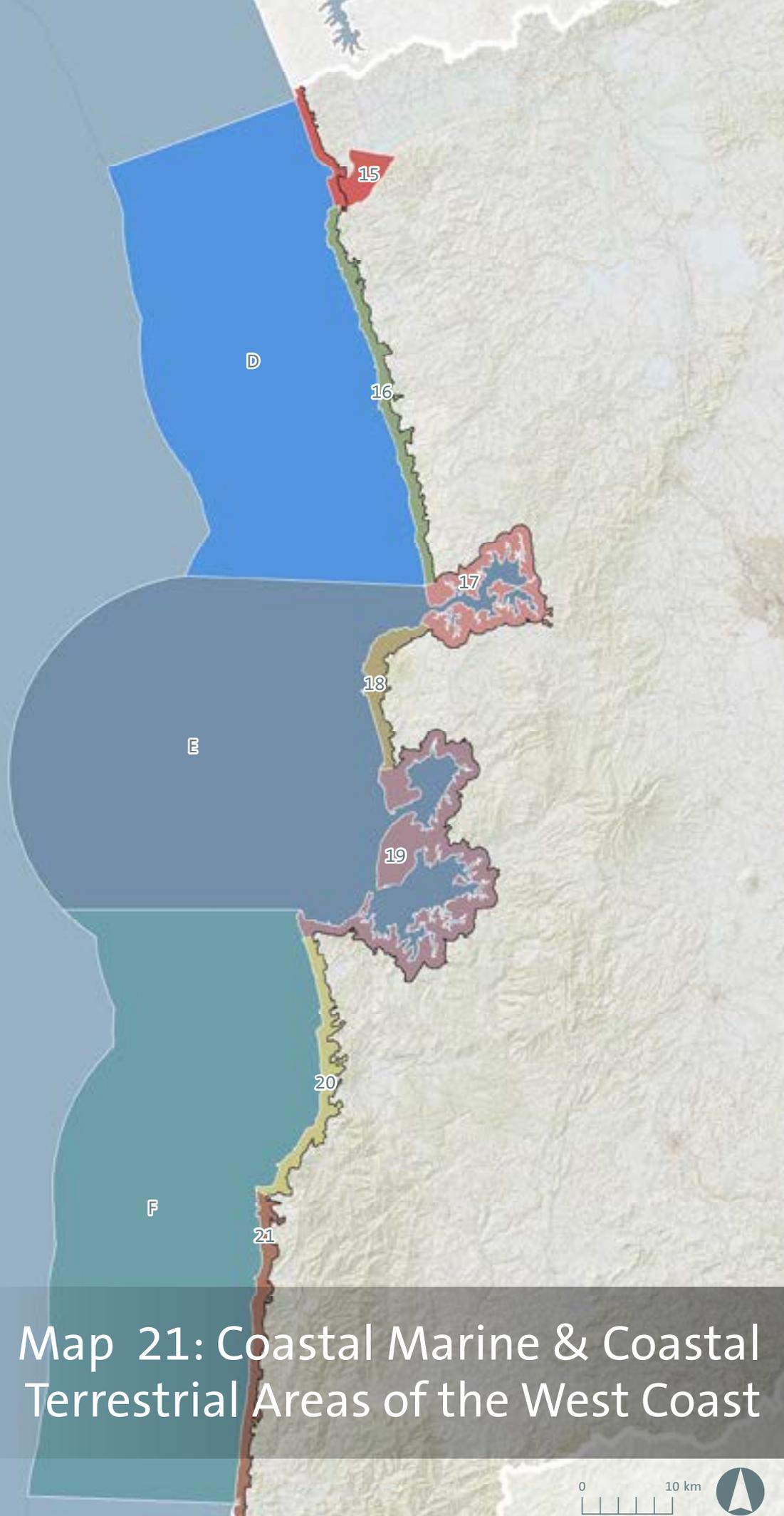




Coastal Marine Areas	
D	Waikato North
E	Whaaingaroa, Aotea and Kaawhia Harbours
F	North Taranaki Bight

Coastal Terrestrial Areas	
15	Port Waikato
16	Opura
17	Whaaingaroa
18	Karioi
19	Aotea Kaawhia
20	Marokopa
21	Awakino

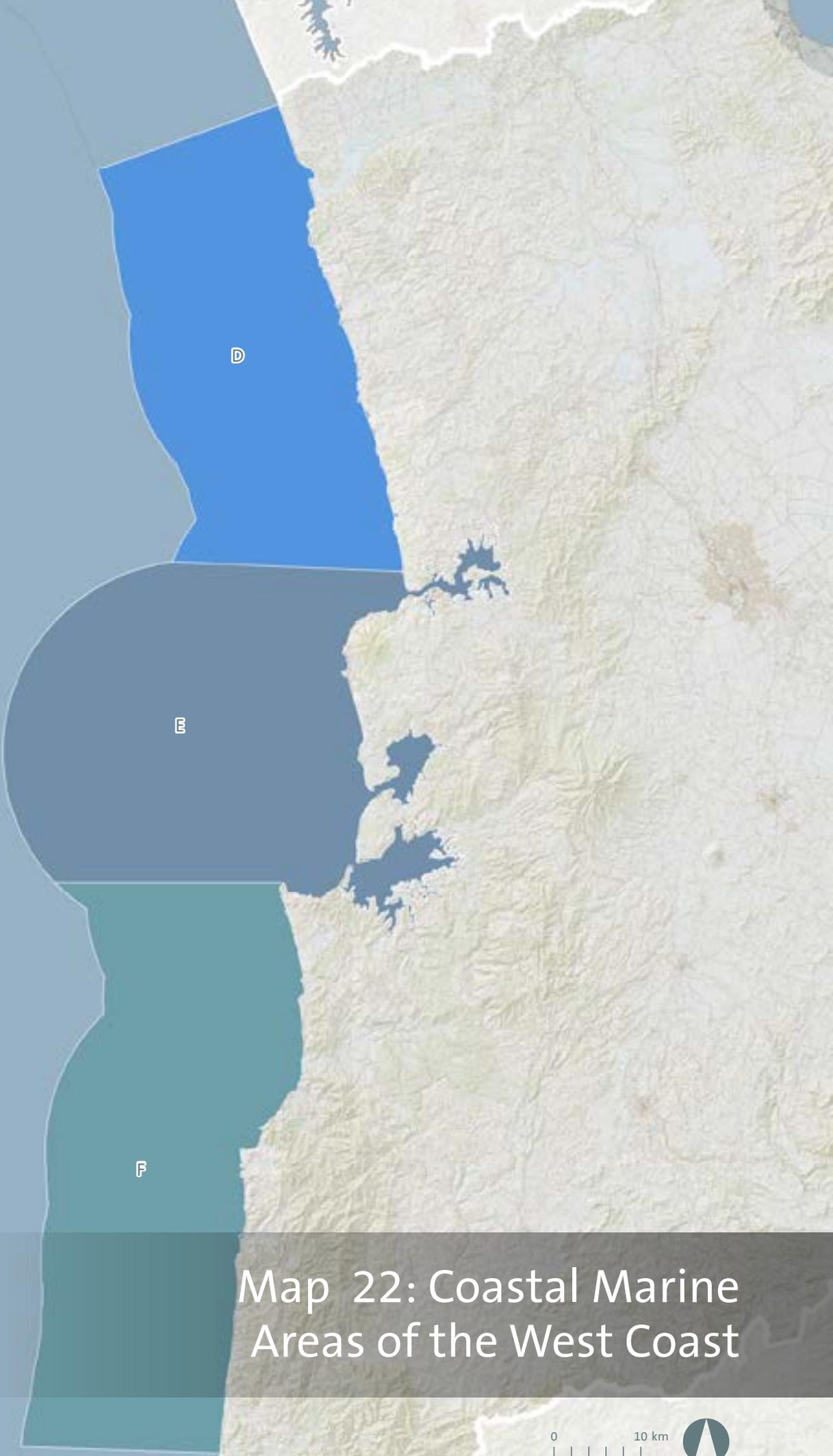
Above: Surfer at Raglan



# Map 21: Coastal Marine & Coastal Terrestrial Areas of the West Coast

**Legend**  
— Extent of Coastal Environment





Map 22: Coastal Marine Areas of the West Coast



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# COASTAL MARINE AREAS

Coastal Marine Areas	
D	Waikato North
E	Whaaingaroa, Aotea and Kaawhia Harbours
F	North Taranaki Bight



*Above: Aquaculture in the calm waters of the Aotea Harbour*

# Waikato North

COASTAL MARINE AREA D:



### Collective Characteristics

Exposed, high energy open coastline with the most notable feature being the Waikato River mouth. Narrow black sand beaches and occasional dunes and areas with steep but stable cliffs. The Waikato River; however, is home to a diverse assemblage of freshwater and saltwater fish taking advantage of the rich resources of the Waikato River delta. This Coastal Marine Area retains high remote and isolation values due to its inaccessibility.

*Below: High energy Waikato North Coastal Marine Area*



## Abiotic

The open coastline is a high energy environment with a narrow sandy beach north of Port Waikato and coastal cliffs south of Port Waikato. It is likely to be part of a littoral cell contiguous with adjacent areas because there are few physical features to control sediment transport. Within the larger system, there are smaller littoral cells defined by physical control features such as headlands, harbour mouths and river mouths that control the local wave climate and the longshore movement of sediment. These littoral cells and their control features, impact directly on erosion and accretion dynamics at the coastal margin resulting in shoreline fluctuations that have temporal scales of hours/days to decades/centuries. Many of the long-term patterns of shoreline fluctuation that have been observed are not well understood.

The coastline is typically comprised of a soft shore (sands and gravels) with fluctuating width depending on the conditions within the littoral cell and larger scale sediment dynamics in the West Coast unit. Where this exists, it is present as a thin veneer of sand over rock, small dunes, or extensive sand dune formations. This soft shore (position, depth, width) can be highly dynamic, especially near harbour entrances and river mouths where the high energy coastal environment influences tidal and sub-tidal channels, tidal currents, and swell waves. In circumstances when sediment supply becomes limited, beaches can rapidly erode and shorelines shift landward. Conversely, when sediment supply is available, beaches can accrete and shorelines shift seaward. Where this occurs adjacent to development, seawalls and other erosion protection measures have been installed with varying success and sometimes impacting on beach widths and levels.

Where there is no soft shore, the coastline consists of coastal cliffs comprised of soft sedimentary rock, hard sedimentary, or hard volcanic rock. The long-term instability in this coastal cliff environment, as influenced by a range of factors (climate, wave conditions, land use), contributes to sediment dynamics in the adjacent littoral cell.

*Above: Exposed waters off Port Waikato*



**Biotic**

The Waikato River, however, is home to a diverse assemblage of freshwater and saltwater fish taking advantage of the rich resources of the Waikato River delta. The delta is known for its whitebait fishery, and provides a habitat, nursery, and conduit for migrating freshwater species. The Delta is also home to a multitude of exotic and indigenous waterfowl, marshbirds, and shore using the various mudflat, sandflat, saltmarsh and wetland habitats for feeding and breeding. Along the open coastline, there are few permanent dunelands or intertidal areas offering food resources or breeding areas. The Delta is a recognised location for waterfowl hunters during duck hunting season with maimai dotting the islands and intertidal mudflats.

There is very limited or no biotic information relating to the open coastline. Given that modification of the marine environment is minimal, marine fish and benthic organism diversity and distribution can be expected to be unmodified. Maui’s dolphin may occasionally use the coastal waters off the West Coast, but there is no information about the relative importance of each of the Coastal Marine Areas to Maui’s dolphin. Like all West Coast Coastal Marine Areas, the coastal environment will provide a transit route for shorebirds and some locations likely provide occasional roosting and feeding areas. Commercial fishing is present in the waters off the coast.

The river mouth also offers temporary habitat for seals, dolphins, and sharks.

**Experiential**

Due to the restricted access to this Coastal Marine Area, experiential attributes are restricted to a small number of locations, notably around the Waikato River Mouth and Karioirahi. Due to this, remoteness and isolation values are high, as well as aspects relating to the darkness of the night sky. The lack of modification of this coastal marine area is amplified due to the relatively low amount of modification (i.e. structures and buildings) on the land. Surfing occurs at Karioirahi and around Raglan (which is outlined within Coastal Marine Area E).

Overall, the wildness and exposed nature of this coastal area further amplifies experiential values.



*Above (top): The mixing of the waters of the Waikato River and the sea.*

*Above (bottom): Waikato River mouth*

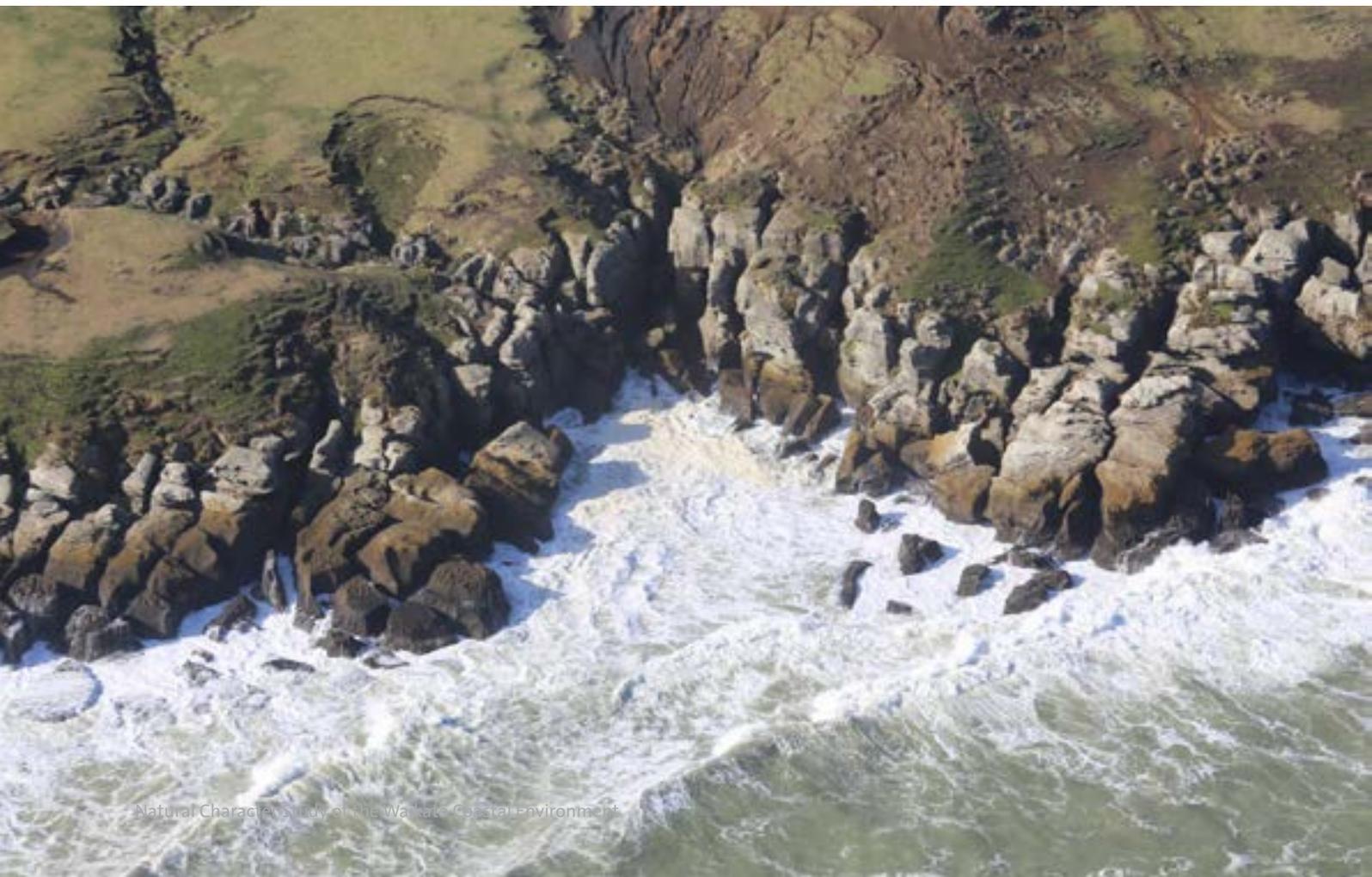
Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High	✓		
High		✓	✓
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating			<b>High</b>

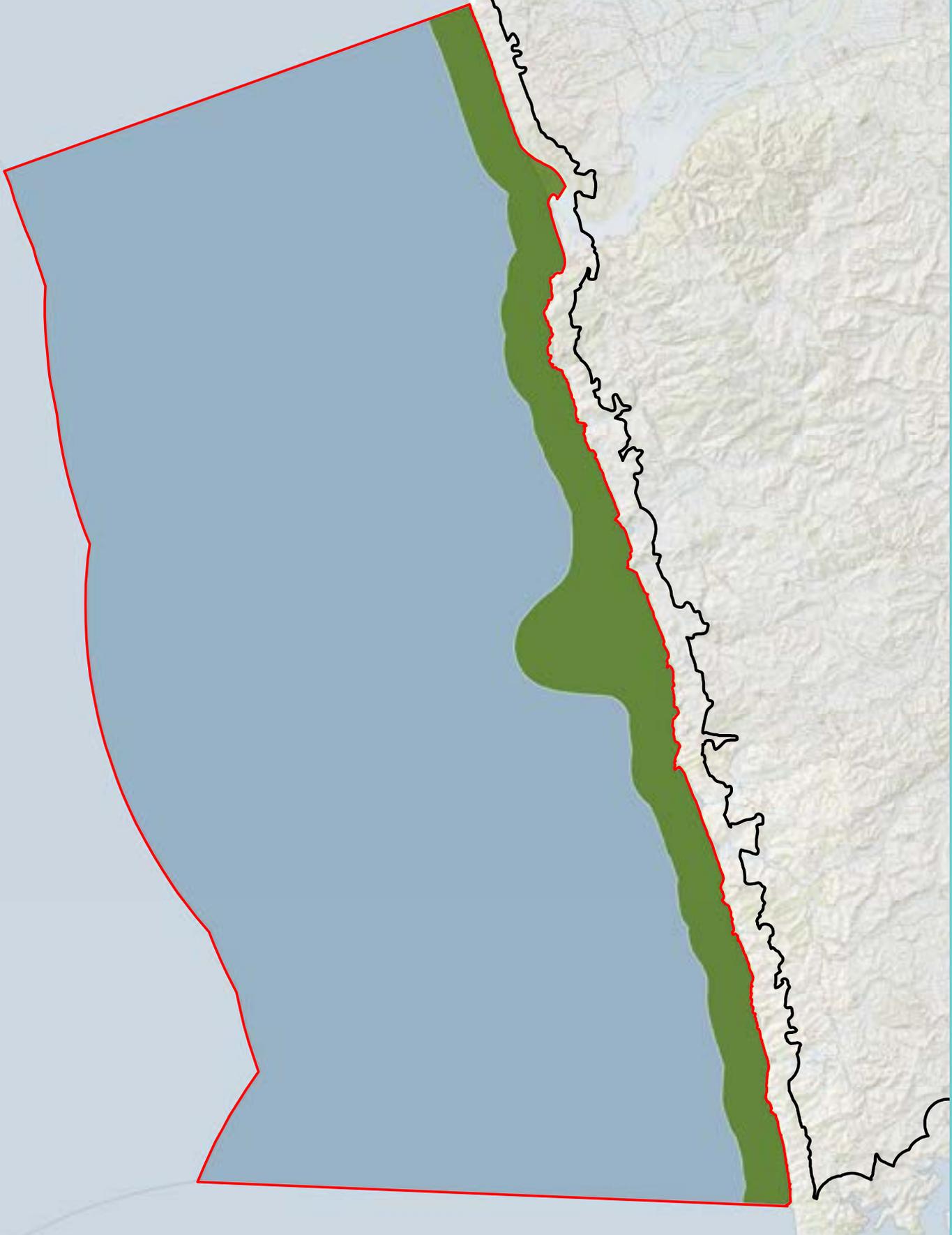
### Coastal Marine Area D: Waikato North Specific Characteristics at Level 4

These are mapped with reference to **Map 23**

Area	Rating	Key Values	Additional Comments
Coastal Waters	Very High	<ul style="list-style-type: none"> <li>Coastal waters and shoreline are expressive of highly dynamic open coastal ocean movement including sand drift.</li> <li>Shore break varies along the coast from sandy beach breaks to rocky reef.</li> <li>The wildness and remoteness of these waters amplifies the naturalness and experience of the natural biotic and abiotic elements.</li> <li>Biotic elements include the whitebait habitat at the Waikato River Mouth and marine life.</li> </ul>	<ul style="list-style-type: none"> <li>Little modification occurs along coastal waters with beach access and boat ramp access gained at Port Waikato.</li> <li>The extension of the Very High area includes an offset of 2km from the shore line and inclusion of reefs and islands in close proximity to the shoreline.</li> </ul>

*Above: Exposed rocky shoreline along Crayfish Point (Otehe)*





**Legend**

-  Extent of Coastal Environment
-  Coastal Marine Area D
- West Coast Coastal Natural Character Ratings: Level 4
  -  High
  -  Very High

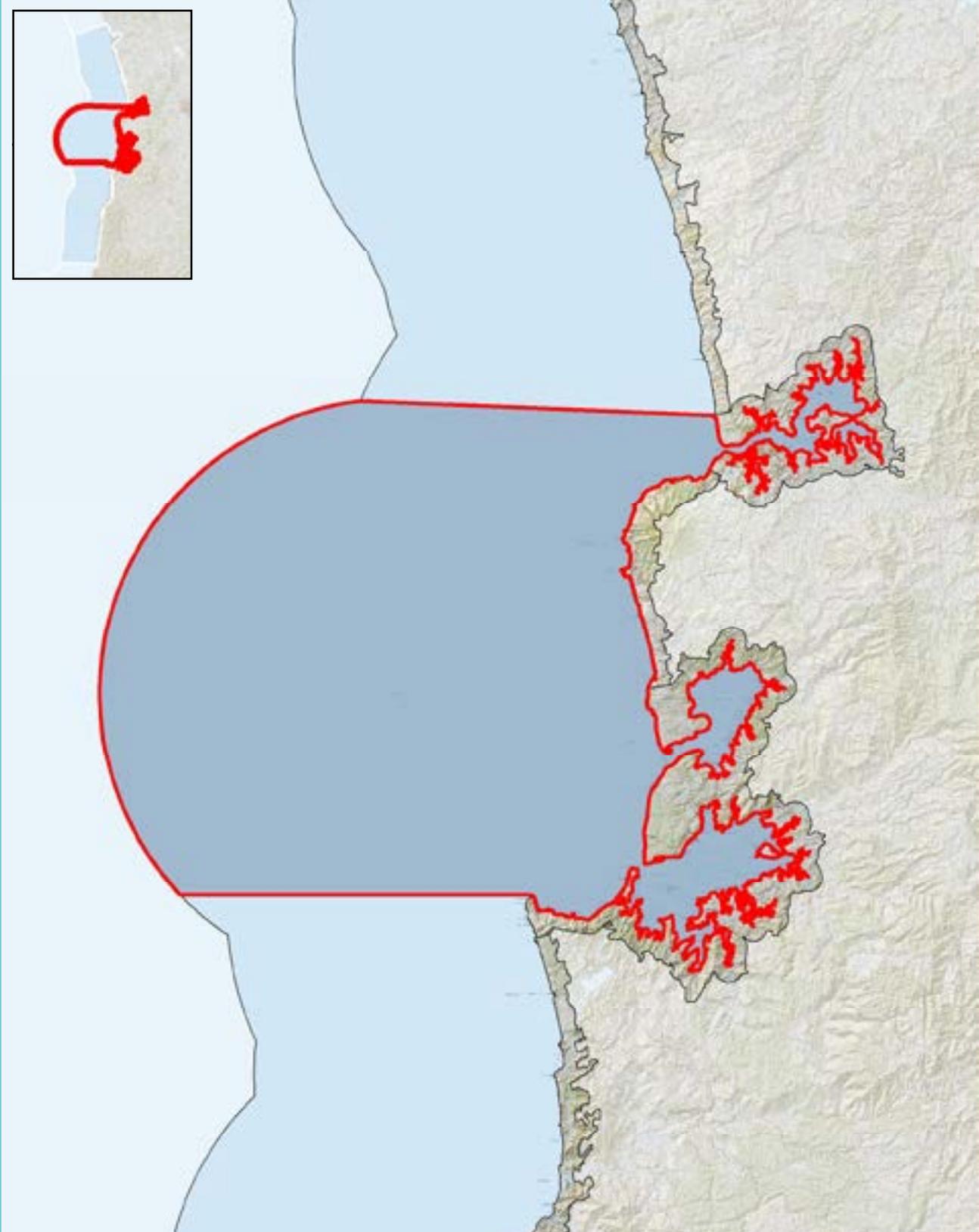
Map 23



# Whaiaingaroa, Aotea and Kaawhia

## Harbours

COASTAL MARINE AREA E:



## Collective Characteristics

The coastal waters are influenced by the interplay of three harbours which nestle around Mt Karioi and Kaawhia. The open coast comprises the volcanic shoreline of Mt Karioi with long black sandy beaches. The rocky shoreline creates exposed rock shelves and blowholes with dynamic and high energy wave action along the shoreline. Manu Bay and Whale Bay provide a nationally significant surf break with the offshore waters including Kaarewa / Gannett Island, a wildlife sanctuary.

The harbour waters are shallow and with large areas of intertidal flats. Saltmarsh and mangrove habitats are scattered along the shoreline of the harbours with Aotea and Kaawhia harbours supporting small shellfish farming.

## Abiotic

Of the three Coastal Marine Areas, the Harbour Coastal Marine Area is the most physically diverse comprising both high energy open coastline and low energy harbours, with a dynamic interconnection between the two environments at the harbour mouths. The Coastal Marine Area extends from Te Hara Point at the northern end of the Whaingaroa Harbour mouth dune system to Albatross Point south of Kaawhia Harbour.

In contrast to the other Coastal Marine Areas, the Harbour Coastal Marine Area has several large physical control features. These include Albatross Point itself, each of the Harbour mouths, and Mt Karioi which protrudes from the coastline south of Whaingaroa Harbour. Each Harbour mouth has mobile sand spit and/or dune systems of varying sizes and depths that contribute to variable discharge dynamics and fluctuating shorelines.

North of Whaingaroa Harbour and on either side of the harbour mouth, the coastal margin consists of a narrow black sand/gravel beach adjacent to unstable coastal cliffs with evidence of earthflows or dunes that are variously stable or transgressive. South of Raglan, the coastal margin consists of steep but stable coastal cliffs, where volcanic rock from Mt Karioi reaches the coast with a single small boulder beach in Whale Bay. Between Mt Karioi and Albatross Point, there is an open coast comprised of hard volcanic rocks or cemented dune sands. The volcanic rocks typically form stable coastal cliffs with no soft shore, whereas the dune sands form stable cliffs with a toe and narrow black sand beach underlain with a rock platform. Rocky reefs, islets and outcrops are generally located adjacent to volcanic geology, particularly around Mt Karioi and south of Kaawhia Harbour. The largest of these is Gannet Island, an eroded basaltic tuff remnant located 19 km west of Aotea Harbour. The physical environment of the island is harsh, waves often wash over the entire island, and it has no anthropomorphic modification. The only notable stream outlet is at Toreparu Stream, and most streams discharge over the coastal cliffs with no defined coastal stream mouth.

Anthropogenic modification of the Coastal Marine Area is low, with few vehicular access points and almost no development or structures at the coastal margin except at Arohaki Bay where erosion protection structures are located at the coastal margin in front of buildings. However, coastal processes are expected to be largely unmodified.

The harbours were created by the partial blocking by sand barriers of drowned river valleys as sea levels rose. Kaawhia is the largest of three harbours with an area of 67.7 km<sup>2</sup> of which 74% is intertidal. Aotea Harbour is 31.9 km<sup>2</sup> to MHWS, of which 74% is intertidal and Whaingaroa is 35km<sup>2</sup>, of which 70% is intertidal. In contrast to the open coast, the

harbours are low energy environments typically comprised of extensive soft sediment intertidal and subtidal channels with sandy/muddy harbour beaches. The soft shore sediments are usually a veneer of varying depths over sedimentary rock shelves although in some locations the sand is only a thin layer or absent. The locations and extent of beaches, subtidal channels and intertidal areas are dynamic and can fluctuate dramatically over short timeframes, affecting the location of shorelines and coastal infrastructure.

The harbour mouths and adjacent beaches are enclosed by sand spits and extensive dune areas, including large areas of transgressive duneland at Aotea Harbour. However, they maintain a dynamic interconnection with the ocean beaches on either side of the Harbour mouths as a result of tidal currents, waves, and sediment transfer. In particular, the dunes between the Aotea and Kaawhia Harbour mouths are mobile and constantly being reshaped.

Rates of sedimentation in the Harbours have historically been impacted by anthropomorphic land use change, so rates of harbour infill have increased since prior to human settlement. However, today sedimentation is considered to be relatively low and impacts on biotic factors are thought to be limited.

Each harbour has numerous waterways of various sizes discharging into them and many, if not most, river mouths have some degree of modification including channelization, reclamation, and drainage. In addition, there are roads, culverts, bridges and their abutments, and coastal erosion protection structures that modify the coastal margin and have an effect on the location of channels and sediment transport. The harbours also have structures extending into the Coastal Marine Area including moorings, jetties/wharfs, and boat ramps. These modifications are more numerous in Whaaingaroa and Kaawhia Harbours than in Aotea Harbour where there is comparatively less settlement and fewer coastal structures.

In Whaaingaroa Harbour there are inanga farms located on land adjoining the intertidal saltmarsh. In Aotea Harbour there is aquaculture located in the channel adjacent to the main settlement. In Kaawhia Harbour there is aquaculture near Mangaora Inlet east of the settlement of Kaawhia.

The scale of modification is generally small compared to the size of the harbours and coastal processes (sediment transport, water movement, tidal movement) which appear to have a low degree of modification.



Above: Gannet

### **Biotic**

There is very limited biotic information relating to the open coastline. Given that, except for fishing, modification of the marine environment is minimal, marine fish and benthic organism diversity and distribution can be expected to be unmodified. Like all West Coast Coastal Marine Areas, the open coast will provide a transit route for shorebirds with the harbours as a focal point. Most biotic information relates to the harbours, although offshore Gannet Island has been surveyed.

The biotic values of Whaaingaroa, Aotea, and Kaawhia Harbours are a function of land use and waterway management in their surrounding catchments. Water quality from stream draining into the harbours has improved over the past 20 years resulting in low sedimentation rates, particularly for Whaaingaroa Harbour. As a result, water quality

is considered largely unchanged by anthropomorphic activity and the harbours have high ecological values, with Whaangaroa considered to have the highest degree of modification.

Unlike the more modified East Coast intertidal areas, all three West Coast harbours have large intertidal areas that support extensive seagrass meadows (*Zostera* sp.). Seagrass is an important habitat for fish nurseries, shorebird feeding, and shellfish. The harbours and river deltas perform significant ecosystem services as nurseries for fish and other aquatic life, and provide a notable food resource for shorebirds with extensive shellfish beds (pipi, cockles, and wedge shells) and large populations of surface dwelling gastropods (e.g. mud snails).

Although survey data is sporadic, the harbours are known to provide habitat for snapper, kahawai, trevally, gurnard, dogfish, flounder, grey mullet, yellow-eyed mullet, eels, stingrays, and anchovy. The harbours also provide a conduit for native diadromous, fish such as giant kokopu during their migrations to and from the sea.

All three harbours have been identified as nationally important sites for wintering indigenous and international migratory shorebirds, with top 10 rankings for a variety of shorebird species. Kaawhia Harbour has the most southern west coast population of NZ dotterel. All three harbours have been identified as Areas of Significant Conservation Value by Waikato Regional Council.

*Below: Kowhai Point, Kaawhia Harbour*



Kaawhia Harbour has been described as the ‘seafood basket’ of Tainui and Aotea Harbour is an important food source for local communities. A taiapure was established over Aotea and Kaawhia harbours in 2000 and includes 2 nautical miles (n.m.) around the entrances, a 1-n.m. coastal strip from Taranaki Point to Albatross Point, and 1 n.m. around Gannet Island.

*Below: Surfer at Raglan*

*Right: Aotea Harbour*

Gannet Island terrestrial flora is limited to two lichens, a moss, and a green alga. There are no vascular plant species, principally because there is no permanent freshwater, no soil, harsh effects of salt water, salt spray and guano, and vegetation removal by birds. However, Gannet Island is a breeding ground for gannet and New Zealand fur seals, both Gannet Island and Albatross Point are fur seal haul out sites.



**Experiential**

The sheltered waters of the three harbours offer very contrasting experiences to those on offer along the exposed coastline. The benign and calm waters of the harbours allow for numerous kinds of water-based activities, including swimming and boating and access is gained around the three main areas of settlement, being Whaaingarua, Aotea and Kaawhia. There is a lack of modification on the water’s surface within the harbours, principally due to the low concentration of population.

The open coastline, notably around Raglan offers premium surfing, with nationally significant surf breaks at Manu Bay, Whale Bay and Indicators. The surf at Raglan, which attracts hundreds of people year round, is internationally recognised. Due to this, the natural elements, patterns, and process of this Coastal Terrestrial Area are considered high. The presence of wildlife and the wildness associated with the water amplifies the natural elements.

Gannet Island is administered as a Wildlife Management Reserve by the Department of Conservation.

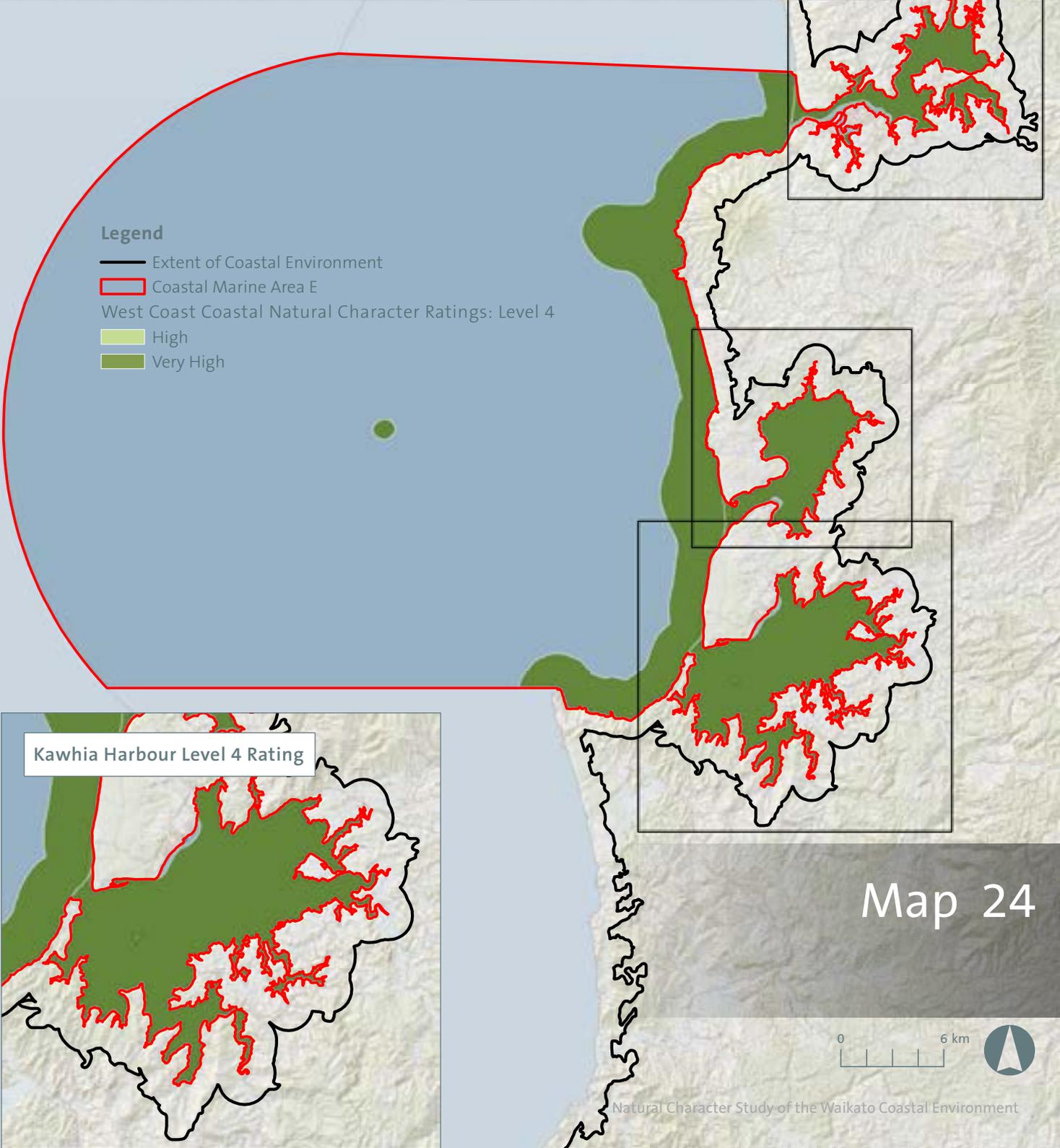
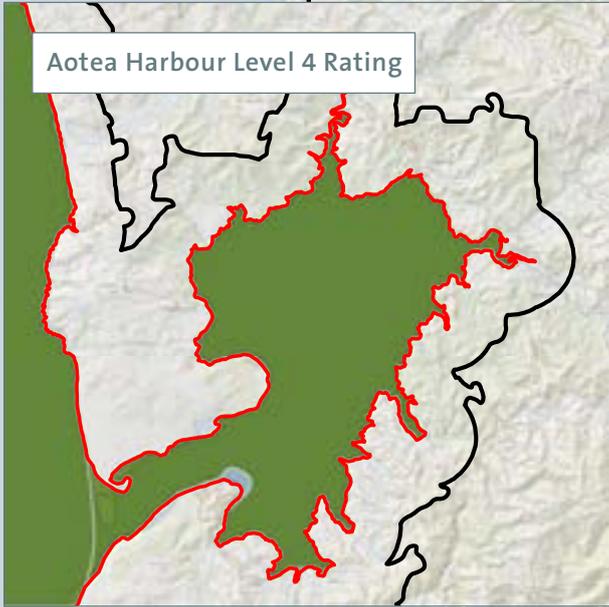
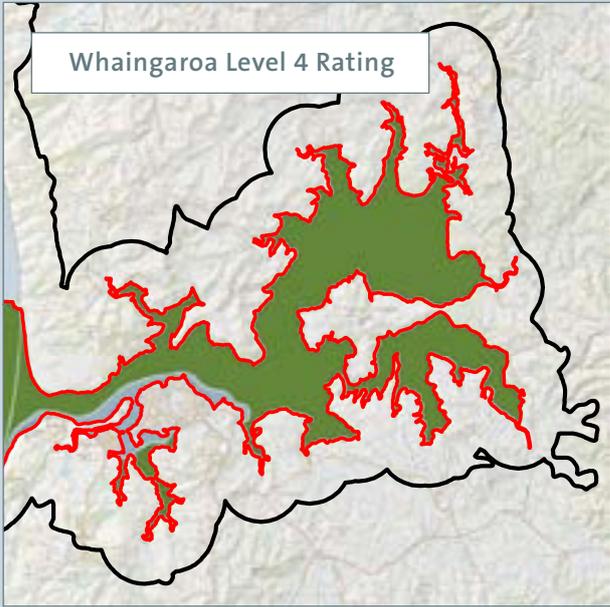
Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High	✓		
Moderate to High		✓	✓
Moderate			
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating			Moderate to High



## Coastal Marine Area D: Whaingaroa, Aotea and Kaawhia Harbours Specific Characteristics at Level 4

These are mapped with reference to **Map 24**

Area	Rating	Key Values	Additional Comments
Whaingaroa Harbour	Very High	<ul style="list-style-type: none"> <li>Coastal edge of the dune feature at harbour mouth highly expressive of natural abiotic processes and sand movement at the harbour mouth. Intertidal waters expressive of constant change to channels. Unmodified coastal margins with significant erosion control around the settlement, private boat access and jetties.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent mostly along the southern harbour margins around the settlement of Raglan and its lower harbour reaches. Includes reclamation and erosion control measures, wharf, jetties, groins and bridges.</li> </ul>
Aotea Harbour	Very High	<ul style="list-style-type: none"> <li>Coastal dune feature at harbour mouth highly expressive of natural abiotic processes and sand movement at the harbour mouth. Intertidal waters expressive of constant change to channels.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent mostly along the southern harbour margins around the settlement of Aotea. Includes reclamation and erosion control measures.</li> </ul>
Kaawhia Harbour	Very High	<ul style="list-style-type: none"> <li>Coastal dune feature at harbour mouth highly expressive of natural abiotic processes and sand movement at the harbour mouth. Intertidal waters expressive of coastal margins and estuarine habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent mostly along the settlement of Kaawhia. Includes reclamation and erosion control measures. Includes jetties, seawall, erosion control and reclamation.</li> </ul>
Open coastline	Very High	<ul style="list-style-type: none"> <li>Coastal waters and shoreline are expressive of highly dynamic opencoastal ocean movement including sand drift.</li> <li>Shore break varies along the coast from sandy beach breaks to rocky reef.</li> <li>The wildness and remoteness of these waters amplifies the naturalness and experience of the natural biotic and abiotic elements.</li> <li>Includes Gannet Island waters and the abundant marine life surrounding the island</li> </ul>	<ul style="list-style-type: none"> <li>No modification is apparent to the open coastal waters.</li> <li>Commercial and recreational fishing is apparent around Whaingaroa and Kaawhia Harbours. Gannet Island provides a popular diving location in good conditions.</li> <li>The extension of the Very High area includes an offset of 2km from the shore line and inclusion of reefs and islands in close proximity to the shoreline.</li> </ul>



**Legend**

- Extent of Coastal Environment
- ▭ Coastal Marine Area E
- West Coast Coastal Natural Character Ratings: Level 4
- ▭ High
- ▭ Very High

Map 24



# North Taranaki Bight

COASTAL MARINE AREA F:



## Collective Characteristics

Exposed, high energy open coastline with numerous small watercourses draining into the sea. Narrow black sand beaches and occasional dunes and areas with steep but stable cliffs. This Coastal Marine Area retains high remote and isolation values due to its relative inaccessibility.

## Abiotic

The North Taranaki Bight Coastal Marine Area encompasses the high energy open coastline extending from the southern regional boundary dunes at the Mokau River north to Albatross Point. Very similar to Waikato North Coastal Marine Area, the North Taranaki Bight Coastal Marine Area has few large physical control features. However, there are small headlands that may delineate local littoral cells including Tirua and Tapirimoko Points at either end of Nukuhakari Bay, and Taungaururoa, Te Mauku and Ngarupupu Points north of Waikawau River. Tirua Point is the most prominent physical relief longitudinally, dividing the Coastal Marine Area into two halves, each with different characteristics corresponding to the underlying geology.

The northern half is comprised of a variable coastline with hard greywacke rocky reefs both at the coastline and further offshore (e.g. Motunau Rocks). The rocky reefs either extend directly from the base of stable coastal cliffs as a shelf, or are buried beneath the soft shore beach. There are extensive lengths of black sand beaches adjacent to coastal cliffs or historic

*Below: Active coastal waters at Opito Point*



stabilised dunes. There is one large sand spit at Marokopa River and a smaller sand spit at Wainui Stream, but otherwise, most streams discharge over the coastal cliffs with no defined river mouth. There is little evidence of earthflows, and the only active erosion is small areas of transgressive dunes.

From Tirua Point south, the underlying geology is weak sandstone and limestone which emerges beneath the soft shore as a flat rocky shelf that extends offshore with few rocky reefs or islets. There are less extensive lengths of beach and in some areas the beach is a narrow strip forming a veneer over the rock shelf. The coastal margin is adjacent to stable coastal cliffs with no evidence of earthflows and few transgressive dunes. As for Tirua Point north, there are only two notable sand spits at Awakino and Mokau Rivers, and most streams discharge over the coastal cliffs.

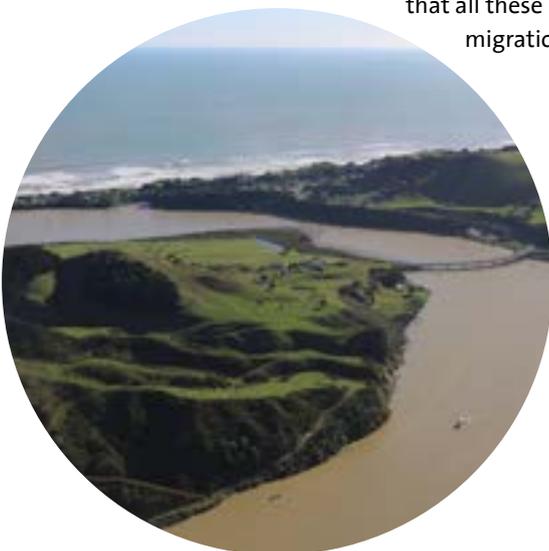
Anthropogenic modification of the Coastal Marine Area is generally low and coastal processes are expected to be unmodified. There are two exceptions to this. The first exception is the submarine pipeline running perpendicular to the coast at Taharoa with a mooring buoy at the surface, servicing the Taharoa iron sand mining operation. The second, is the coastline between Awakino and Mokau, where coastal development includes vehicular beach access points, sea walls and other erosion protection measures, and buildings at the coastal margin.

### **Biotic**

There is limited/ no biotic information relating to the open coastline, except in relation to the Tirua Point haul out site for New Zealand fur seals. Given that modification of the marine environment is minimal, except for commercial and recreational fishing activities, marine fish and benthic organism diversity and distribution can be expected to be largely unmodified. Maui's dolphin may occasionally use the coastal waters off the West Coast, but there is no information about the relative importance of each of the Coastal Marine Areas to Maui's dolphin. Like all West Coast Coastal Marine Areas, the coastal environment will provide a transit route for shorebirds and some locations likely provide occasional roosting and feeding areas.

Most biotic information relates to the Marokopa and Mokau River mouths which are identified by Waikato Regional Council as ASCVs and recognised for their whitebait fisheries. Marokopa Estuary is known for its kahawai, flounder and eel fisheries, while the Mokau and Awakino Estuaries are home to at least 15 marine fish species. It is likely that all these rivers provide a conduit for native diadromous fish species during their migrations to and from the sea.

*Below: Mokau River*



**Experiential**

The open coastline is largely unmodified due to its exposure to the high energy coastal waters. This part of the Waikato West Coast is highly remote with limited access at Marokopa and Awakino, with the remainder of the coast in private ownership.

Recreational use of the coastal waters is limited due to travel distance to the nearest boat ramp or monitored beach. Offshore shipping movements are apparent on a transient basis. However, overall experience of remoteness of the natural abiotic and biotic elements of the open coast is high.

Disruption to the unmodified coastal waters is apparent offshore from Taharoa Sand Mine with a sand depositing bouy and pipeline extending 2km offshore. The visual presence reinforces the modification to the coastal waters and shoreline of the mining landuse.

Rating at Level 3			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High	✓	✓	✓
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
<b>Overall Natural Character Rating</b>			<b>High</b>

*Below: Rocky coastline south of Albatross Point*



### Coastal Marine Area F: North Taranaki Bight Specific Characteristics at Level 4

These are mapped with reference to **Map 25**

Area	Rating	Key Values	Additional Comments
Exposed coastline	Very High	<ul style="list-style-type: none"> <li>Highly remote from recreational human activity.</li> <li>No modification to the open coastal waters and shoreline excluding Taharoa Sand Mine.</li> <li>Biotic environment largely unmodified with supporting habitats for abundant marine life. The estuaries provide habitats for some 15 marine species and whitebait.</li> <li>Shoreline varies from wide coastal sand beaches to steep shorelines and rocky outcrops and reefs.</li> </ul>	<ul style="list-style-type: none"> <li>Limited access from the shore and the exposure of the west coast limits the recreational use of the waters.</li> <li>Offshore shipping routes are visible on a transient basis.</li> <li>The gap in the mapped area adjacent represents the location of the Taharoa Sand Barge and Pipeline.</li> </ul>

*Below: North Taranaki Coastline - looking south toward Awakino*





Map 25

**Legend**

— Extent of Coastal Environment

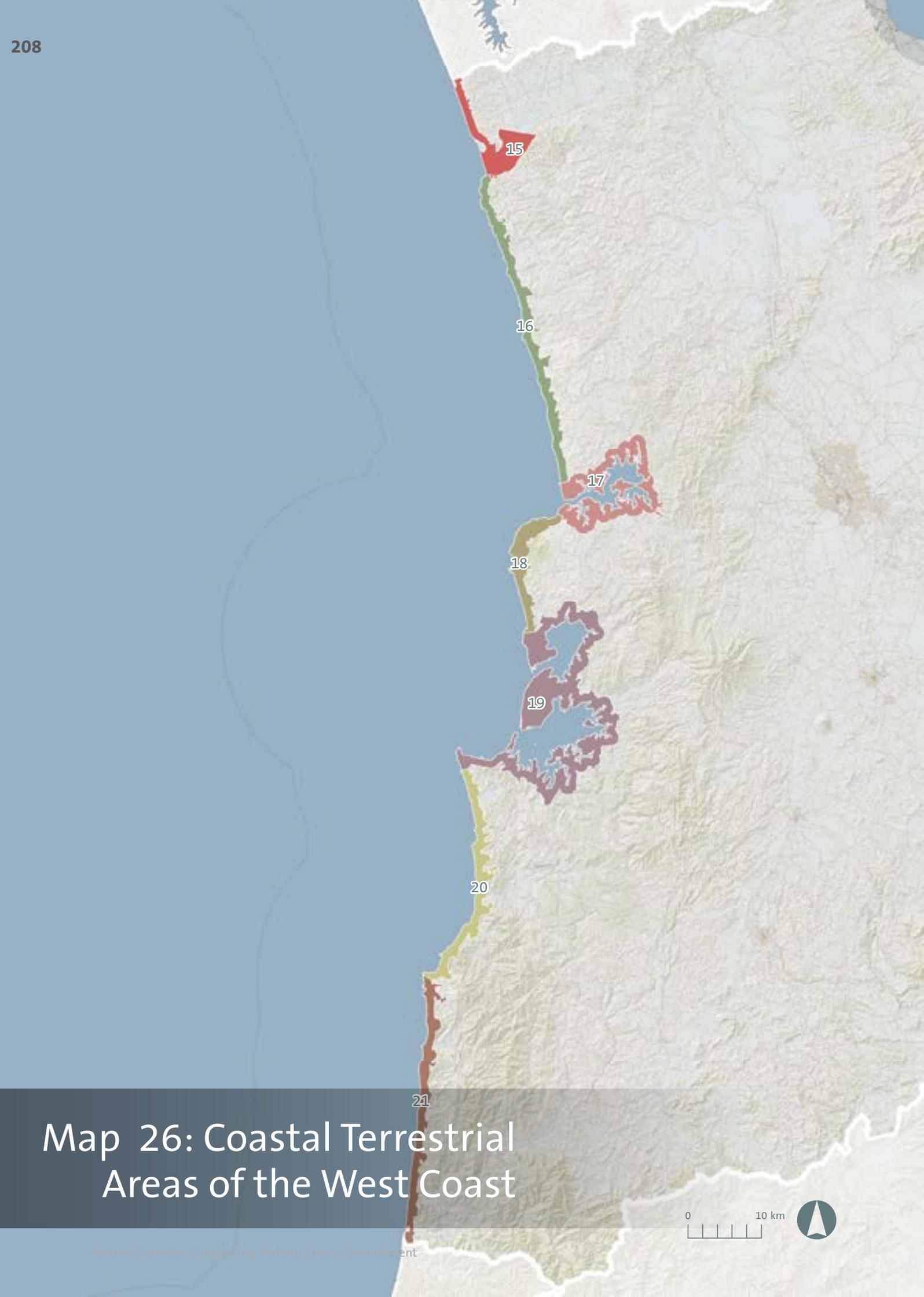
▭ Coastal Marine Area F

West Coast Coastal Natural Character Ratings: Level 4

▭ High

▭ Very High





Map 26: Coastal Terrestrial Areas of the West Coast

## COASTAL TERRESTRIAL AREAS

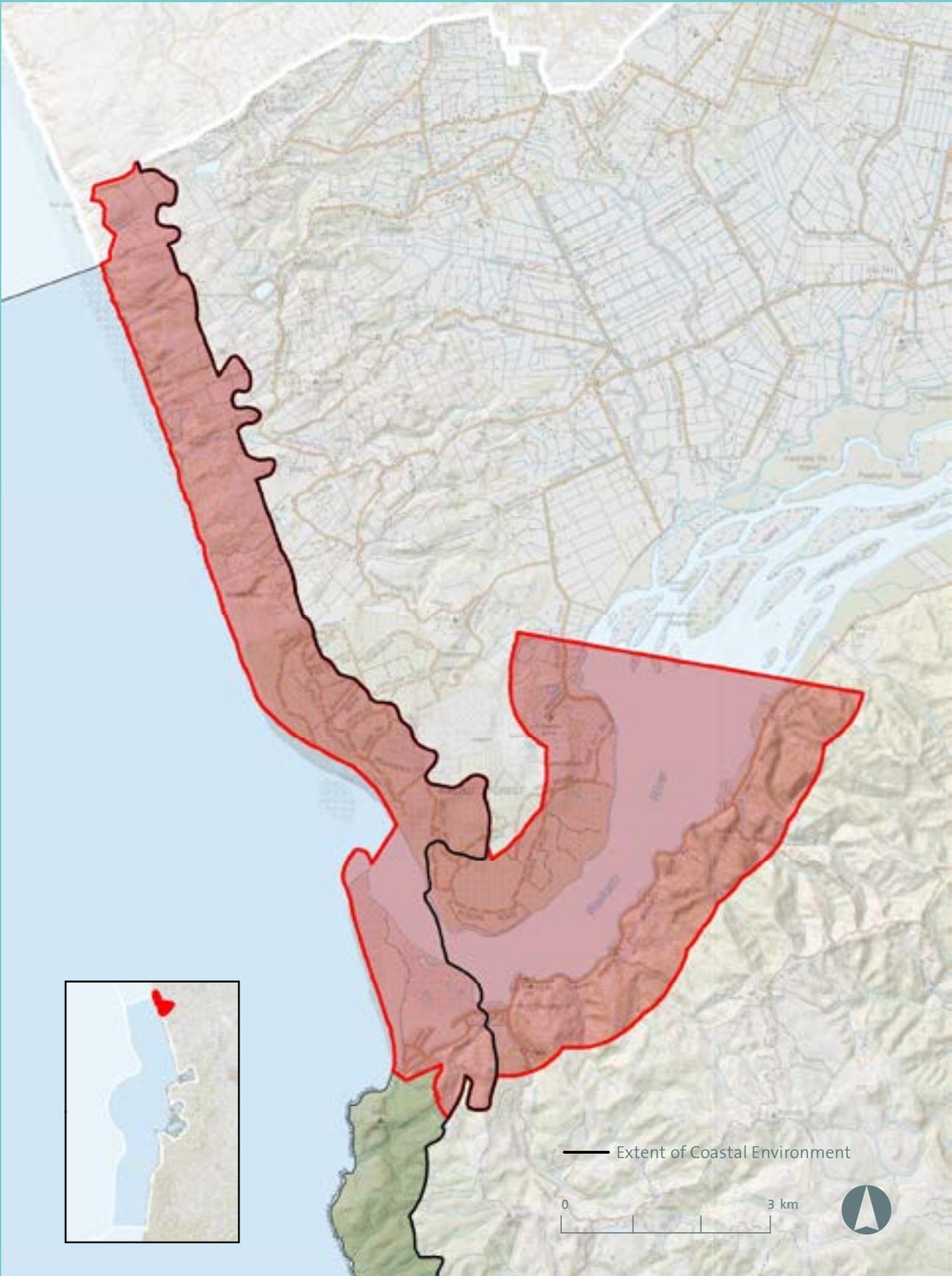
Coastal Terrestrial Areas	
15	Port Waikato
16	Opura
17	Whaaingaroa
18	Karioi
19	Aotea Kaawhia
20	Marokopa
21	Awakino

*Below: Coastal stream west of Te Akau*



# Port Waikato

## COASTAL TERRESTRIAL AREA 15:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area extends from the northern part of the region's West Coast southwards to Port Waikato and includes the Waikato River mouth and Okariha Sand Spit. The landform is gently undulating and consistent in character and form with the remaining part of this coastline that extends further north (Awhitu Peninsula, which falls in Auckland Council).

Typically, the beach profile ends abruptly with a steep coastal cliff of variable height which represents the actively eroding face of very large old dunes that are tens of metres high. At the top of the dune face is a characteristically sharp edge with a flatter undulating terrain falling away to the east, a result of the very strong and erosive westerly wind that has historically pushed the dunes for long distances inland. In a few places, the wind erosion is so severe that it shears off the vegetation completely, exposing the sand. These undulating dune contours are intersected by small streams discharging the coast and forming small gullies.

Settlement of the northern coastal cliffs is centred around Karioitahi Beach with the next settlement being Port Waikato and Sunset Beach. Access to the northern coastal cliffs is limited to Karioitahi Beach and the predominant land use is agricultural grazing for dairy, sheep and drystock farming.

Sand mining operations extend along the northern edge of the Waikato River mouth and are encompassed in productive forestry. Further south along the Waikato River, the Coastal Marine Area extends into the river wetlands and islands which contain numerous 'maimai' for duck hunting and stands for whitebaiting activities.

The coastal edge through this Coastal Terrestrial Area is backdropped by productive farming along the northern end, forestry, and mining through the centre and native forestry at the south.

*Below: Crumpled landscape south of Karioitahi Surf Club*



## Abiotic

The Port Waikato Coastal Terrestrial Area is characterised by a narrow beach backed by steep bluffs that typically rise from 120m to 190m above sea level. The cliff faces are subject to extensive erosion with predominantly pasture forming the vegetation cover along cliff tops and plateau. Where valleys meet the coast, the pasture extends to the coastal edged.

Sand country is common along this coastal unit and is apparent with migrating sand dunes, sand sheets and blowouts along the cliff faces and tops. Pockets of narrow dunes extend along the foot of the coastal cliffs with modification associated with vehicle access tracks.

Ephemeral streams, prevailing winds and high energy waves subject this area of the coast to considerable erosion. To the immediate north of the Waikato River mouth, the sand dunes are steep and modified through productive forestry use, accompanied with sand mining operations.

The Okariha sand spit, to the south of the Waikato River Mouth, forms part of the mobile dune sands of the Karioitahi Group. The native vegetation cover provides a critical role in dune repair and erosion control. Sunset Beach forms a section of the 3km spit on the southern mouth of the Waikato River. The southern extent of the beach comprises Quaternary sandstone cliffs of the Awhitu Group which is underlain by siltstone, sandstone and conglomerate of the Apotu Group<sup>10</sup>.

The Port Waikato spit's form is subject to natural processes of a river mouth system and the influences of human activity. Between 1877 and 2002, the sand dunes have grown at an approximate rate of 2m per year (Tonkin and Taylor 2007). However, at Sunset Beach, the dunes and foreshore have begun retreating near the settlement area<sup>11</sup>. The accretion and erosion are part of a wider interconnected system that extends from Taranaki to North Cape with prevailing westerly winds and high energy waves driving andestic volcanic based sands in a northerly direction along the west coast.

10. Edbrooke, S.W., 2001: Geology of the Auckland Area, Scale 1:250 000. Institute of Geological and Nuclear Sciences, Geological Map 3

11. Sunset Beach Erosion Project, Oharuha, Te Puaha-o-Waikato, Waikato District Council, SFA 14/076, December 2014, GHD.

*Below: Crumpled landscape of Karioitahi*



## Biotic

Land cover analysis: The total land area of the Port Waikato Coastal Terrestrial Area is 1,796ha. Almost 48% of the land cover is rural production land with a further 22% being plantation forestry and 3% being a sand mine. Of the remainder, 15% is estuarine open water, lake/pond, and sand/gravel, and 2% is urban area. Only 8% is indigenous vegetation comprising forest, wetland or manuka/kanuka scrubland. There is a very small area (<1%) of gorse/broom.

The biotic environment is strongly influenced by abiotic environment processes both historically and today. The narrow high energy beach environment actively erodes the dunelands, which terminate in a steep and mobile dune face. The dune cliffs typically terminate in a sharp edge at the crest, beyond which the land falls away at a more gentle gradient where the dune ridges have been sheared off and flattened in a landward direction by the severe and erosive force of the prevailing Westerly wind. Bare sand occurs where severe winds and salt spray have completely removed vegetation leaving exposed sand.

The entire Coastal Terrestrial Area would originally have been completely covered in indigenous coastal forest and shrubland in variable stages of succession depending on historic volcanic activity, and coastal and fluvial dynamics. This fluid dune environment may have had pockets of more mature coastal forest, particularly with increasing distance from the coast and in sheltered gullies, but it is likely to have had variable species assemblages depending on forest stature, canopy development and intactness, and land stability. Long shore sediment movement would have dictated coastal dune erosion, in turn, dictating the maturity of coastal vegetation. It is likely that coastal vegetation was dominated by short stature transitional communities, interspersed with small areas of more mature shrubland, along with areas of exposed sand.

At the southern end of the Coastal Terrestrial Area, the Waikato River provides a dominant fluvial process, generating a flat floodplain and shifting sequences of mudflats, islands, saltmarshes, and wetlands. These highly dynamic coastal and fluvial processes would historically have resulted in vegetation communities dominated by transitional, rather than climax assemblages, with coastal forest only existing in sheltered inland gullies. Most vegetation is likely to have been short stature shrublands and scrublands, herbfields, sedge or rushlands, with stature increasing with distance inland.

Today, coastal vegetation is very limited and typically found only on the coastal dune face and providing variable cover in pasture, depending on the land management regime. The vegetation is highly modified by vegetation clearance and grazing with only less palatable species present or those capable of surviving on the mobile coastal cliff environment. Weed infestation, sand mining, and plantation forestry also affect the vegetation present at the Port Waikato and river mouth dunes, and there are areas of sand/mud flats on the landward side of the Waikato River barrier dune. Pasture is the dominant land cover, and indigenous vegetation is typically associated only with the seaward dune margins. Waikato Regional Council identifies the Port Waikato dunes and river mouth as key ecological sites<sup>12</sup>, but no other sites are identified in the Coastal Terrestrial Area. Part of Port Waikato dunes have recreation reserve status and part of the Waikato Heads dunes are within a conservation area, but no other areas have legal protection.

The streams discharging to the coast are generally first-order streams with very small catchments. Because of the sand substrate, most are likely to be ephemeral or intermittent, with pools persisting in deeper gullies. Where gullies have incised more deeply to bedrock, streams may be perennial and provide a more stable aquatic habitat. Although artificial barriers to fish

12. Waikato Regional Key Ecological Site, GIS Layer : Biosec, Under the administration of Waikato Regional Council

passage are likely to be infrequent, most streams will have natural barriers presented by the topographically challenging coastal cliff, providing perched channels or waterfalls that preclude access for non-climbing species. Fish access to many coastal streams may also be prevented entirely if low summer flows soak into the beach at low tide, providing very limited connectivity.

The streams themselves are likely to be affected by the lack of riparian cover, with their small size making them particularly vulnerable to temperature impacts. They will also be impacted by livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants).

The Waikato River, however, is home to a diverse assemblage of freshwater and saltwater fish taking advantage of the rich resources of the Waikato River Delta. The delta is known for its whitebait fishery, and provides a habitat, nursery, and conduit for migrating freshwater species. The Delta is also home to a multitude of exotic and indigenous waterfowl, marshbirds, and shorebirds using the various mudflat, sandflat, saltmarsh and wetland habitats for feeding and breeding. Along the open coastline, there are few permanent dunelands or intertidal areas offering food resources or breeding areas. However, the Port Waikato dunes provide nesting and roosting areas, and the area is on the flightpath for migratory shorebirds. Variable oystercatchers winter at Port Waikato, New Zealand dotterels are permanently resident and Caspian terns breed there. The lower Waikato River and estuary has been identified as a wetland that meets the criteria for international importance.

The Delta is a recognised location for waterfowl hunters during duck hunting season with maimai dotting the islands and intertidal mudflats.

The river mouth also offers temporary habitat for seals, dolphins, and sharks.

*Below: Port Waikato and  
Sunset Beach*



**Experiential**

Largely in private ownership, access to the coastal edge is limited to Karioitahi Beach to the north and Port Waikato and Sunset Beach to the south of the Waikato River Mouth. Access tracks along the coastal dunes and base of the coastal cliffs are evident from Karioitahi Beach creating some activity and signs of modification. This area of the coast is remote and dramatic in its form, with the natural processes of the coast dominating the coastal experience.

Human modification is apparent through development of dwellings and accommodation around Karioitahi Beach and productive farming. Whilst dramatic in its remoteness and experience of the coastal processes, these modifications are apparent and recognisable.

Further south, modification of the coastal edge increases with productive forestry and sand mining to the north of the Waikato River Mouth. Screened from view by productive forestry, the mining is apparent when viewed from the air and well known to the community of Port Waikato.

The settlement of Port Waikato and Sunset Beach provide the southernmost access to the coastal edge for this Coastal Terrestrial Area. The Okariha sand spit is dynamic and retains its natural formations along with a web of vehicle and pedestrian access tracks throughout. The rocky headland at the southern end of this Coastal Terrestrial Area provides a dramatic and dynamic example of the coastal processes, with regenerating native bush cover extending down its slopes to meet the beach.



*Above: Sunset Beach (top) and mining at Maoro (Waiuku Forest) north bank of the Waikato River*

Rating at Level 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			<b>Moderate</b>

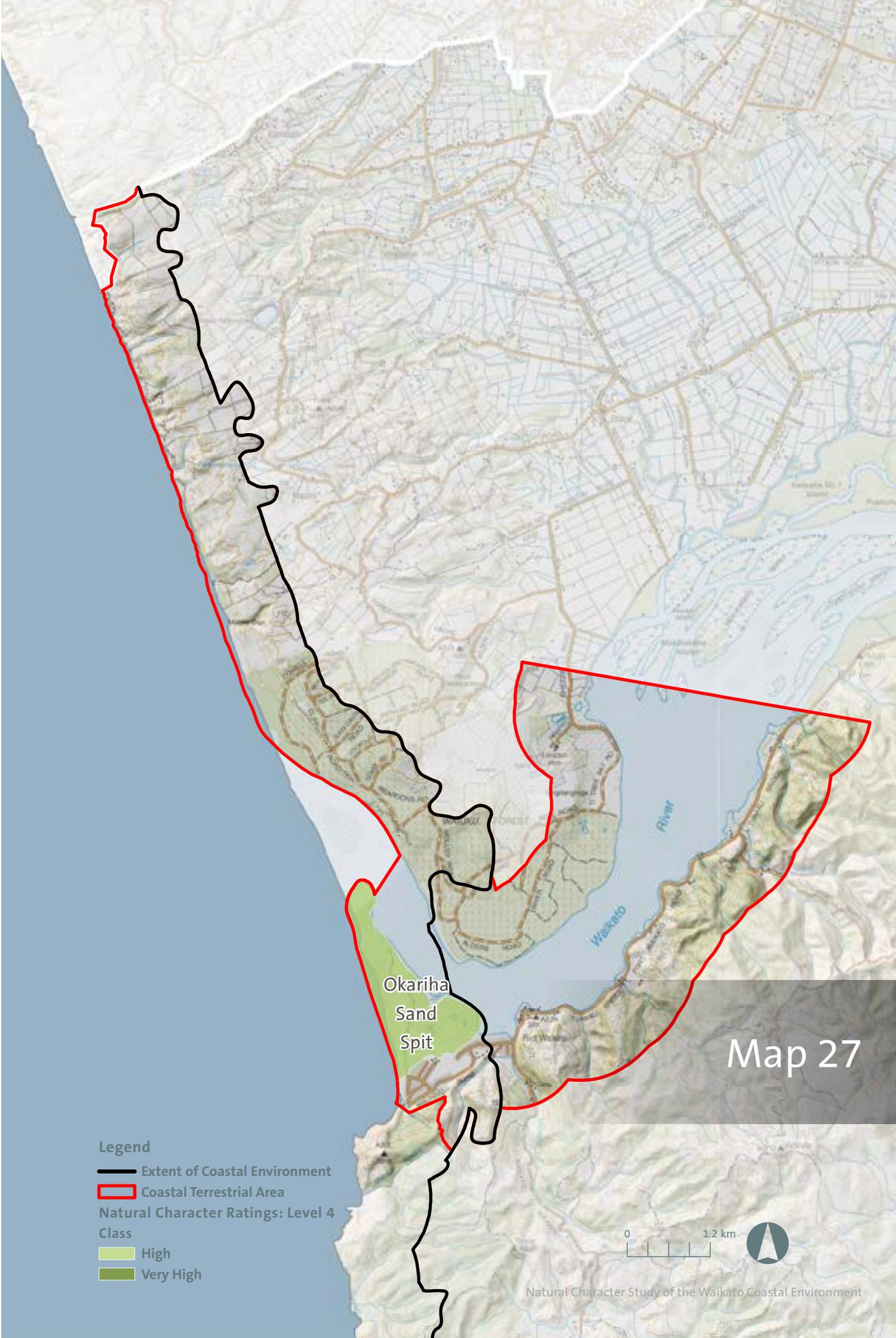
### Coastal Terrestrial Area 15: Port Waikato Specific Characteristics at Level 4

These are mapped with reference to **Map 27**

Area	Rating	Key Values	Additional Comments
Okariha Sand Spit	High	<ul style="list-style-type: none"> <li>Dynamic dune system with dominant dune patterns uniquely influenced by fluvial and coastal processes. These processes remain unmodified. Largest example of river mouth dune system along the Waikato West coast.</li> <li>Native dune species are prevalent mixed with exotic weed species.</li> <li>Highly dynamic and dominant coastal processes with a large dune system that extends in a full sequence from the coastline to the river edge.</li> <li>A strong sense of the natural systems of the river are apparent through the intertidal movements and sand accretion and erosion at the distal end of the sand spit.</li> </ul>	<ul style="list-style-type: none"> <li>Dunes remain intact with minor patterns of modification from vehicle and pedestrian movement throughout.</li> <li>Forms an integral part of the coastal dune and cliff faces of the northern extent of the Waikato and Waikato River system.</li> </ul>

*Below: Sand dunes of Okariha Sand Spit and Waikato River Mouth*





Okariha  
Sand  
Spit

Map 27

Legend

— Extent of Coastal Environment

▭ Coastal Terrestrial Area

Natural Character Ratings: Level 4  
Class

▭ High

▭ Very High



# Opura

## COASTAL TERRESTRIAL AREA 16:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area extends along the exposed predominantly linear coastline between the Waikato River Mouth and Whaaingaroa Harbour. This Coastal Terrestrial Area is principally undulating, where coastal, fluvial and tectonic processes have eroded the coastal edge to form a series of cliffs. Black sands dominate the beach and where watercourses interact with the coastal environment, the land becomes flatter and dune-like. In some areas, dunes and sand sheets are located on upper terraces and elevated well above the coastal edge.

Most of the land is grazed with the northern and steeper areas of the Coastal Terrestrial Area reverting to native bush cover. Pockets of native vegetation are found along the steeper coastal escarpments and in poorer soils and sand dune areas. The remainder of the area is dominated by agricultural grazing as close to the coastal edge as possible. There are only two areas main of indigenous bush, such as immediately south of Port Waikato.

Public access is virtually impossible with no public access gained through private land. The beach access is limited due to the rocky coastline and steep cliff faces, and sandy beaches are located around stream and gully floors that meet the coast.

Key coastal characteristics include relatively straight, narrow stretch of coastline, black sand on beaches, steep coastal cliffs along the majority of the coastline, back dunes, flatter land associated with the mouths of watercourses where sand accumulation has occurred, grazing.

Beyond the coastal environment the land continues to gently rise in elevation, creating a crumpled and hilly pastoral area. Settlement is restricted to small farmsteads and access predominantly is gained via private tracks.

*Below: The rocky shores of Nihonui and Tetehe*



## Abiotic

Substantial sand dunes with high iron content have formed around the Kaawhia and Aotea Harbours. David Kear's 'Geology of Ironsand Resources of New Zealand' (NZ Dept of Scientific & Industrial Research 1979) says, "*The ironsand deposits extend from south Kaipara and Muriwai, north of Auckland, for over 300 miles southwards to the Whangaehu River, south of Wanganui. Soluble iron in concentrates exceed 50% in most locations. It is currently mined at Taharoa and Waikato North Head.*"

This coastline contains significant geological sites and features including the coastal cliffs of Port Waikato between Huriwai River and Waikawau Stream, Wwiwiri Beach and Ngatutura Point. (Waikato District Plan - Franklin Section Part 5, Conservation of Natural Features October 2013)

Geopreservation Sites include: Huriwai-Waikawau Coastal Section Jurassic/Oligocene unconformity (C3), Waiwiri Beach unconformity and Basal Waitemata group sediments (C3), Kaawa Creek – Ngatutura Bay section (B3) and Ngatutura Point dissected eruptive centre (C3).

Key features of this coastal landscape include the sand sheets and dune incursions that extend inland and up the coastal escarpments. Pockets of native bush cover that extends toward the coastal edges reflect components of the pre-human occupation coastal landscape.

*Below: Eroded cliffs close to Otehe (Crayfish Point)*

*Right: Sand tussock with sea primrose perched precariously on eroded soil at the base of a coastal cliff*



## Biotic

Land cover analysis: The total land area of the Opura Coastal Terrestrial Area is 5,779ha. Almost 80% of the land cover is rural production land, and there is very little plantation forest. There is almost 15% indigenous vegetation cover, with most being manuka/kanuka or forest, and very small areas of flaxland or estuarine vegetation. Of the remainder, almost 3% is sand or landslide, almost 2% is gorse/broom or other scrub, less than 1% is estuarine open water, lake/pond, or river, and sand/gravel, and there is no urban area.

Like the coast north of the Waikato River, the beach is narrow and high energy, actively eroding the coastal cliffs of mixed sedimentary rock and lava formations. However, beyond the cliffs the underlying rock strata are from older more stable land units rather than dunes, although dunes are present on cliff tops that are elevated tens to hundreds of metres above the sea. On this more stable land, the entire Coastal Terrestrial Area would originally have been completely covered in mature indigenous coastal forest, with vegetation sheared off by salt spray and wind.

Today, indigenous coastal vegetation is limited and typically found only on the narrow coastal cliffs and in the isolated patches of regenerating forest. The largest forest patch is Te Tehe Bush south of Port Waikato, and this is also the only forest remnant that extends to the coast, although cover at the coastal fringe is fragmented. The other patches are notably smaller and located some distance from the coast, although one is re-establishing a connection via regeneration through gorse. Where land is reverting, gorse is providing a nursery crop and regeneration is beginning to occur. Waikato Regional Council identifies Te Tehe Bush and Te Kotuku bush fragments northwest of Te Akau as a key ecological sites in the Coastal Terrestrial Area, but none have legal protection.



The streams discharging to the coast are generally first- or second-order perennial streams, along with eight larger waterways with catchments extending beyond the coastal zone. Depending on their location relative to underlying strata, the catchments either have wide flat floodplains close to sea level in which farm drainage networks have replaced extensive swamps, or steeper incised catchments dominated by gullies elevated well above sea level and discharging to the coast via waterfalls. In some gullies, raupo-dominated wetlands persist, some covering relatively large areas, and isolated kahikatea specimens point to the swamp forest that would once have existed. Farm tracks and road culverts may present some barriers to fish passage, but where streams are not modified by farm drainage system, most offer a relatively natural habitat although waterfalls will preclude access even for climbing species. The streams at lower elevations contribute greater ecological

value at the coastline, and Waikato Regional Council identifies the Kaawa Stream coastal dunes, Waikorea Stream wetlands (also incorporating Waimai and Matira Stream habitats) as a key ecological site<sup>13</sup>, but none have legal protection.

The low elevation streams are likely to be affected by the lack of riparian cover and channelisation, and all streams will be impacted by livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants). Along the open coastline, the few dunelands or intertidal areas offering food resources or breeding areas for shorebirds, are generally associated with stream outlets, but the area is on the flightpath for migratory shorebirds.

13. Waikato Regional Key Ecological Site, GIS Layer : Biosec, Under the administration of Waikato Regional Council

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## Experiential

Inaccessible to the public, the majority of this Coastal Terrestrial Area forms a remote part of the West Coast. No public roads extend to the coast with some farm tracks extending along the coast with sporadic access to the coastal edge.

Human modification is apparent through activities mainly associated with productive farming. While the northern end of the area includes native vegetation cover and a rocky shoreline that is dynamic and dominated by natural processes and patterns the coastal environment further south is largely farmed to the immediate coastal edge where possible. The large iron sand sheets that extend up into the coastal plateau and stream mouths are highly expressive of the coastal processes that occur in this high energy coastal environment.

There is a strong sense of remoteness along this coast with the natural processes dominating the experience. The natural patterns are evident at many scales with evidence of coastal erosion at large and small scales. The natural elements including biotic cover is limited to the northern and southern end of the coast and the immediate coastal edge where farming activities have been avoided. These areas provide a strong sense of naturalness or perceived naturalness for the user.

*Below: Otehe (Crayfish Point)*



Rating at Level 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			<b>Moderate</b>

Below: Waikaretu Beach



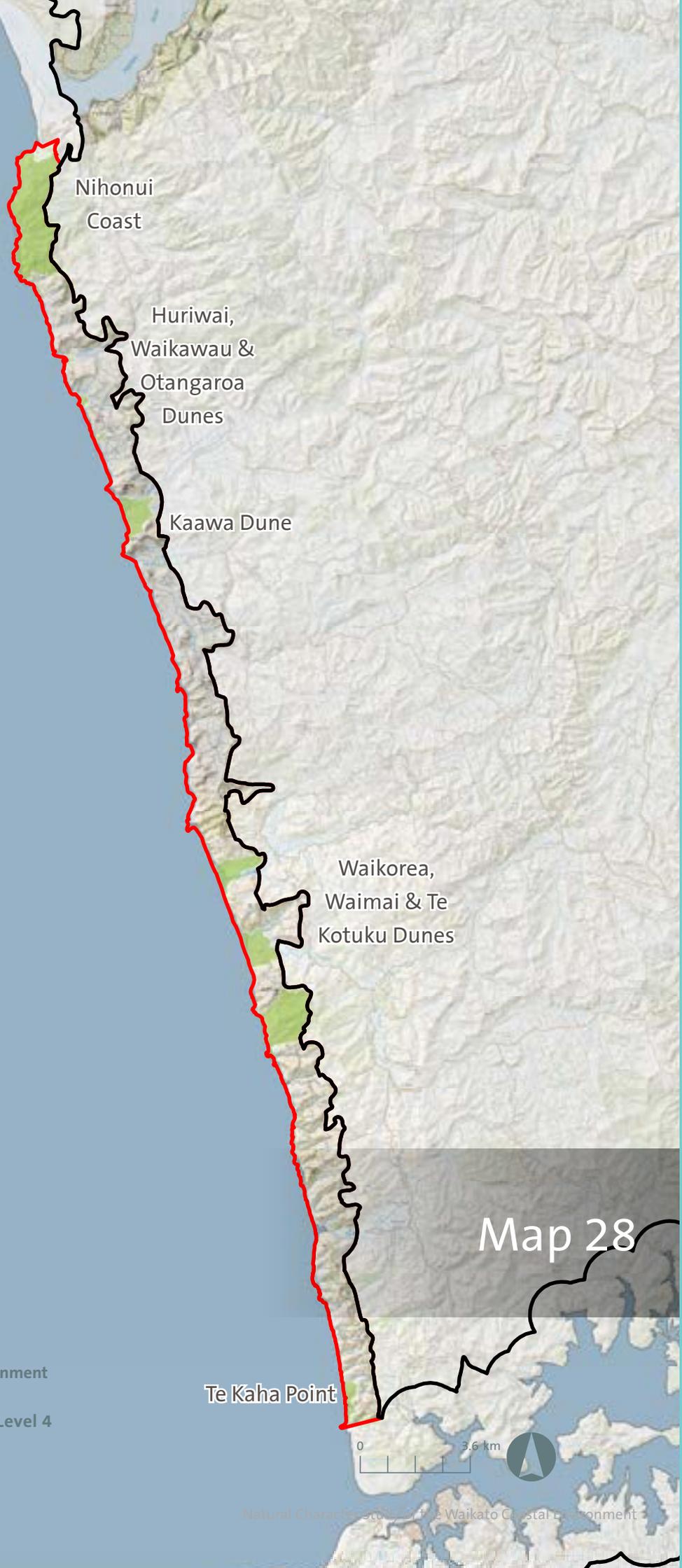
Coastal Terrestrial Area 16: Opura Specific Characteristics at Level 4

These are mapped with reference to **Map 28**

Area	Rating	Key Values	Additional Comments
Nihonui Coast	High	<ul style="list-style-type: none"> <li>Regenerating coastal vegetation sequencing to coastal edge with some areas of grassland. Abiotic processes dominate the coastal cliffs with exposed sedimentation layers evident and no modification along the coastal edge.</li> </ul>	<ul style="list-style-type: none"> <li>Regenerating coastal bush vegetation interspersed with some modification including access tracks.</li> </ul>
Huriwai, Waikawau, Otangaroa, Kaawa, Waikorea, Waimai, Kotuku and Te Kaha Point Dunes	High	<ul style="list-style-type: none"> <li>Dynamic dune incursion system extending up the stream valley systems. Coastal processes are dominant with exposed iron sand sheets atop plateau with exposed coastal cliffs. Low lying dunes are evident on valley floor with streams and rear dune wetland systems remaining intact. Remote with private access gained only via farmland to the areas.</li> </ul>	<ul style="list-style-type: none"> <li>Little modification on the dune system largely as a result of dominant coastal processes. Erosion and tectonic processes evident and dominant along the coastal edge.</li> </ul>

*Below: Waikawau Dune*





Map 28

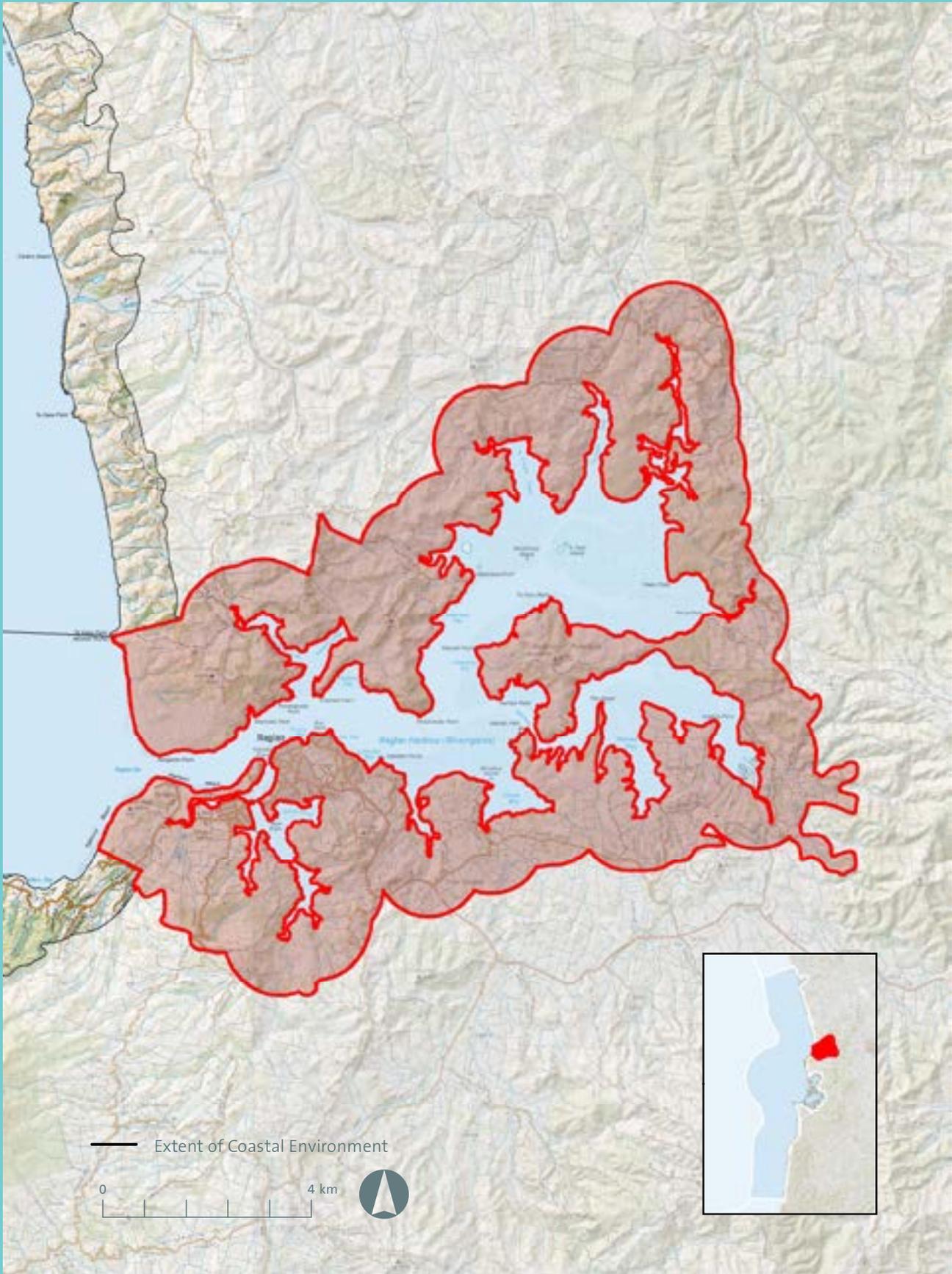
- Legend**
-  Extent of Coastal Environment
  -  Coastal Terrestrial Area
  - Natural Character Ratings: Level 4 Class**
  -  High
  -  Very High

Te Kaha Point



# Whaingaroa

## COASTAL TERRESTRIAL AREA 17:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area surrounds Whaingaroa Harbour and includes the settlement of Raglan and the gently undulating pastoral grazing land. The harbour itself extends for a long distance inland and has a largely unmodified landform, with a narrow neck and mouth relative to the size of the harbour. The surrounding watercourses drain into the harbour, and as a result, the margins are highly indented and alluvial. Whaingaroa Harbour supports a number of areas of indigenous vegetation, which are principally located within the inner parts of the harbour. Access to the harbour is provided by State Highway 23 and the Ohautira Road. The Paritata Peninsula is a significant prominent focus central to the harbour as is the large sand dune on the northern side of the harbour mouth.

Key coastal characteristics include: The settlement of Raglan; highly indented estuarine coastline contained by undulating rural pastoral land; noted areas of indigenous bush, the prominent feature of Karakaringa on the Paritata Peninsula; the numerous watercourses that drain the surrounding coastal context and their associated river channels; largely undeveloped.

Beyond the coastal environment, the coastal context contains the pastoral hinterland of rural Waikato including the largely indigenous area of Kokako.

*Below: Dunes near Te Kaha Point, immediately north of the harbour mouth*



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### Abiotic

Whaiaingaroa Harbour covers 33km<sup>2</sup> with a catchment area of 525km<sup>2</sup>. With 70% of the harbour being intertidal and exposed at low tide, a number of the upper arms of the catchment from the upper reaches of the intertidal zone.

The north harbour mouth forms an extensive sand dune system that is rich in ironsands along with dune dammed lakes. The dune system transitions to an inner harbour landscape of headlands and embayments that are a mix of native bush and agricultural grazing land cover types. The land form comprises gentle to moderately steep rolling landscape of headlands.

Rivers running into the harbour include Opotoru River, Waingaro River, Tawatahi River and Waitetuna River. The Waingaro River is one of the largest sources of sediment for the Whaiaingaroa Harbour.

*Below: Forest Remnant close to Tawatahi River*

The area is well-known for its limestone geology with tomo located throughout the upper areas of the harbour's headlands.



## Biotic

Land cover analysis: The total land area of the Whaiaingaroa Coastal Terrestrial Area is 7,988ha. Almost 70% of the land cover is rural production land with a further 2% being plantation forestry and cropland. Twelve percent is indigenous vegetation, principally manuka/kanuka with a small amount of wetland and indigenous forest. Of the remainder, 3% is lake/pond/river and sand/gravel/rock, 4% is urban area and parkland, and 4% is gorse/broom.

Compared to the open coastline, the greywacke landform that defines Whaiaingaroa Harbour is relatively stable and subject to long term processes of fluvial erosion and harbour sedimentation. As a result, the entire Coastal Terrestrial Area would originally have been completely covered in mature indigenous coastal forest with saltmarshes at the coastal fringe and small raupo or sedge wetlands in the narrow, entrenched gullies. Because the ridgelines and streams fall to the harbour edge at a relatively steep gradient, there are few lowlying floodplain areas or land drainage networks, and the landform remains relatively natural. However, apart from isolated patches of regenerating shrubland or reverting gorse, there is very little indigenous vegetation cover. Over the past 20 years there has been significant effort locally to replant the riparian margins of the catchment feeding the harbour as part of the Whaiaingaroa Environment Catchment Plan.

The forest remnants have fragments of more mature canopy, but vegetation is typically recent and comprised mainly of maturing scrubland with canopy species beginning to emerge. These include bush areas identified as key ecological sites by Waikato Regional Council located at the Kerikeri and Waingaro River and Ohautira Stream outlets north of Ohautira, along with a scenic reserve and several QEII covenants. Much of the Harbour fringe has been fenced and either planted or allowed to revert to indigenous shrubland. These areas are typically very narrow and often fragmented although they transition to coastal rushland and sea meadows.

On the northern side of the Harbour mouth, there is a large duneland overlying the greywacke strata that provides a less stable substrate for vegetation. As for Waikato North, this is likely to have been historically vegetated with indigenous forest in varying states of succession, but is currently predominantly exotic duneland reverting to gorse, as is much of the land to the north. East of this are wetland and bush fragment mosaics identified Waikato Regional Council as key ecological sites.

Most streams discharging to the Harbour are generally first- and second-order perennial streams, but 12 are larger waterways with catchments extending well beyond the coastal zone. The streams are generally incised in gully networks with relatively unmodified channels. Many have been fenced from livestock and planted through the Whaiaingaroa Harbourcare programme, although most of the steep and less accessible first- and second-order streams remain unprotected, and some have been dammed for livestock water supply. Unprotected streams will be affected by the lack of riparian cover, livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants).

Farm tracks and road culverts may present some barriers to fish passage, but most streams offer a relatively natural habitat for a diverse range of freshwater fish, and access will be possible for fish migrating to and from Whaiaingaroa Harbour.

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## Experiential

Large parts of the northern harbour margins are in private ownership and are inaccessible to public. Modification to the harbour margins is consistent with rural farm dwellings, structures and jetties occupying the shoreline. The southern extent of the harbour is heavily modified with the settlement of Raglan, which includes wharves, bridges, residential settlement and industrial activities.

Human modification is apparent in the northern and western margins of the area through activities mainly associated with productive farming. Despite this modification, the many arms of the harbour create a sense of isolation and visual disconnect with the modified areas of the Coastal Terrestrial Area. Headlands and embayments in the northern and western areas of the harbour that are covered in native bush create a strong sense of remoteness along this coast with the natural processes dominating the experience.

The natural patterns are evident at many scales with evidence of coastal erosion more evident along the modified areas of the coastal terrestrial area. The northern head of the harbour mouth is expressive of the natural processes particularly during high winds.

*Below: Forest remnant within  
The Finger, Haroto Bay*



Rating at Level 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			<b>Moderate</b>

*Below: Silo associated with Ann Point, Raglan*



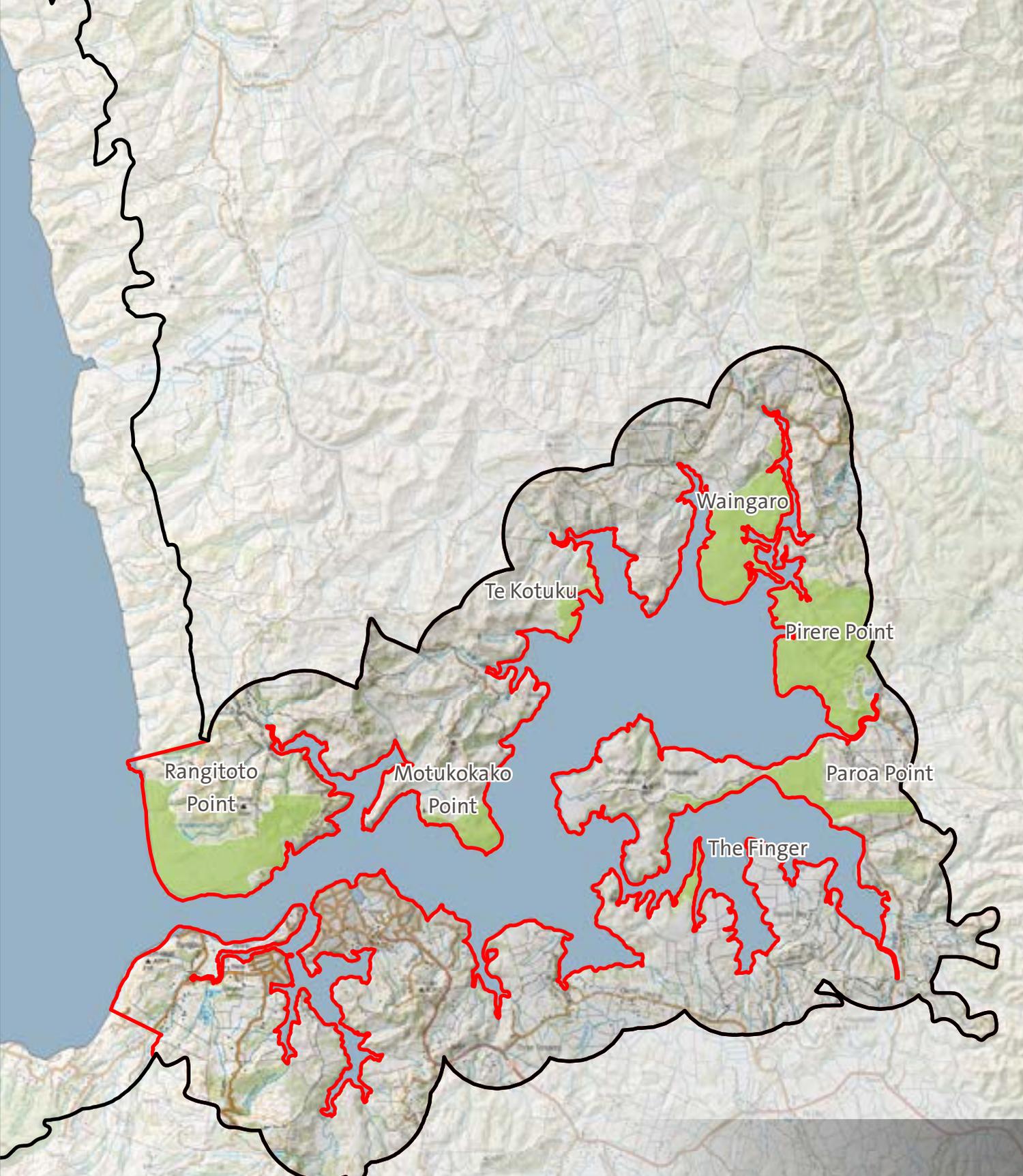
## Coastal Terrestrial Area 17: Whaaingaroa Specific Characteristics at Level 4

These are mapped with reference to **Map 29**

Area	Rating	Key Values	Additional Comments
Rangitoto Point	High	<ul style="list-style-type: none"> <li>The dynamic dune system extends from coastal edge to the inner harbour with natural patterns remaining intact. Vegetation cover is a mix of native and weed species. The natural dune processes are evident throughout and most apparent along the margins of the feature. A moderate sense of remoteness is evident within the feature.</li> </ul>	<ul style="list-style-type: none"> <li>Farming around the point and settlement along the inner harbour margins introduce modification to the natural abiotic and biotic sequencing of the dune system.</li> </ul>
Motukokako Point, Te Kotuku, Waingarō, Pirere Point, Paroa Point and The Finger	High	<ul style="list-style-type: none"> <li>Biotic values of comprehensive areas of regenerating native bush along the inner harbour headlands. Interspersed with estuarine vegetation including sequencing from coastal bush, to saltmarsh to mangrove habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Margins of the areas are defined by adjoining land use rather than natural patterns. Modification is largely in the form of access tracks and grazing of wild stock and pests underneath the canopy.</li> </ul>

*Below: Waingarō River and its estuarine margin and vegetated headland.*





Map 29

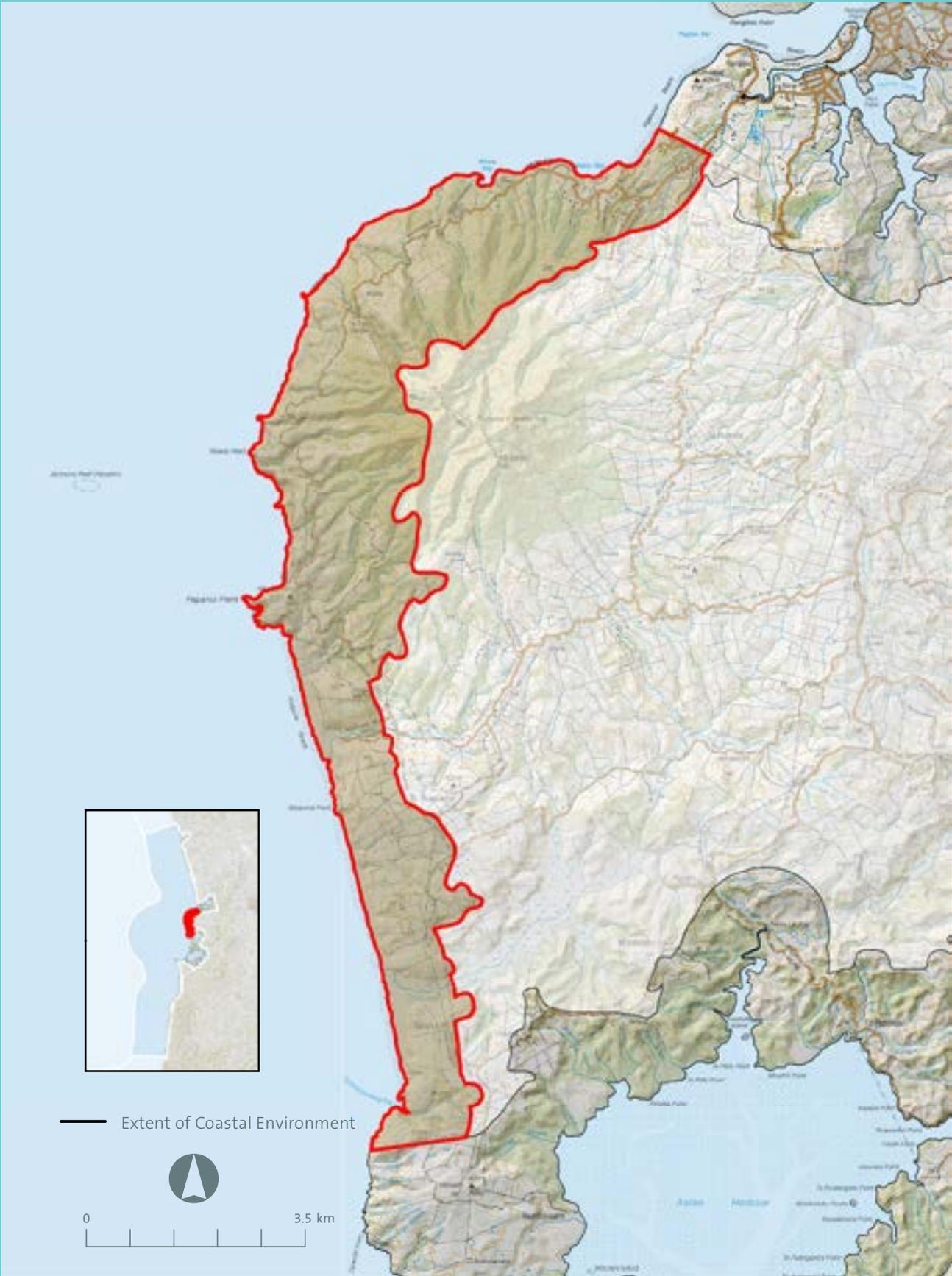
Legend

-  Extent of Coastal Environment
-  Coastal Terrestrial Area
- Natural Character Ratings: Level 4 Class**
-  High
-  Very High



# Karioi

## COASTAL TERRESTRIAL AREA 18:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

Located immediately south of Whaaingaroa Harbour and north of Aotea Harbour, this Coastal Terrestrial Area includes the northerly and westerly flanks of the extinct volcano of Karioi and the predominantly straight coastal duneland associated with Ruapuke Beach. Within the crumpled topography of the lower slopes of Karioi is the Te Toto Gorge, where a walking track extends in elevation to the top of the volcano. Access is provided by the Whaanga Road around Mt. Karioi with numerous other roads connecting the southern part of this Coastal Terrestrial Area. The majority of this Coastal Terrestrial Area is pastoral farming with areas around Mt. Karioi being predominantly indigenous.

Key coastal characteristics include: The indigenous vegetated lower slopes of Mt. Karioi; the Te Toto Gorge area; the predominantly straight coastal edge of the southern section of this Coastal Terrestrial Area and its associated dunelands; predominantly pastoral land use with indigenous vegetation flanking parts of Mt. Karioi; access being provided by the Whaanga Road; any settlement associated with farms and satellite houses located off the small number of roads.

Beyond the coastal environment, the coastal context to the north comprises the vegetated elevated slopes of Mt. Karioi. To the south are the pastoral undulating lands of Ruapuke.

*Below: The prominent peninsula of Papanui Point*



## Abiotic

This Coastal Terrestrial Area includes the extinct volcano of Mt. Karioi, in the north and the ancient sands and siltstones in the south. Mt. Karioi forms a backdrop to the Whaingaroa Harbour and settlement of Raglan. It is dissected by deep ravines that radiate from the summit and terminate, on the western side, in towering coastal cliffs (Woody Head) that expose basaltic lava interbedded with volcanic fragmental material penetrated by andesitic dikes.

A particular feature of this is Te Toto Gorge, a geopreservation site. This feature comprises up to 15 lava flows which make up the 150m cliffs of the Gorge which display many large augite crystals up to 15mm. Other features of the Mt. Karioi volcanics include Papanui Point and a lava flow section at Whale Bay.

Topographically the area is rugged with a rocky shoreline around Mt Karioi before transitioning to steep cliffs and ironsand beaches further south. The inland coastal area is undulating and expressive of the coastal erosion processes occurring along the west coast. To the south, beyond the volcanics of Mt. Karioi, are the beach and dune deposits containing titanomagnetite (iron sands).

*Below: Vegetated coastal cliffs of Mt Karioi*



## Biotic

Land cover analysis: The total land area of the Karioi Coastal Terrestrial Area is 3,218ha. More than 51% of the land cover is rural production land. Indigenous vegetation covers over 42% and is principally comprised of indigenous forest, with small proportions of flaxland, manuka/kanuka and other scrub. Of the remainder, 3% is sand/gravel, 1% is gorse/broom, and <1% is urban area.

Both the volcanic landform of Karioi and the sedimentary rock strata to the south are relatively stable and subject to long-term processes of fluvial and coastal erosion. As a result, the entire Coastal Terrestrial Area would originally have been completely covered in mature coastal, lowland, and submontane indigenous forest with very narrow dunelands at stream outlets to the coast, and small raupo or sedge wetlands in the narrow, entrenched gullies. Because the ridgelines and streams fall away from Karioi or towards the coast at a steep gradient, floodplain or land drainage areas are very limited, and the landform remains relatively natural. Although the Karioi forests are a dominant feature of the Coastal Terrestrial Area, there is very little indigenous vegetation cover elsewhere, apart from isolated small patches of regenerating forest and the coastal cliff communities. However, threatened plants *Hebe speciose* and Cook's scurvy grass have been reintroduced to the Te Toto Gorge.

Waikato Regional Council identifies parts of the Karioi forest and riparian areas as key ecological sites, and the remaining area is protected by scenic reserve and conservation park status. There are also several QEII covenant areas. Waikato Regional Council also identifies the Matawha Point coastal cliffs as a key ecological site, and part of this area, along with most of the adjacent headland north of Ruapuke Stream, is also protected by a QEII covenant. The coastal cliffs from Woody Head to the southern side of Papanui Point are protected by a marginal strip.

Almost all streams discharging to the coast are first- and second-order perennial streams, and only two have catchments extending beyond the coastal zone. The streams follow the topography, and are incised in gully networks with relatively unmodified channels, except for those close to roads. Few have been fenced from livestock, although most of those on Karioi benefit from the indigenous forest cover and reserve status and will have very high ecological values. Unforested streams will be affected by the lack of riparian cover, livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants).

Farm tracks and road culverts may present some barriers to fish passage, but most streams offer a relatively natural habitat for a diverse range of freshwater fish. Like Opura, depending on their location and stream size, the catchments either have narrow floodplains close to sea level, or steeper incised catchments dominated by gullies elevated well above sea level and discharging to the coast via waterfalls. For elevated streams, access may only be possible for climbing species, but for streams with flatter gradients access will be possible for a wider range of aquatic fauna. Along the open coastline, the few dunelands or intertidal areas offering food resources or breeding areas for shorebirds, are generally associated with stream outlets.



*Right: Ruapuke stream*

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## Experiential

Residential and rural residential settlement are focused to the coastal edge near Whale Bay with some properties extending along the spurs and ridges of Mt Karioi foot hills. The coastal margin of Karioi is highly expressive of the natural processes and patterns occurring along the coastline and on the mountain.

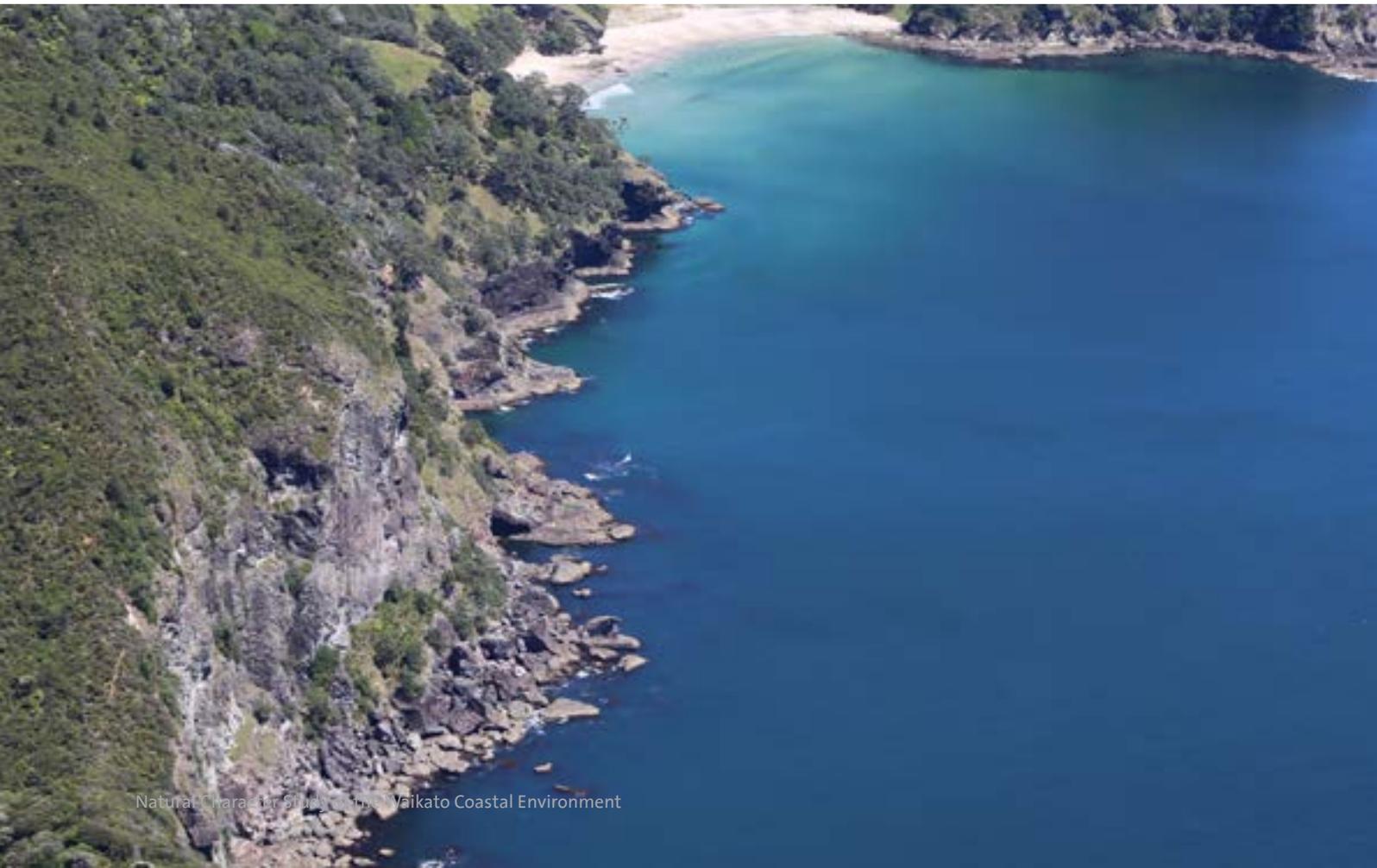
Fingers of native bush extend down the valleys toward the coast providing connection of the native coastal bush to the shoreline.

DOC walking tracks extend around the coastline with DOC facilities located along the lower coastal slopes of Mt Karioi. Modification is apparent along the lower slopes with agricultural grazing interspersed along the shoreline of Mt Karioi. Further modification along the lower foot hills is in the form of access tracks, both for pedestrians and off road vehicles.

Further south, the landform transitions back to low to moderate rolling landscape with remnant dune systems that extend inland. Farming land use is dominant and coastal vegetation patterns, relatively sparse. The natural patterns and elements dominate only in areas where agricultural land use is difficult to achieve.

Access to this area is limited to private access only with public access only to Ruapuke Beach.

*Below: Vegetated coastal cliffs of  
Woody Head*



Rating at Level 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			<b>Moderate</b>

*Below: Coastal vegetation within the steep, rocky coastal gullies*



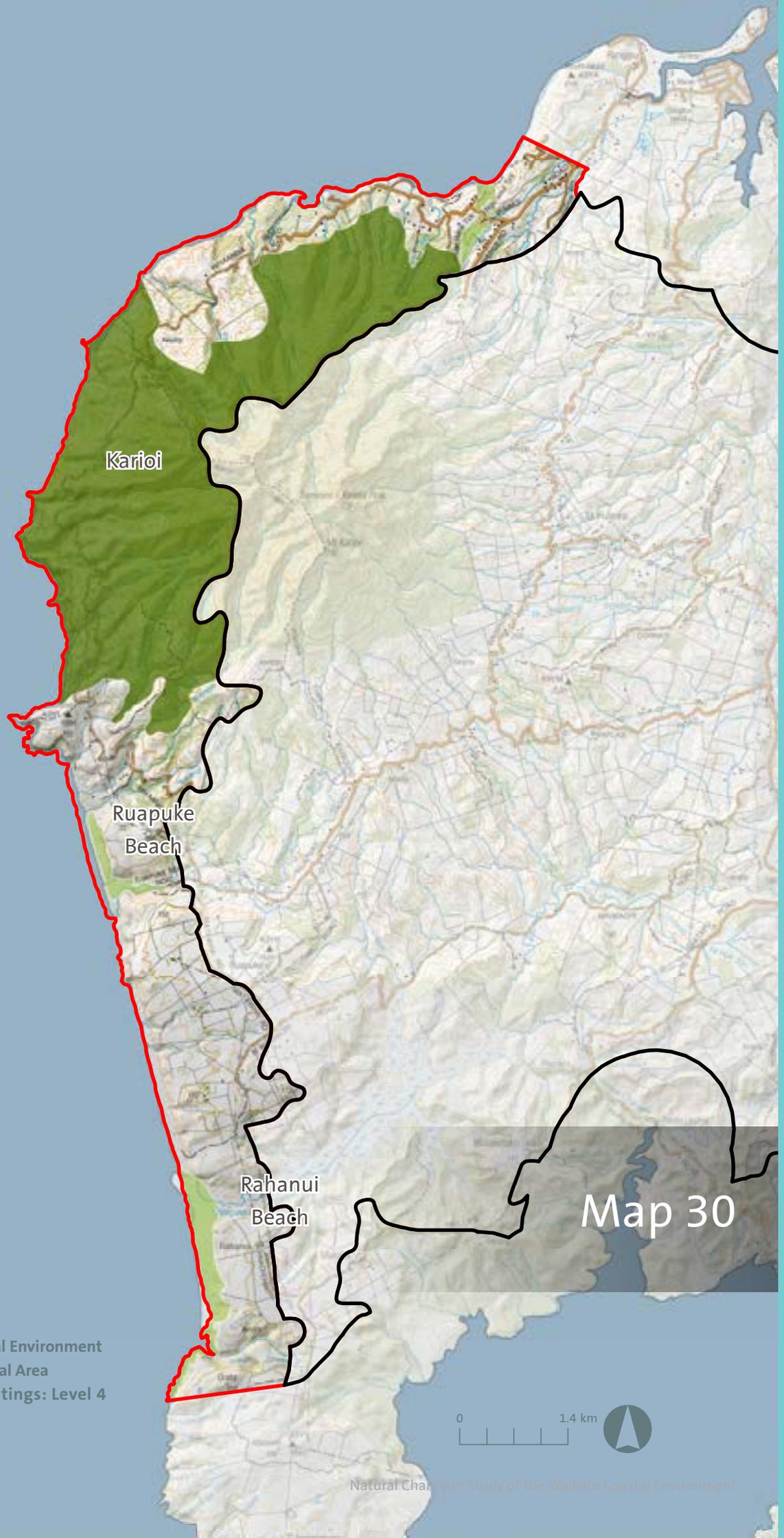
## Coastal Terrestrial Area 18: Karioi Specific Characteristics at Level 4

These are mapped with reference to **Map 30**

Area	Rating	Key Values	Additional Comments
Karioi	Very High	<ul style="list-style-type: none"> <li>Volcanic cliff faces extending steeply toward summit of Mt Karioi. The natural processes are evident with the volcanic formations evident from coast to summit. Biotic elements comprise dominant native bush cover extending down to the coastal edge and along the cliffs. A highly remote experience dominated by the natural processes occurring.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is interspersed amongst the vegetation patterns with open grazing areas, vehicle and walking tracks.</li> </ul>
Ruapuke and Rahanui Beaches	High	<ul style="list-style-type: none"> <li>Valley floor dune systems comprising elevated dune sheets and dune systems extending inland to meet wetland systems. Vegetation cover is a good example of sequencing from coastal dune to coastal shrub species. The entire beach and coast is remote with limited public access.</li> </ul>	<ul style="list-style-type: none"> <li>Full sequencing of dune system is interrupted by adjoining land use of farming. Areas not farmed are largely associated with highly dynamic coastal processes.</li> <li>Public access is gained off the access road near the Ruapuke Motor Camp.</li> </ul>

*Below: Rahanui Beach Dunes*





**Legend**

 Extent of Coastal Environment

 Coastal Terrestrial Area

Natural Character Ratings: Level 4 Class

 High

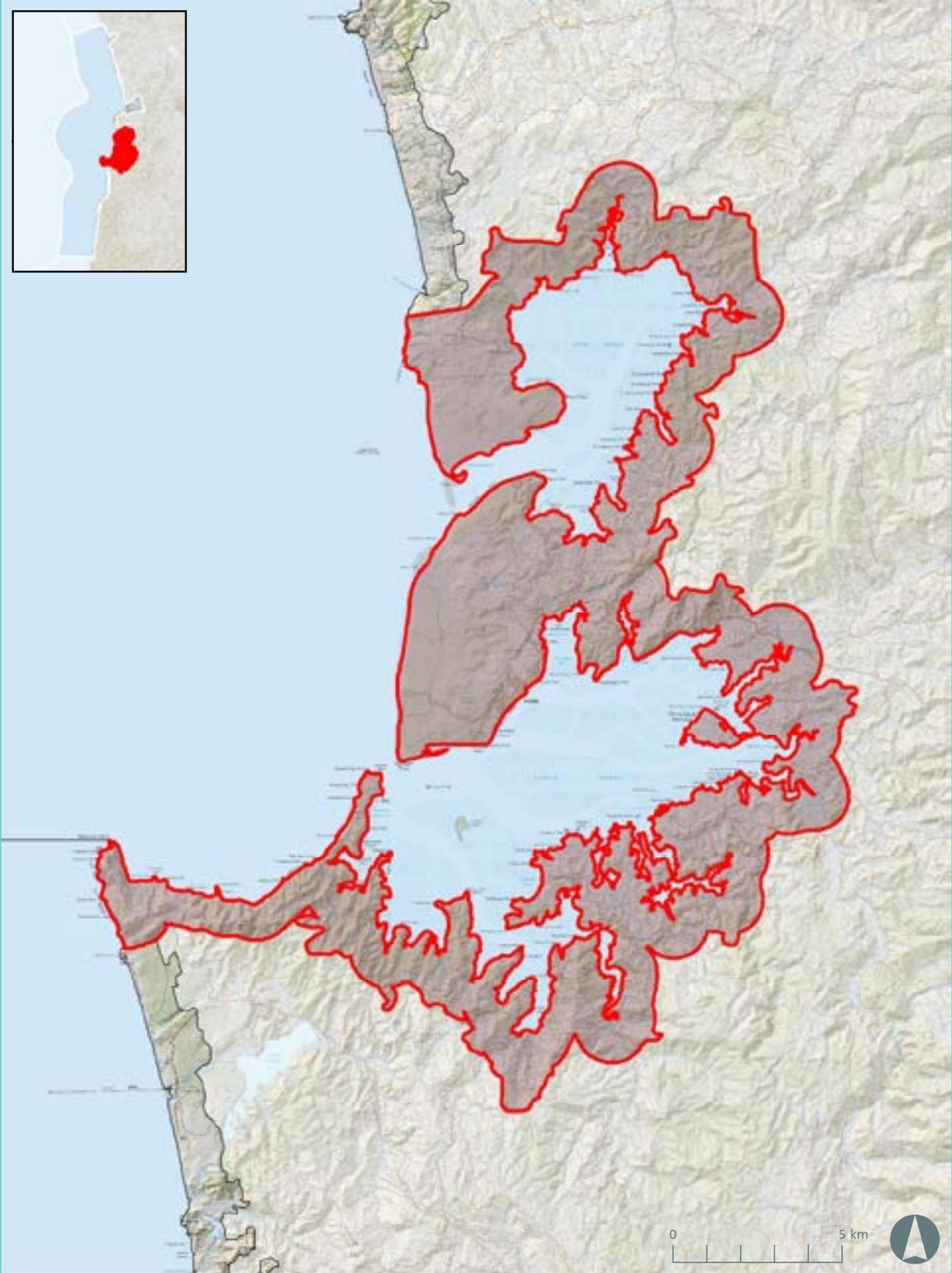
 Very High



Map 30

# Aotea and Kaawhia

COASTAL TERRESTRIAL AREA 19:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area encompasses the land associated with both the predominantly sheltered harbours of Aotea and Kaawhia. These two prominent inlets retain very different characteristics. Aotea Harbour features the Aotea dune fields, which are considered a geopreservation site of national importance. The larger Kaawhia Harbour is highly indented, with numerous slender peninsulas extending into the harbour waters. Much of this land is used for pastoral land use; however, there are significant stretches of indigenous vegetation found around both harbours. Access is provided principally from State Highway 31 (the Kaawhia Road) with numerous other roads providing access to the majority of this Coastal Terrestrial Area. The principal settlement is Kaawhia, although smaller, more rural settlements such as Aotea, Okapu, Te Waitere and Kinohaku are located off the main roads.

Key coastal characteristics include: Impressive dunelands associated with the northern mouth of Aotea Harbour; highly indented Coastal Terrestrial Area, especially around Kaawhia Harbour, land predominantly used for pastoral land use, however significant tracts of indigenous areas apparent; numerous small settlements, including Kaawhia and Aotea; access provided to most of the Coastal Terrestrial Area by the numerous roads; and provides a relatively sheltered coastal experience.

Beyond the coastal environment is the rural undulating hinterland of Waikato, where numerous small roads connect the many farmsteads. Some 18km to the east of both harbours is the indigenous vegetated extinct volcano of Pirongia, which clearly punctuates the Waikato rural landscape.

*Below: Looking west along Aotea Harbour*



## Abiotic

This Coastal Terrestrial Area is associated with the ancient Jurassic rocks, some of which are exposed south of Kaawhia Harbour. The Jurassic rocks are principally fossiliferous and siltstone; however, sandstones and conglomerate also form prominent strike ridges locally.

The principal features of this Coastal Terrestrial Area are the Aotea and Kaawhia Harbours which are drowned valley system following post glacial Aranuian sea level rise, which have also been influenced by numerous faults. Much of the sands contain a high iron content, with some mining occurring at Taharoa, south of Kaawhia Harbour.

Topographically, the area is reasonably low-lying; however, gently undulating terrain broadly contains these harbours. The highest part of this Coastal Terrestrial Area is along the southwestern part of Kaawhia Harbour, where the land rises to approximately 250 metres above sea level. Much of the developed parts of the harbours are on the more level, lower-lying areas, such as coastal sands and alluvial deposits.

There are a number of geopreservation sites associated with this Coastal Terrestrial Area. The principal site in Aotea Harbour is the dune fields at the northern mouth. This impressive, nationally significant, and well-defined landform of mobile sands is the largest example on the northwest coast.

Further south, within Kaawhia Harbour are the sequence of Jurassic exposed rocks, which individually and collectively are considered of national importance. These rock features are noted for their exposure where the formative processes are clearly evident. In all, there are eleven geopreservation sites associated with this group. Motutara Peninsula Jurassic and

*Below: Ripples created on the Potahi Point sand dunes at the mouth of Aotea Harbour*



Oligocene sediments (B3); Puti Point Jurassic fossiliferous siltstone (B3); Kawarua anticline (C3); Te Maika Point Jurassic Sequence (B2); Totara Point and Capt. King Shell bed Jurassic fauna (B2); Ohaua Point Jurassic fauna (B3); Heteri Point Jurassic macrofossils (B3); Ururoa Point Jurassic Dactyloceras beds (B3); Arataura Point Jurassic sequence (B3); Anaomaki Point volcanic sequence; Waiharakeke bridge – Kinohaka Jurassic sediments (C3); Puaroa Creek Kaawhia Jurassic fossil locality (B3)<sup>14</sup>.

There is also a nationally significant geopreservation site at Albatross Point, which illustrates a reasonably well exposed syncline showing geomorphic expressions of dip slopes.

## Biotic

Land cover analysis: The total land area of the Aotea and Kaawhia Coastal Terrestrial Area is 16,462ha. Almost 50% of the land cover is rural production land with a further 10% being plantation forestry. Indigenous vegetation forms nearly 32% of the cover, principally comprised of forest and manuka/kanuka scrub, with small areas of wetland and estuarine vegetation. Of the remainder, 5% is estuarine open water, lake/pond, and sand/gravel. Gorse/broom covers 2% and there are also very small areas (<1%) of iron sand mine, urban area/park and cropland.

Like Whaaingarua Harbour, the Kaawhia/Aotea Harbour landforms are relatively stable and subject to long term processes of fluvial erosion and harbour sedimentation. The exception is the dynamic harbour mouths and associated dunelands. While most of the Coastal Terrestrial Area would originally have been covered in mature coastal indigenous forest with saltmarshes at the coastal fringe and extensive freshwater wetlands in the gullies, the dunelands would have provided less stable substrate covered with successional and dune vegetation. Waikato Regional Council identifies the Potahi Point sand spit and Rauiri Head dune scrubland/saltmarsh mosaic on the northern side of Aotea Harbour mouth as key ecological sites<sup>15</sup>. Between these two sites, more than 500ha of dunelands are protected by the Aotea Heads Scientific Reserve.

Where higher order streams discharge to the harbours within a wider floodplain, land drainage networks have been established and wetlands/saltmarshes removed but, in general, the landform remains relatively natural. The coastal margin has been straightened and some wetland or saltmarsh areas impounded by road embankments.

Whereas the land around Aotea Harbour has a substantial cover of regenerating indigenous forest down to the harbour margins, forest cover around Kaawhia Harbour is limited to several large remnants and harbour fringe vegetation. Kaawhia also has a plantation forestry, especially on the dunelands between the two harbour mouths. The forest remnants have fragments of more mature canopy but are typically comprised mainly of maturing scrubland with canopy species beginning to emerge. However, many of the Aotea Harbour indigenous forests provide complete vegetation sequences from harbour fringe rushlands/sea meadows to coastal and lowland forest. Waikato Regional Council identifies seven areas of regenerating forest and indigenous scrubland areas around Aotea Harbour as key ecological sites covering some 930ha. In contrast, there are no key ecological sites identified around Kaawhia Harbour but numerous very small scenic reserves and QEII covenants over vegetation close to the harbour margin.

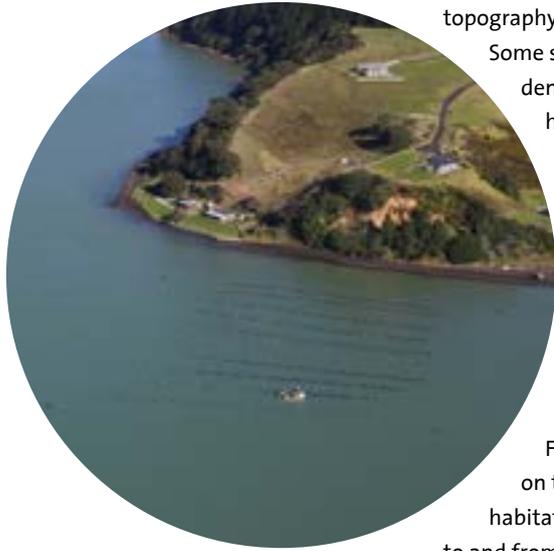
The vast majority of streams discharging to the harbours are first- and second-order perennial streams. However, there are 14 larger streams and rivers with extensive upstream catchments that extend beyond the coastal zone and for some distance inland. The streams follow the

14. Inventory and Maps of Important Geological Sites and Landforms in the Waikato Region, First Edition 1998, Geological Society of New Zealand.

15. Waikato Regional Council, GIS Database, Biosec, Under the Administration of Waikato Regional Council

*Below: Typical dune plant community - spinifex, sand tussock, knobby clubrush, flax, tauhinu*





*Above: Aquaculture north of Pourewa Point, Aotea Harbour*

topography and are generally incised in gully networks with relatively unmodified channels.

Some streams appear to have been fenced from livestock and allowed to regenerate with dense raupo wetlands. However, although most streams appear to be unfenced, many have extensive wetlands along much of their downstream reaches indicating that water levels are high enough to preclude stock grazing and wetland vegetation is permanent. Some of these also have forested or gorse covered headwaters and may have relatively high ecological values. Those streams around Aotea Harbour with uninterrupted forest cover from the coast to the headwaters will have very high values. Those unfenced streams without wetland vegetation or modified by drainage will be affected by the lack of riparian cover, livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants).

Farm tracks and road culverts may present some barriers to fish passage, especially on the larger waterways with road crossings, but most streams offer a relatively natural habitat for a diverse range of freshwater fish, and access will be possible for fish migrating to and from both harbours.

Like Whaaingarua, Aotea and Kaawhia Harbours provide abundant and varied intertidal and subtidal habitat for saltwater fish, offering food resources and nurseries, conduits for migratory freshwater fish, and habitat for a multitude of exotic and indigenous waterfowl, marshbirds, and shore birds using the various mudflat, sandflat, saltmarsh and wetland habitats for feeding and breeding. Albatross Point also offers a seal haulout location for NZ fur seals and islets off Albatross Point are home to the threatened Cooks scurvy grass.

*Below: Wetlands associated with Rauiri Head, Aotea Harbour*



**Experiential**

The northern Aotea harbour mouth is highly expressive of the natural dune processes of the west coast. The sequencing of dunes, to saltmarsh to native coastal bush cover provides a strong sense of naturalness for the harbour mouth which is modified with coastal reclamation, residential subdivision and structures. Human modification is apparent around the settlement of Aotea along with the productive forestry of the coastal margins between Aotea and Kaawhia Harbours. The coastal ironsand dunes between Aotea and Kaawhia Harbours form one of the wider coastal beach areas that is accessible to public through forestry and public reserve. The Kaawhia Te Puia natural hotsprings sited along the shoreline within the intertidal shoreline are frequented by the community and tourists.

Kaawhia Harbour margins vary in degrees of perceived naturalness with the frequency of human activities and modification occurring around the settlement of Kaawhia. Land use modification occurs most frequently around the northern and eastern margins of the Kaawhia harbour with the southern extent of the harbour and the embayments remote, isolated and inaccessible. Some areas with headlands and native bush cover are expressive of the natural processes and patterns. Parts of the coastal terrestrial area provide high levels of perceived naturalness, whilst other areas are low to moderate. Low to moderate perceived naturalness is attributed to areas of pasture, human settlement and infrastructure including roading.



Above: Southern Kaawhia Bush



Above: Southern Kaawhia Bush - Coastal Edge

Rating at Level 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			High

## Coastal Terrestrial Area 19: Aotea and Kaawhia Specific Characteristics at Level 4

These are mapped with reference to **Map 31**

Area	Rating	Key Values	Additional Comments
Potahi Point	Very High	<ul style="list-style-type: none"> <li>The largest sand dune headland of its type on the west coast it is highly reflective of the coastal processes. The extensive sand dunes extend from open coast to inner harbour. Vegetation sequencing is a good example of coastal dune, shrub to estuarine species. The area is extremely remote with no public access possible. The coastal experience is dominated by the coastal processes including continue dune movement.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is extremely limited with historical Maori use of the land.</li> </ul>
Tauranga Bush, Te Pahi Point, Pirau Bush and Ahititi Bush.	Very High	<ul style="list-style-type: none"> <li>Successional native bush vegetation dominating large headland and inner harbour margins with sequencing beyond the coastal environment line. The coastal margins include coastal wetland systems (Te Pahi Point) which reflect the natural processes occurring within them. The areas are remote with little evidence of human presence or modification within them.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent on the margins of the bush areas where they interface with agricultural land use.</li> </ul>
Raukumara Beach	High	<ul style="list-style-type: none"> <li>A long ironsand beach extending from Nihinihi Point to Tauratahi Point. The dune system is steep with a wide flat black sand beach. The coastal dunes a highly dynamic and subject to coastal erosion and accretion along the length of the beach. The Te Puia hot water spring on the beach is a popular tourist and local destination at low tide. Vegetation comprises dune species backdropped by exotic forestry. A remote but popular beach for locals and tourists.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent on the margins of the dune area with productive forestry impacting on the natural rear dune patterns. Access through the dunes is limited to public access off Te Puia Road.</li> </ul>
Kaawhia Harbour Coastal Bush Areas: Tiritirimatangi, Awaroa, Rakanui, Te Rangiora Point, Southern Kaawhia and Arohaki Bay.	High	<ul style="list-style-type: none"> <li>The coastal margins remaining intact include coastal native bush set along headlands and inner harbour arms with the largest area comprising the southern Kaawhia bush area. Intertidal areas comprise estuarine saltmarsh with margins of native bush cover.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent on the margins of the bush areas where they interface with agricultural land use.</li> </ul>

Legend

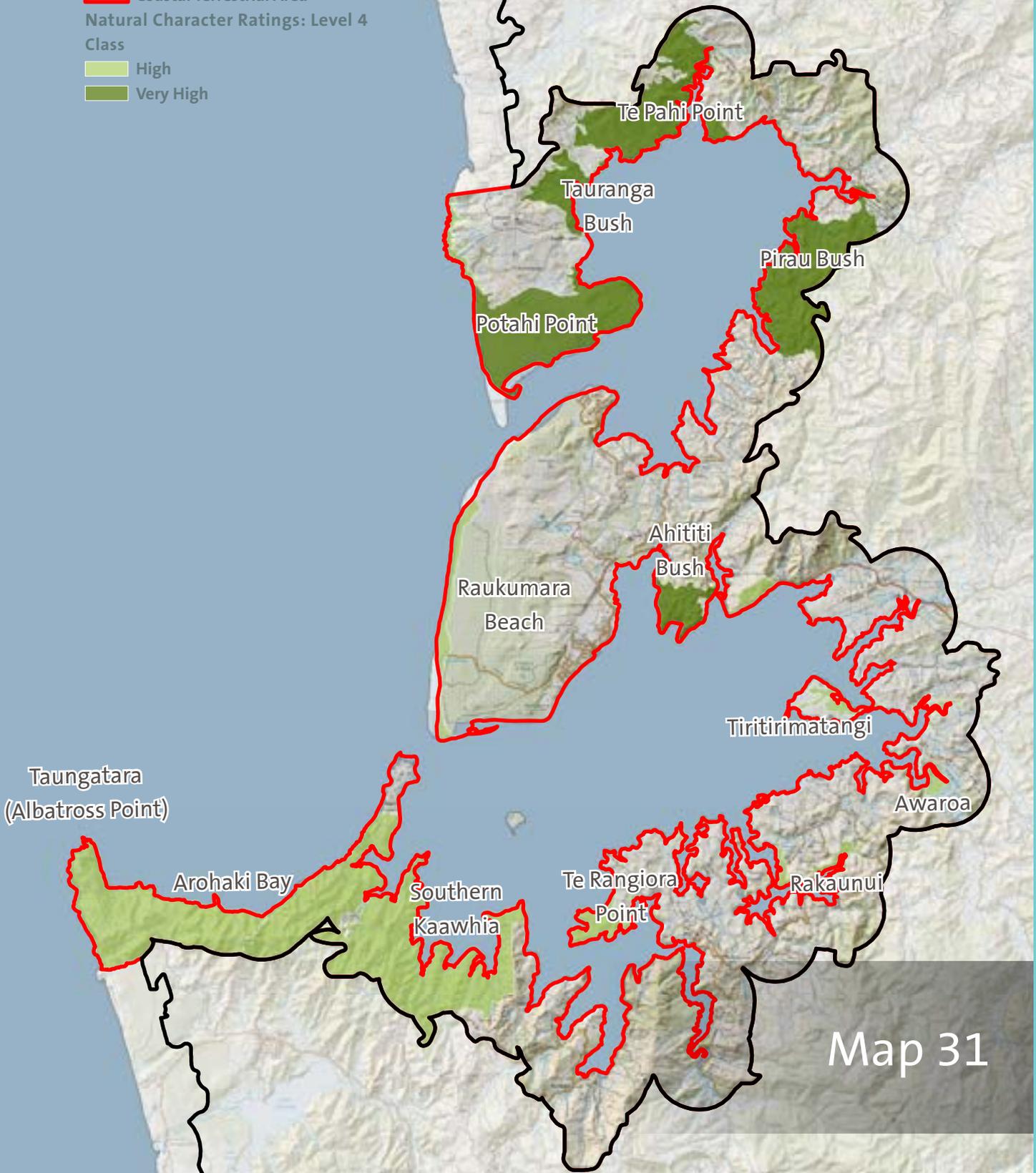
— Extent of Coastal Environment

▭ Coastal Terrestrial Area

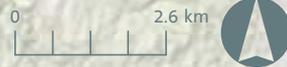
Natural Character Ratings: Level 4 Class

▭ High

▭ Very High

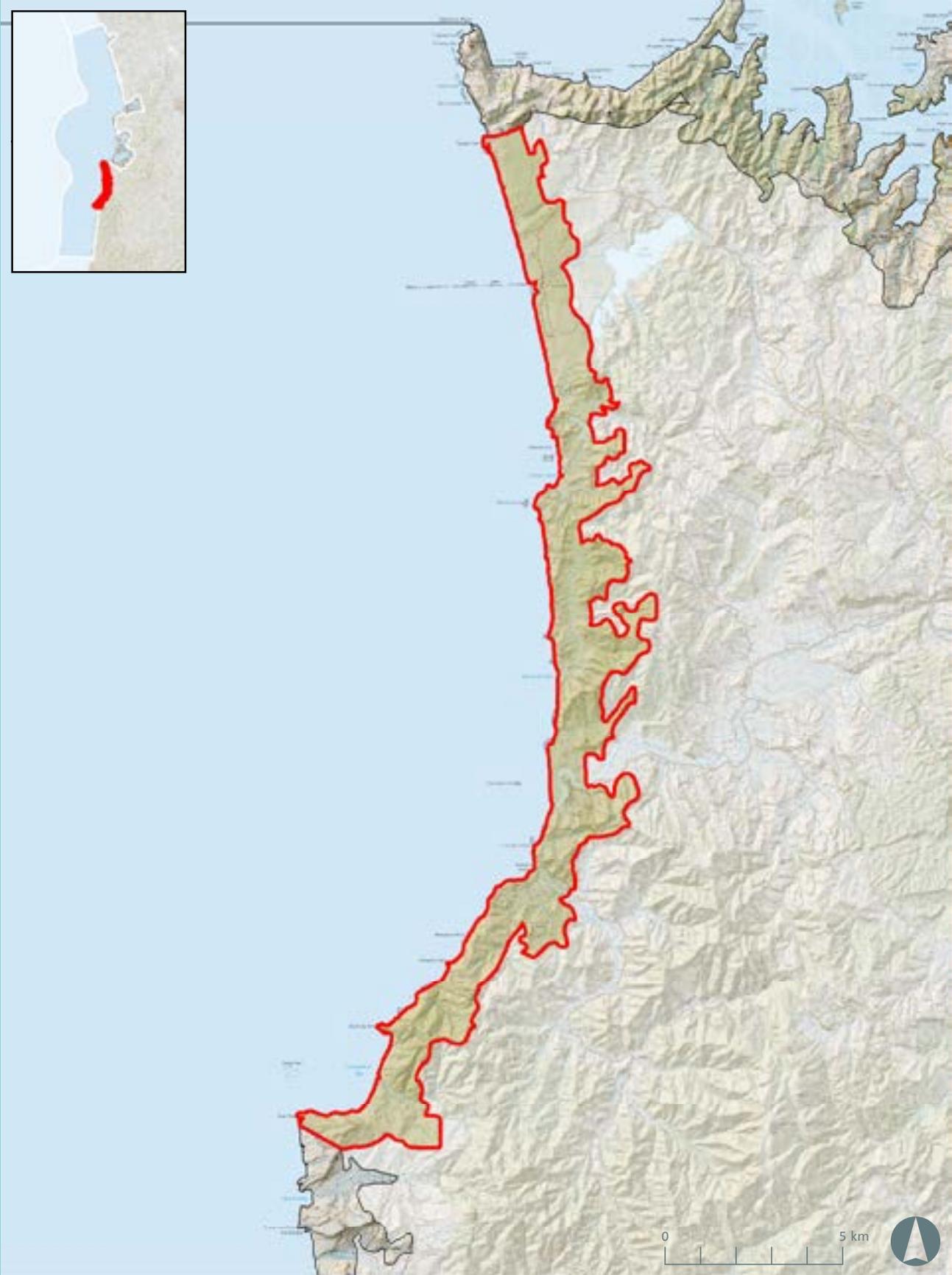


Map 31



# Marokopa

COASTAL TERRESTRIAL AREA 20:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

Extending south from Kaawhia Harbour to Tirua Point, this Coastal Terrestrial Area retains a diverse topography, encapsulating the flat ironsands in the north and the undulating, often rugged predominantly rural terrain to the south. The principal settlement is Marokopa with access gained via Marokopa Road.

Beyond the coastal environment, is the rural undulating hinterland of Waikato. There are also significant areas of ironsand dune systems and dune sheets. The coastline returns to rocky headlands with dramatic exposed sedimentation profiles to smaller coastal cliffs atop of long ironsand beaches. Small dune systems at the toe of the coastal cliffs provide some refuge for small coastal beaches and access tracks.

The ironsand mine of Taharoa has modified extensively the natural processes and systems of its area. The site covers an area of 1,300 hectares segmented into three regions. Operated by NZ Steel, the mining includes extracting sand from a pond by a floating dredge which is then conveyed for processing. The slurry is then pumped via a pipeline to an off-shore single buoy mooring where it is transferred to a bulk carrier fitted with dewatering equipment (*source: NZ Steel website*).

Further south, other large dune systems extend large distances inland along the low lying valley floors. Along the rocky shoreline and coastal cliffs, the native vegetation patterns reflect the high energy and high wind environment of the West Coast, including large areas of windswept native vegetation.

The Coastal Terrestrial Area is depicted by its large coastal cliffs with ironsand sheets atop and large coastal ironsand dune systems with rear dune wetlands.

*Below: Parihaki Dunes*



### Abiotic

This Coastal Terrestrial Area is associated with the ancient Jurassic rocks. The Jurassic rocks are principally fossiliferous and siltstone; however, sandstones and conglomerate also form prominent strike ridges locally. The Taharoa Fault extends almost parallel with the coast along this Coastal Terrestrial Area. Alluvial soils around rivers/ river flats are prevalent with large parts of the hill country being of early ash deposits.

Extensive beach and dune deposits containing titanomagnetite sands (iron sands) are evident along much of the coastline; however, a particularly large concentration at Taharoa (greater than 10km<sup>2</sup> and greater than 50m deep) is evident. Although part of this area is being mined, it remains a geopreservation site of regional significance.

Topographically the area is reasonably rugged and undulating. The highest part at Pehimatea rises to 483 metres above sea level, close to Kaitangata Point in the south of this Coastal Terrestrial Area.

South of Marokopa and along the coastline is a sequence of impressive exposed coastal cliffs and platform features of the upper Triassic era. These are of national importance considered the best Triassic sequence in the North Island.

The prevailing weather is westerly, with moist winds, moderate temperatures, and ample sunshine.

*Below: Coastal erosion of cliffs*



The Herangi Range is the dominating topographical feature, falling towards the coast and deeply dissected by the major waterways of Kiritehere Stream and Marokopa River which form broad alluvial flats at the coast. Cliffs form most of the relatively straight coastline, with sand spits and beaches at the mouths of rivers and streams. The most extensive beach is in Nukuhakari Bay; elsewhere beaches are very narrow.

### Biotic

Land cover analysis: The total land area of the Marokopa Coastal Terrestrial Area is 4,870ha. Rural production land covers 45% with a further 9% being plantation forestry. Indigenous vegetation forms nearly 33% of the cover, principally comprised of forest and manuka/kanuka scrub, with small areas of wetland and estuarine vegetation. Of the remainder, 9.5% is estuarine open water, lake/pond, and sand/gravel. Gorse/broom and other scrub covers 1.5%, the sand mine covers 1.6%, and there are also very small areas (<1%) of urban area.

Like much of the west coast and very similar to Awakino Coastal Terrestrial Area to the south, most of Coastal Terrestrial Area has beaches that are narrow and high energy, eroding the steep, high coastal cliffs of sandstone, mudstone and siltstone. The exception is south of Albatross Point, where extensive dunelands extend for a long distance inland and have drowned the Mangatangi Stream. The impounded stream forms Lake Taharoa and several other small dune lakes, with an outlet to the coast north of the Taharoa sand mine via the Wainui Stream. To the south, Lake Harihari has been formed by the same process, along with extensive coastal wetlands and small lakes along the coastal margin.

On the stable land, landward of the cliff edge, the entire Coastal Terrestrial Area would originally have been completely covered in mature indigenous coastal forest, with vegetation sheared off by salt spray and wind at the coastal edge. The more dynamic duneland is likely to have been historically vegetated with indigenous coastal forest and scrubland in varying states of succession.

Given the length of this Coastal Terrestrial Area, there are relatively few streams discharging to the coast. Those that do, are generally first-order streams, with several second- and third-order perennial streams, and three larger waterways with catchments extending beyond the coastal zone. Typically, the larger waterways have wide flat floodplains close to sea level, and the smaller waterways have steeper incised catchments dominated by gullies elevated well above sea level and discharging to the coast via waterfalls. Farm tracks and road culverts may present some barriers to fish passage for the low-elevation catchments, but where streams are not modified by farm drainage system, most offer a relatively natural habitat, although waterfalls will preclude access even for climbing species. The streams at lower elevations contribute greater ecological value at the coastline, and Waikato Regional Council identifies the Kaawa Stream coastal dunes, Waikorea Stream wetlands (also incorporating Waimai and Matira Stream habitats) as key ecological sites, but none have legal protection.

Few streams are fenced from livestock and are likely to be affected by the lack of riparian cover and channelisation, and most will be impacted by livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants). However, the streams flowing through indigenous forest cover and with regenerating shrubland in gullies will have moderate ecological values and the Marokopa River is known for its whitebait fishery. Along the open coastline, the few dunelands or intertidal areas offering food resources or breeding areas for shorebirds are generally associated with stream outlets.

The largest site, Moeatoa Scenic Reserve, is protected and there is one smaller QEII covenant area protecting forest vegetation, but no other vegetation has legal protection or recognition. Moeatoa Scenic Reserve is also home to the threatened plant, *Myosotis petiolata* var. *pansa* and is the southern limit of the *Stipa stipoides* tussockland.



Above: Tapirimoko Coast

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## Experiential

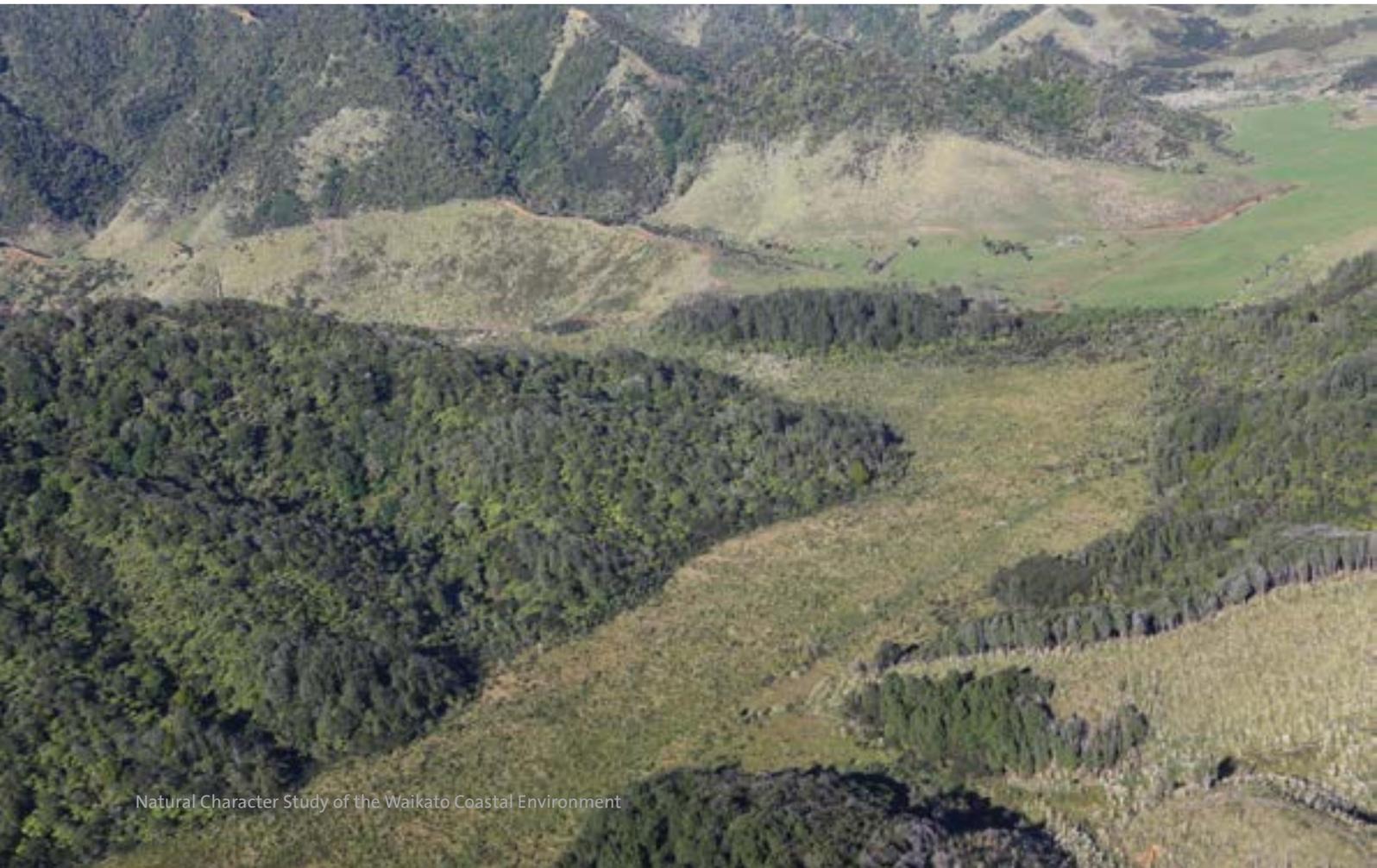
Despite being remote, there is some public presence at Kiritihere and Marokopa south beaches through the use of quads and motorbikes. There is limited public access to Marokopa north head and Taharoa beach and combined with the extensive mining activities in the coastal area, there are isolated areas of low perceived naturalness.

On the other hand, the coastal dune system further north and south of Taharoa, is highly expressive of the natural processes and vegetation patterns that occur in an unmodified environment.

The mixture of native vegetation and farmland extending along the coast and the location of pa sites in places, depicts a working landscape that has undergone modification for productive land use. Agricultural farming extends right to the tops of the coastal cliffs both detracting from the natural biotic patterns and emphasising the natural abiotic patterns of the area. Coastal dunes, waterfalls and streams provide a strong sense of naturalness in what is a highly modified coastal edge.

There are a limited number of structures visible from coastline with the coastal cliffs and high energy of the natural processes dominating the coastal experience. The Taharoa Ironsand plant and marine pipeline are visible and recognisable detractors on the naturalness of the area.

*Below: Wetland associated  
with Tauhua Stream*



Rating at Level 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			<b>Moderate</b>

Below: Small settlement of Marokopa

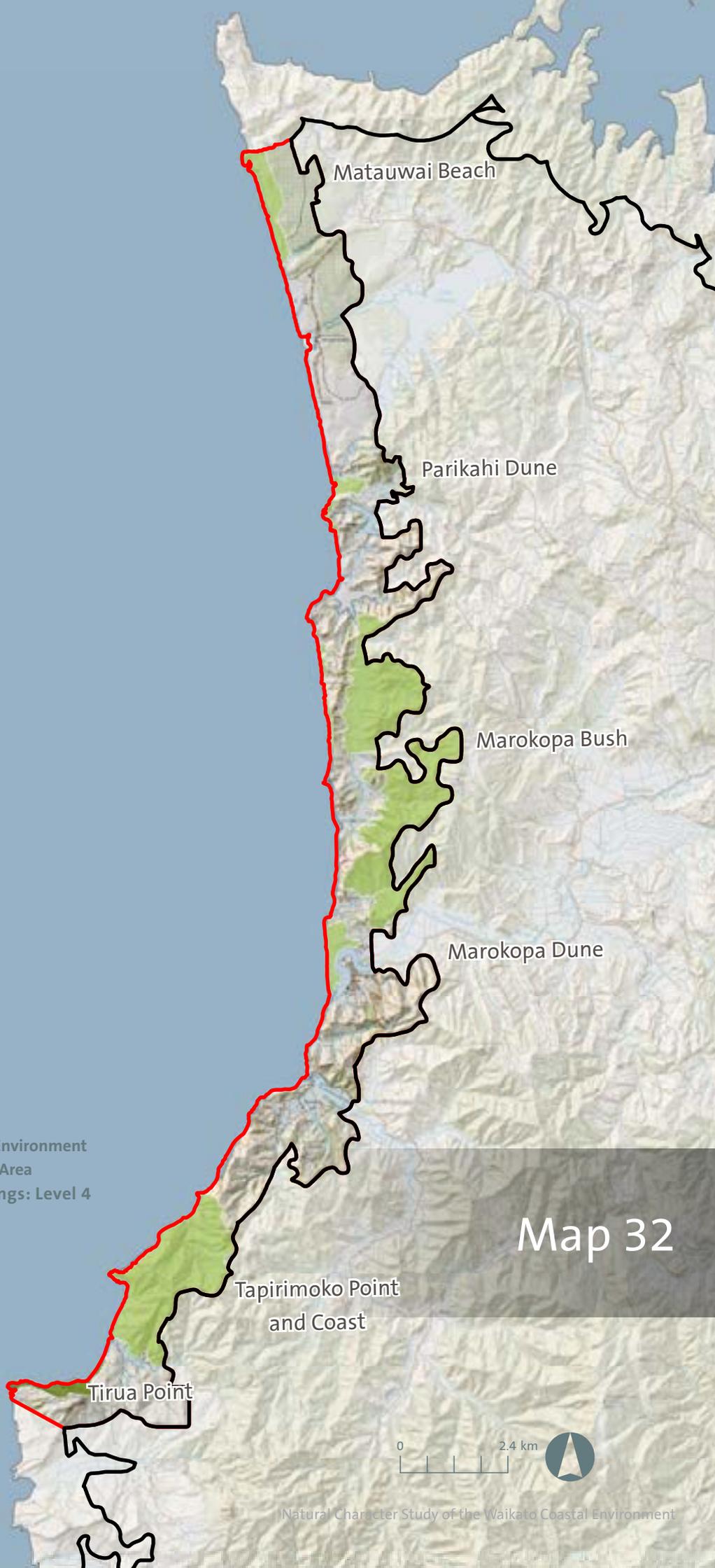


## Coastal Terrestrial Area 20: Marokopa Specific Characteristics at Level 4

These are mapped with reference to **Map 32**

Area	Rating	Key Values	Additional Comments
Matauwai Beach	High	<ul style="list-style-type: none"> <li>Coastal dune sequencing across frontal dune system to upper dune shelves. Dune vegetation and coastal bush vegetation is a good example of coastal vegetation sequencing which is also reflective of the coastal abiotic processes occurring (wind).</li> </ul>	<ul style="list-style-type: none"> <li>Some modification is apparent from coastal vehicle tracks along the frontal dunes and the placement of coastal baches.</li> </ul>
Parikahi Dune	High	<ul style="list-style-type: none"> <li>An isolated and unmodified ironsand dune system extending a long way inland, connecting with the stream and coastal lakes. Nestled between two small headlands the area is isolated and very remote, with no public access apparent.</li> </ul>	<ul style="list-style-type: none"> <li>Modification and activity dominates the coastal edge to the north of the feature with the Taharoa Sand Mine forming an industrial environment.</li> </ul>
Marokopa Bush	High	<ul style="list-style-type: none"> <li>The backdrop of hill country covered in native bush heightens the sense of remoteness for the area and the adjoining coastal edge.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent through access and farm tracks.</li> </ul>
Marokopa Dune	High	<ul style="list-style-type: none"> <li>The Marokopa sand spit comprises unmodified coastal processes along the open coast with influences to its inner edge from adjoining coastal protection measures for Marakopa. Vegetation is representative of coastal dunes.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is not apparent except for influences incurred from adjoining coastal protection measures within the settlement.</li> </ul>
Tapirimoko Point	High	<ul style="list-style-type: none"> <li>A striking coast reflective of tectonic and coastal processes with a jagged rocky coast. Coastal vegetation dominates the cliptops connecting to the hinterland of native bush.</li> </ul>	<ul style="list-style-type: none"> <li>Modification is apparent through pockets of coastal farming along the immediate coastal edge.</li> </ul>
Tirua Point	Very High	<ul style="list-style-type: none"> <li>Dominant coastal processes interfaced within a highly remote coastal landscape. Vegetation on the eroding slopes remains intact and an example of coastal regeneration.</li> </ul>	<ul style="list-style-type: none"> <li>Modification occurs at the top of the cliff influencing the natural coastal erosion processes to some extent.</li> </ul>

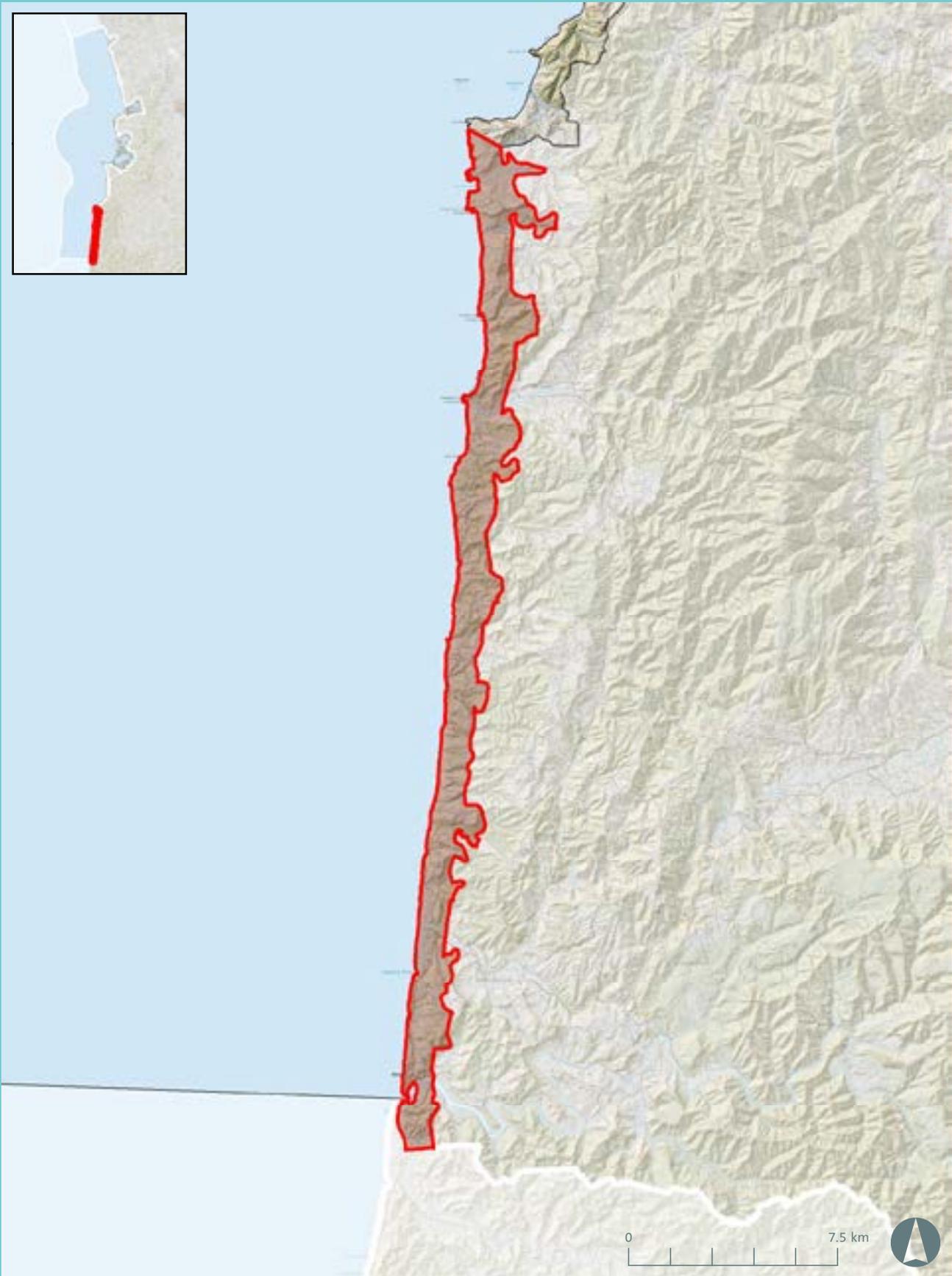
- Legend**
- Extent of Coastal Environment
  - ▭ Coastal Terrestrial Area
  - Natural Character Ratings: Level 4 Class
    - ▭ High
    - ▭ Very High



Map 32

# Awakino

COASTAL TERRESTRIAL AREA 21:



### Coastal Characteristics, Coastal Environment Extent and Coastal Context Area

This Coastal Terrestrial Area extends from Tirua Point in the north to the region's southernmost boundary at Mokau. The coastline varies with straight lengths of shoreline and rugged edges in a few places. Land use is predominantly rural agriculture; however, there are some significant incised and indigenous-clad gully features that penetrate this undulating farmland. Settlements are far and few between with the principal ones being Mokau and Awakino, which are accessed off State Highway 3. There are a number of large rivers that drain into the ocean, and these include the Awakino River and Mokau River. This Coastal Terrestrial Area is reasonably remote, due to the limited access provided.

Key coastal characteristics include: Relatively straight coastline used primarily for rural grazing; significant incised gullies, vegetated with indigenous bush; two large river mouths (Awakino and Mokau) along with a number of smaller watercourses (i.e. Waikawau River); small settlements, including Awakino and Mokau; limited access and remoteness to the area.

Beyond the coastal environment is the Herangi Range a defining ridge of indigenous clad hills which is the source of the Awakino River. Isolated rural farmsteads are also present west of this area; however, some of the smaller watercourses that have eroded the land to create impressive incised vegetated gullies, also dominate these lands, notably north of Awakino.

*Below: Grazing land terminates abruptly at the coast below Tirua Point*



## Abiotic

This Coastal Terrestrial Area is associated with the ancient Jurassic rocks. The Jurassic rocks are principally fossiliferous and siltstone, however, sandstones and ocean mudstones also form notable features locally.

Alluvial soils are found principally around rivers/ river flats interspersed with small dunelands with large parts of the hill country being of early ash deposits.

Black magnetite sands dominate the coast providing a contrast to the white sands of the east coast.

Topographically the area is reasonably rugged and undulating. The highest part, just north of the Waikawau River, reaches 294 metres above sea level.

There are a number of Geopreservation Sites included within this Coastal Terrestrial Area, all of which are of regional significance. Two relate to the Awakino River mouth, with one representing an extremely well-defined example of a river mouth barrier and the remaining one focusing on the exposure of volcanic cliffs.

The Herangi Range is the dominating topographical feature, falling towards the coast and deeply dissected by the major rivers of Waikawau, Manganui/Awakino, and Mokau which form broad alluvial flats at the coast. Cliffs form most of the relatively straight coastline, with sand spits and beaches at the mouths of rivers and streams. The beaches are typically very narrow.

*Below: Ancient rocks extend into the sea at Ngararahae Bay*



## Biotic

Land cover analysis: The total land area of the Awakino Coastal Terrestrial Area is 4,939ha. Rural production land covers 66% with only a small area of plantation forestry (1%). Indigenous vegetation forms nearly 25% of the cover, principally comprised of forest and manuka/kanuka scrub, with small areas of wetland and estuarine vegetation. Of the remainder, sand/gravel covers 4% and river/lake/estuarine open water covers 1.5%. Gorse/broom and other scrub covers 1.2% and there are very small areas (<1%) of urban area.

Like Opura and Marokopa Coastal Terrestrial Areas, the Awakino CTA beaches are narrow and high energy, actively eroding the high, steep sedimentary rock coastal cliffs. However, beyond the cliffs the underlying rock strata are from older more stable land units. On this stable land, the entire Coastal Terrestrial Area would originally have been completely covered in mature indigenous coastal and lowland forest, with vegetation sheared off by salt spray and wind at the coastal edge.

Today, indigenous coastal vegetation is relatively limited and typically found only on the narrow coastal cliffs and in the isolated large patches of regenerating forest. However, most forest cover is some distance from the coast, and none provide a complete vegetation sequence from coastal dune/herb vegetation to lowland forest. Where land is reverting, manuka/kanuka is providing a nursery crop and regeneration is beginning to occur but the areas are small. Despite of the 25% indigenous vegetation cover, Waikato Regional Council identifies no key ecological sites in the Coastal Terrestrial Area. However, a number of the larger forest patches are protected in reserves and there are several smaller stewardship areas protecting riparian vegetation. The Coastal Terrestrial Area is also home to the northernmost examples of coastal turfs on the West Coast and good populations of the forget-me-not, *Myosotis petiolata* var *pansa*.

The streams discharging to the coast are generally first- or second-order perennial streams, and eight are larger waterways with catchments extending beyond the coastal zone. Typically, the larger waterways have wide flat floodplains close to sea level, and the smaller waterways have steeper incised catchments dominated by gullies elevated well above sea level and discharging to the coast via waterfalls. Farm tracks and road culverts may present some barriers to fish passage for the low-elevation catchments, but where streams are not modified by farm drainage system, most offer a relatively natural habitat, although waterfalls will preclude access even for climbing species. The streams at lower elevations contribute greater ecological value at the coastline,

The low elevation streams are likely to be affected by the lack of riparian cover and channelisation, and all streams will be impacted by livestock access, erosion, sedimentation, enrichment, and a lack of suitable instream habitat (e.g. woody debris and aquatic plants). However, many of the higher elevation streams benefit from indigenous forest cover, particularly in gullies where regeneration is occurring, and ecological values will be moderate. The Waikawau and Awakino Rivers are known for their whitebait fisheries. Along the open coastline, the few dunelands or intertidal areas offering limited food resources or breeding areas for shorebirds are generally associated with stream outlets.



Right: Typical sedimentary coastal cliff herbaceous plant community - sand tussock, flax, ice plant, sea primrose, wharanui

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## Experiential

There is very limited public access to the coastline outside of the settlement of Mokau resulting in a relatively isolated coastal experience. However, farming and access tracks are more frequent along this extent of coast with numerous farm dwellings scattered along the coastal edge. Despite this, the coastline is relatively free of artificial light and the natural darkness of the sky unaltered, outside of the settlement areas.

Modification to the upper terraces and clifftops of the shoreline is apparent from agricultural land use. The remaining natural dune and coastal bush areas display the highest degree of perceived naturalness due the lack of modification from productive land use and structures. Like the rest of the west coast, the high energy coastal processes dominate the experience of the natural processes.

Areas where native bush cover extends along and to the coastline accentuate the recognition of the broader coastal patterns. Frequent waterfalls are scattered along the coastline and are indicative of the geomorphology and tectonic processes of the area. The vegetated escarpments with the narrow sandy beach provide isolated experiences of remoteness and intactness.

However, overall, this Coastal Terrestrial Area is modified and, whilst the natural processes continue to dominate the experiences, the naturalness of the biotic and abiotic systems are lessened as a result of modification.

*Below: Opito Point and the forested slopes of Huikomako*



Rating at Level 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			<b>Moderate</b>

*Below: The small southern township of Mokau and the Mokau River mouth.*

*Right: Hand dug pedestrian tunnel from Waikawau Rd to Waikawau Beach.*



## Coastal Terrestrial Area 21: Awakino Specific Characteristics at Level 4

These are mapped with reference to **Map 33**

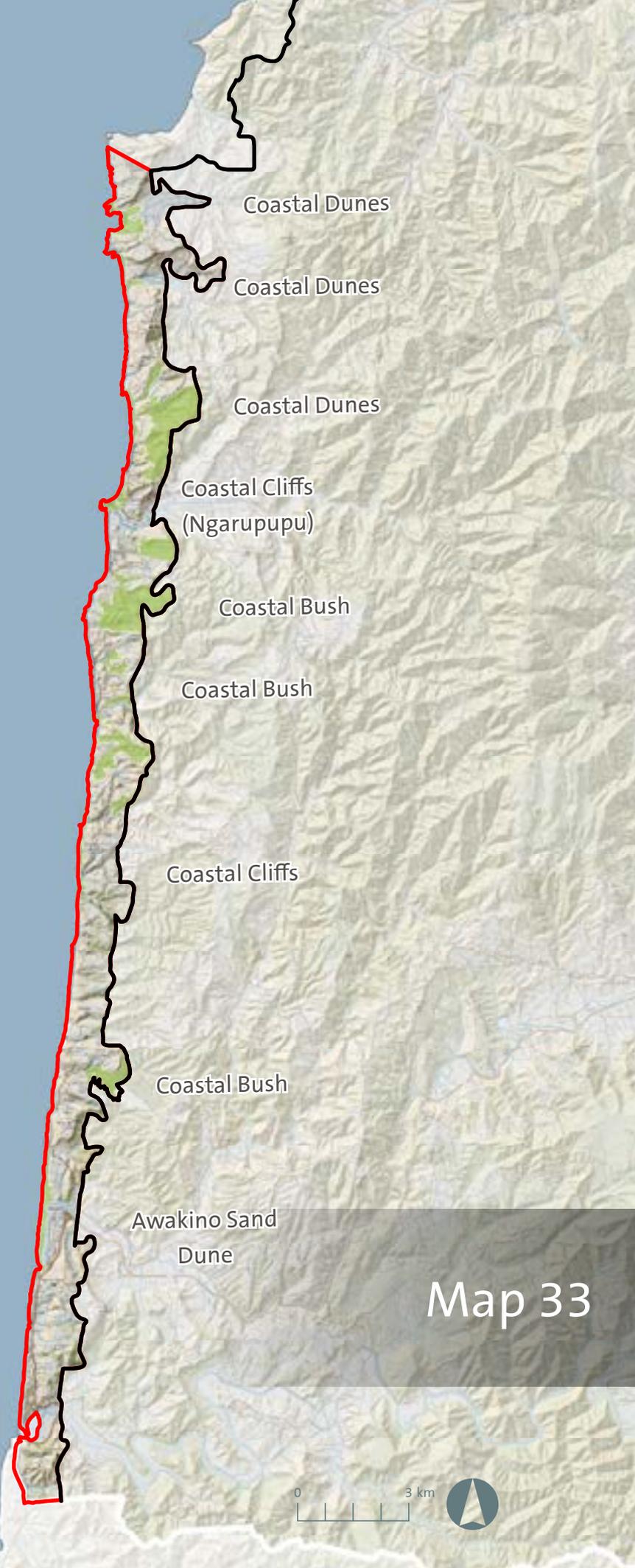
Area	Rating	Key Values	Additional Comments
Coastal Dunes	High	<ul style="list-style-type: none"> <li>Several dune systems extend inland along valley floors creating a sequence of unmodified natural patterns, including clifftop dune sheets. Biotic patterns are dominated by coastal dune species.</li> </ul>	<ul style="list-style-type: none"> <li>The natural edges to the dune system are modified through adjoining agricultural land use.</li> </ul>
Coastal Cliffs	High	<ul style="list-style-type: none"> <li>A narrow margin of striking coastal cliffs subjected to dominant coastal erosion and natural coastal forces. A number of waterfalls extend down the cliff faces which are evident of tectonic processes.</li> </ul>	<ul style="list-style-type: none"> <li>Atop the coastal cliffs farming dominates the land use along with access tracks. Gully systems where farming land use is abandoned or inaccessible are dominated by native vegetation cover. A highly remote area with no public access possible.</li> </ul>
Coastal Bush	High	<ul style="list-style-type: none"> <li>The hill country is steep and reflective of the native tectonic and erosion processes occurring. Native vegetation is comprehensive and intact.</li> </ul>	<ul style="list-style-type: none"> <li>Remote, with the margins managed by the adjoining agricultural land use.</li> </ul>
Awakino Sand Dune	High	<ul style="list-style-type: none"> <li>The Marokopa sand spit comprises unmodified coastal processes along its southern edge with modification at the northern end.</li> </ul>	<ul style="list-style-type: none"> <li>A small but important feature for the coastal dune system with modification apparent along its northern margins.</li> </ul>

*Below: Waikawau Beach and waterfall*



Legend

-  Extent of Coastal Environment
-  Coastal Terrestrial Area
- Natural Character Ratings: Level 4 Class**
-  High
-  Very High



Map 33

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## Overall Evaluation – Level 4

At the more specific Level 4 scale, individual bays, estuaries, harbours, headlands and islands have been mapped to illustrate those areas holding high or very high levels of natural character. This more detailed mapping has only been undertaken where specific mention or detail has been included about a smaller area within the broader 'Area' of Level 3 descriptions and evaluations.

Within some of the least modified areas, the extent of the high and very high mapped areas has been more straight forward. For example, Southern Kaawhia bush areas retains mature indigenous bush which has largely avoided the impact of humans. The harbour and coastal margin of this area also retains high levels of naturalness, again due predominantly to the lack of human change and the resultant high ecological habitats. All of the areas that are mapped as high or very high natural character within the 10 different Level 3 'Areas', at the Level 4 scale, are shown collectively on the map opposite.

Refer to Section E of this study for the separate mapping of the Outstanding Natural Character Areas, which used this Level 4 mapping as a basis for further consideration.

*Below: Northern shoreline  
of Whaingaroa Harbour*

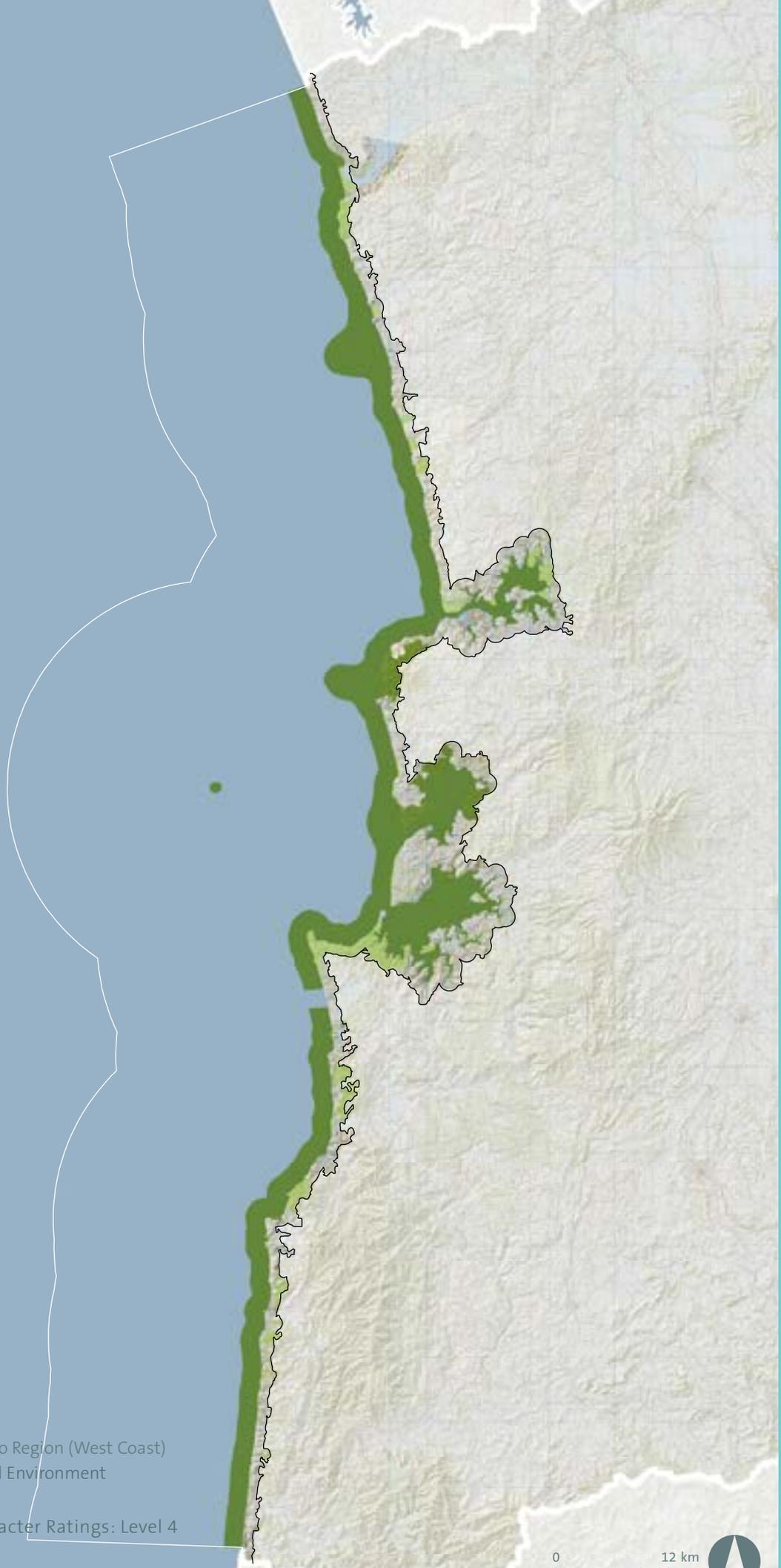


**Legend**

- Extent of Waikato Region (West Coast)
- Extent of Coastal Environment

Waikato West Coast  
Coastal Natural Character Ratings: Level 4

- High
- Very High





*Above: Elephant Cove, Motukawao Island Group*

# SECTION E: OUTSTANDING COASTAL NATURAL CHARACTER

## Introduction to Outstanding Coastal Natural Character

As outlined within Section B, under Policy 13 of the NZCPS 2010 there is a requirement that an evaluation is made as to whether the natural character in the existing coastal environment is at least high (in order to then be able to determine whether Policy 13(1)(a) or 13(1)(b) is triggered).

Following on from the evaluative work undertaken within Sections C and D of this report, a further level of assessment was undertaken to determine which parts of the Waikato Coastal Environment would reach the high threshold of Outstanding Natural Character. This is outlined within the NZCPS Policy 13 (1)(a) *'avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character'*.

It was determined by the study team that outstanding natural character should be assessed separately, re-assessing the High and Very High's at the most detailed scale (i.e. Level 4). It should combine, where possible, both terrestrial and marine components. This is described further within Section A of this report. Combining both terrestrial and marine components means that where sequences of ecological naturalness are considered important in a regional context (such as from the top of a ridge above ground to the bottom of the adjacent sea), these aspects are captured. Also, Outstanding Natural Character (referred to as ONC areas below), by its very term, determines the highest rated area, including systems that interconnect with each other.

As outlined, all areas hold high or very high natural character abiotic, biotic or experiential attributes. Map 34 provides an overview of all ONC's for the East Coast of Waikato and Map 43 outlines an overview of all ONC's for the West Coast of Waikato, with each 'area' being specifically mapped and values articulated at 1:10,000 scale (i.e. the most detailed scale of mapping at Level 4).

Outstanding Natural Character was only considered at the most detailed scale (i.e. Level 4). Mapping ONC areas at this scale provides the council with greater certainty as to where these 'highest rated' areas are located, as opposed to mapping ONC at the Level 3 'Area' scale, where greater levels of modification can be apparent.

Under the methodology, an area of outstanding natural character must be:

*‘those areas that 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’. (BML statement)*

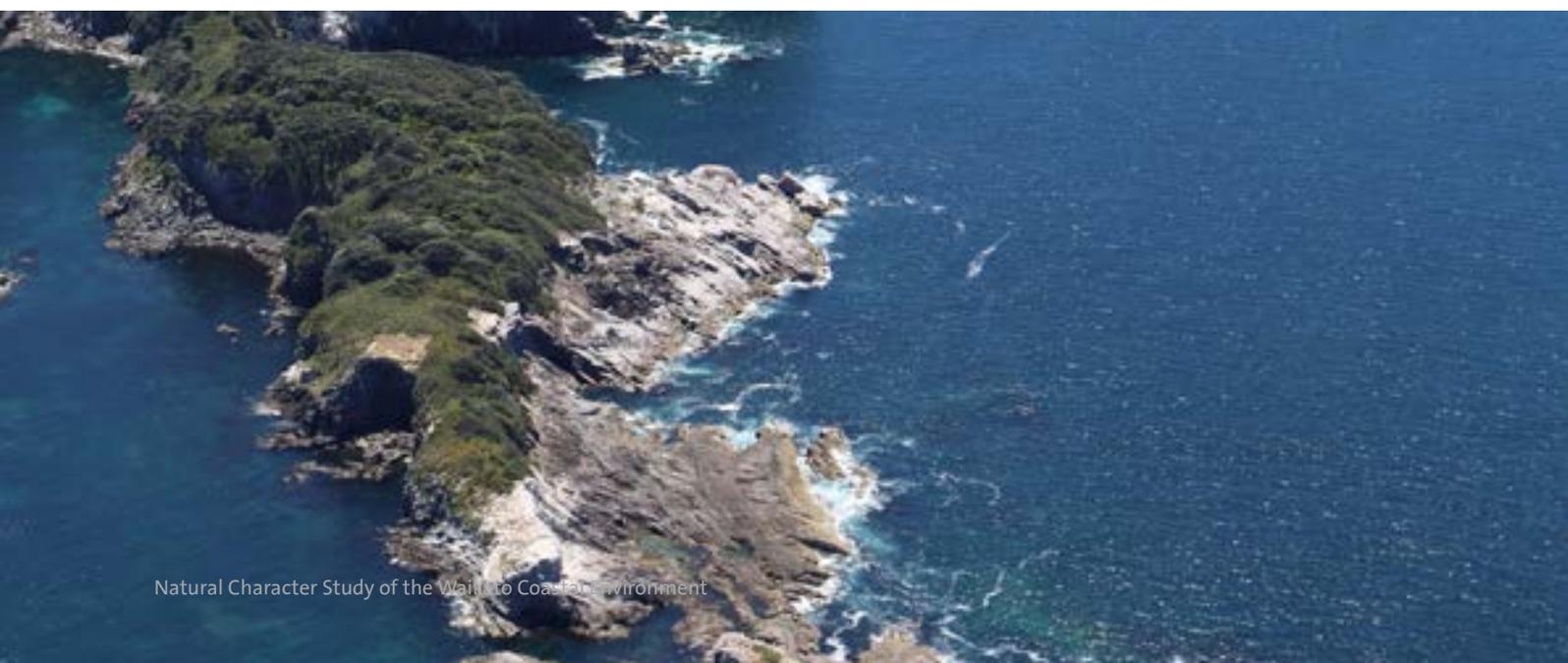
The following pages outline the result of this separate assessment. Of all the areas holding high and very high levels of natural character at the Level 4 scale, only eleven areas were mapped as outstanding natural character. These eleven areas were considered by the study team to meet the threshold statement outline above. Their individual characteristics and values are listed on the following pages. There was of course debate around areas that did not reach this threshold, while rated as holding either high or very high levels of natural character.

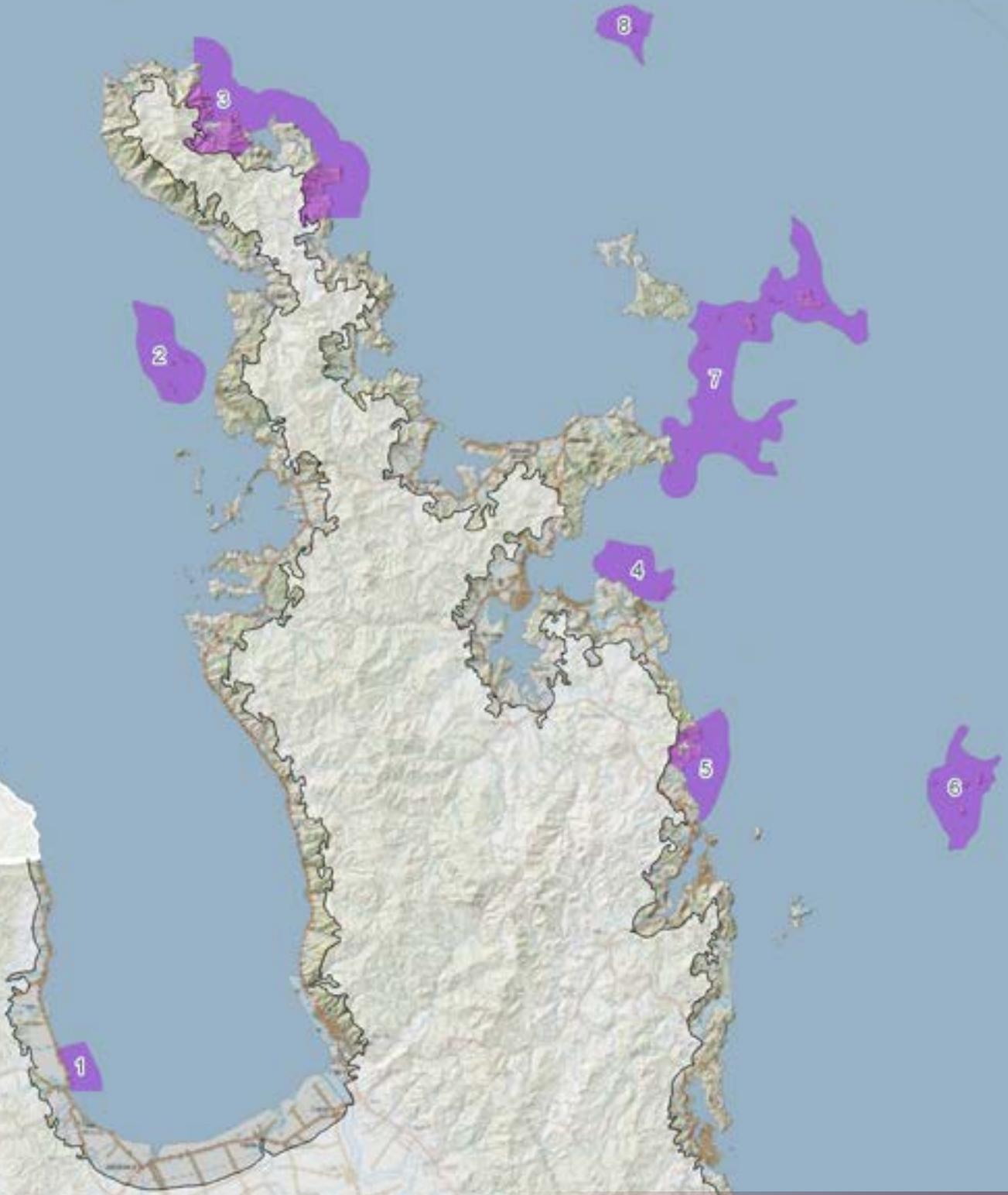
## Waikato’s East Coast

On Waikato’s East Coast, seven Outstanding Natural Character Areas (ONCs) have been identified. They are listed in the table below, identified collectively on the facing map and described in the following pages. ONCs for Waikato’s West Coast are listed after ONC No. 7 below.

### Outstanding Natural Character Areas for Waikato’s East Coast

1	Pūkorooro Chenier Plains & Miranda Wetlands (Map 35)
2	Motukawao Island Group (Map 36)
3	Coastline between Fletcher Bay and Kennedy Bay (Map 37)
4	Coastline, coastal waters and islands off Cathedral Cove (Map 38)
5	Remote coastline and coastal waters of Tapuaetahi (Map 39)
6	Aldermen Islands and coastal waters (Map 40)
7	Mercury Islands and associated coastal waters (Map 41)
8	Cuvier Island / Repanga Island and associated coastal waters (Map 42)





- Legend**
- Extent of Coastal Environment
  - Outstanding Coastal Natural Character Areas**
  - 1 Pōkorokoro Chenier Plains and Miranda Wetlands
  - 2 Motukawao Island Group
  - 3 Port Charles and Kennedy Bay
  - 4 Cathedral Cove Waters
  - 5 Tapaeitahi Bay and adjacent land
  - 6 Aldermen Islands
  - 7 Mercury Islands
  - 8 Repanga Island (Cuvier Island)

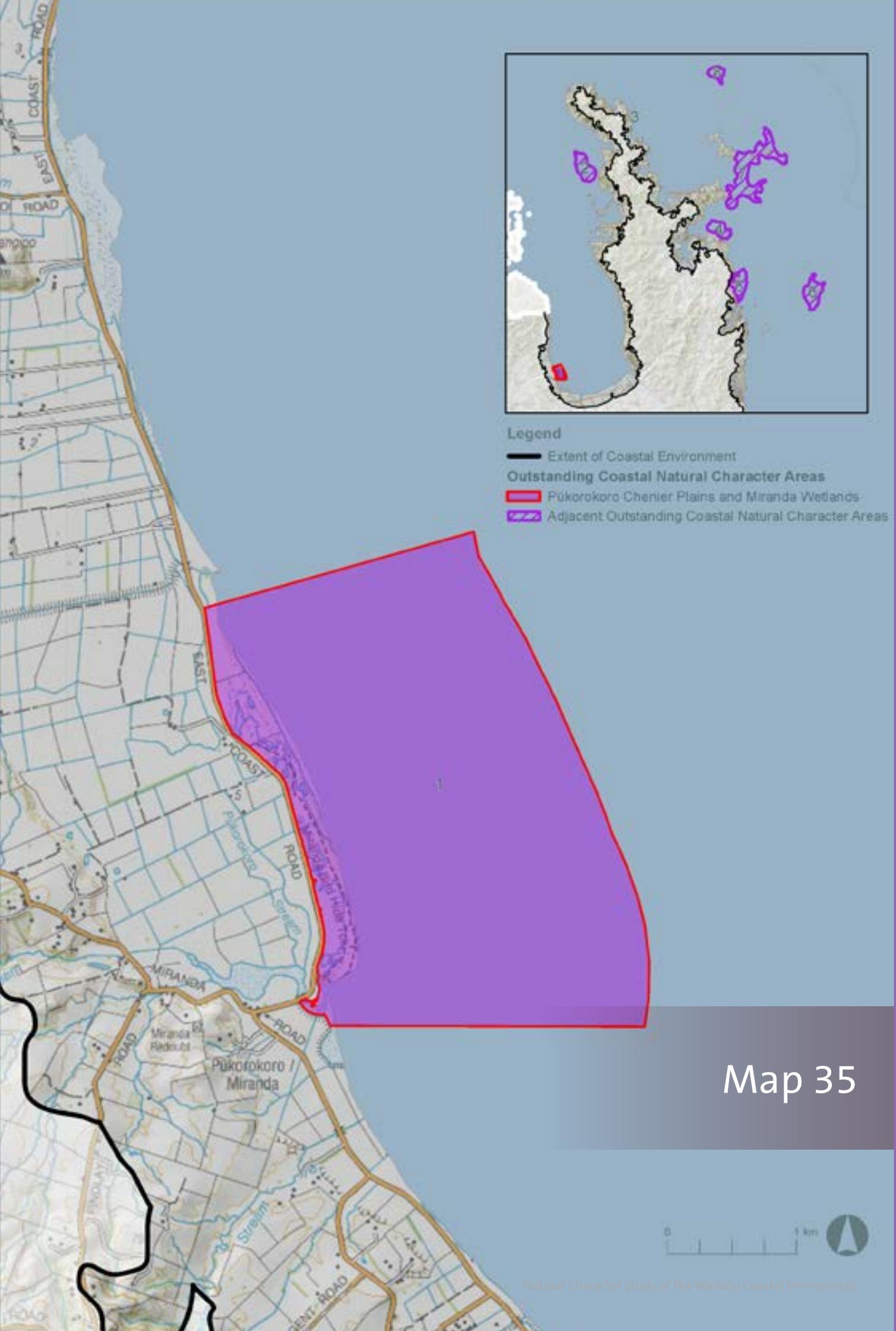
Map 34





## Pūkorokoro - Chenier Plains and Miranda Wetlands

*This area of Outstanding Natural Character includes the intact and internationally significant shell barrier beach (Chenier Plains) as well as the country's most important location for coastal and wading birds harbouring a wide range of biotic assemblages.*



Map 35



## Pūkoro-ro - Chenier Plains & Miranda Wetlands Outstanding Natural Character Attributes (Level 4)

<b>CTA and rating (Level 3)</b>	Hauraki (Low)
<b>CMA and rating (Level 3)</b>	Firth of Thames (Moderate- High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>The shell barrier beach at Miranda is the largest in New Zealand and is the only one of its type that is actively aggrading.</li> <li>Chenier Plains: Internationally significant landform at Miranda.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>The Firth of Thames contains a Ramsar site of international significance to migratory wading birds, including the rare New Zealand Dotterel.</li> <li>Associated mangroves add to biotic sequences from land to sea.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>Largely remote unmodified shores amplifies the perceived naturalness.</li> <li>Tidal changes promote ephemeral activity.</li> <li>Presence of birds amplifies perceived level of naturalness.</li> </ul>
<b>Mapped extent</b>	
<p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows the high marine mapping at the Level 4 scale, which is approximately 2km off shore. The 2km limit was decided by the marine experts as an appropriate offshore distance with respect to understanding the marine environment, where greatest knowledge is around the areas closest to land. Although not always the case, it was concluded that this would be appropriate for this Outstanding Natural Character Area.</p> <p>The mapped extent inland includes the Ramsar site (so much as it extends onto land), the unmodified sections of the Chenier Plains and any ecological sequences between land and sea that remain intact. This is consistent with the Very High terrestrial rating.</p>	
<b>Pūkoro-ro Chenier Plains &amp; Miranda Wetlands</b>	<b>Outstanding</b>

*Right (above): Miranda wetland and Chenier Plains*

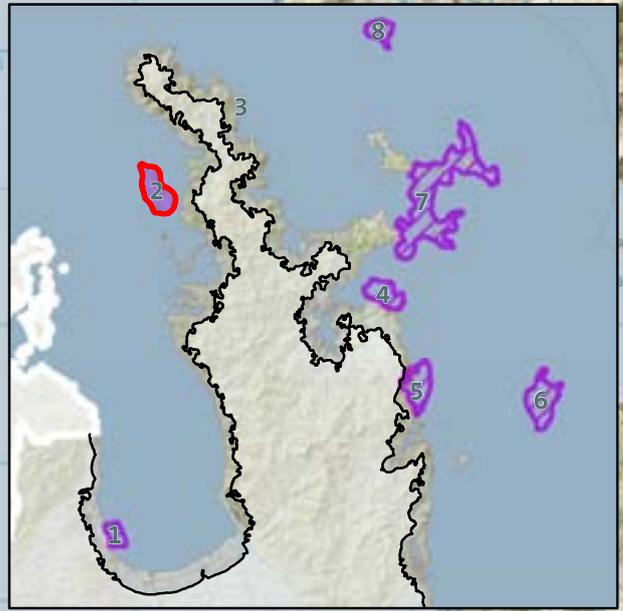
*Right (below): Waters off Miranda and the Chenier Plains*





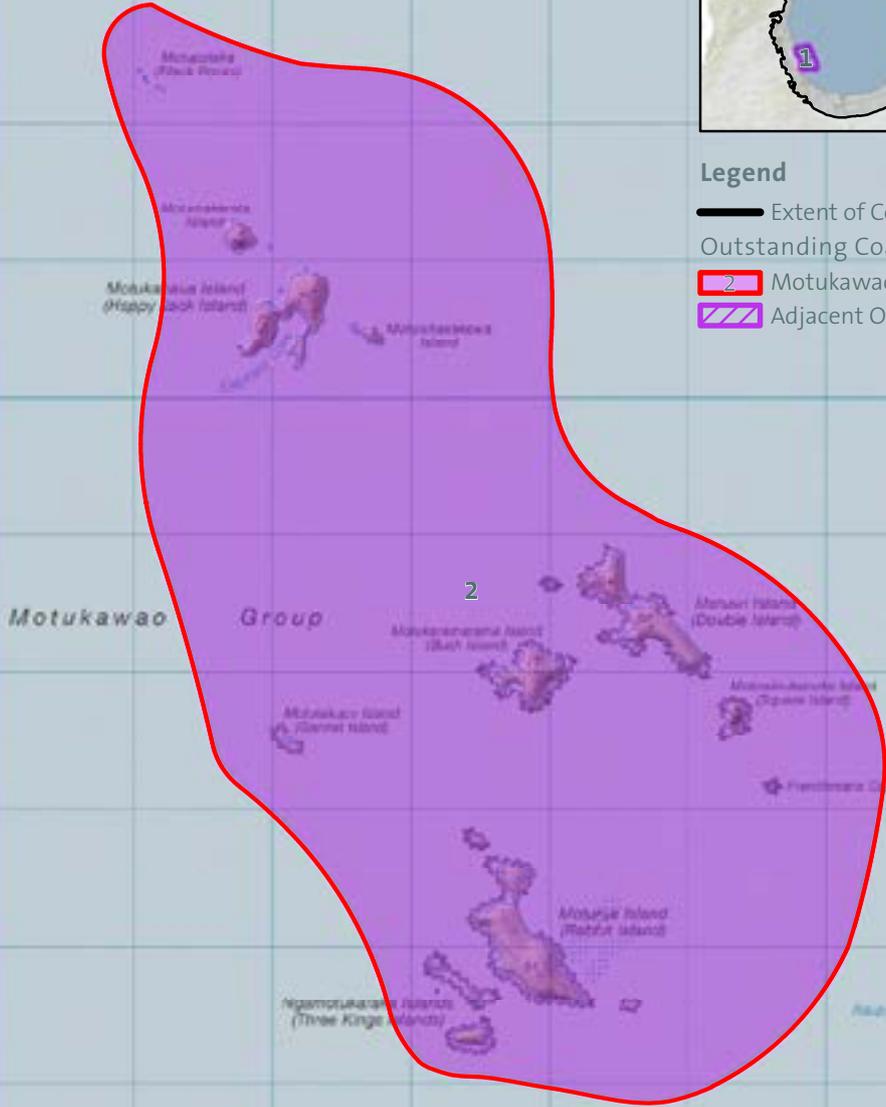
## Motukawao Island Group

*This area of Outstanding Natural Character includes the most northwesterly remote and unmodified island group off the west coast of Coromandel's peninsula. Encompassing steep and rocky coastlines and indigenous vegetation, this island group harbors some endangered and threatened biota.*



Legend

-  Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
-  2 Motukawao Island Group
-  Adjacent Outstanding Coastal Natural Character Areas



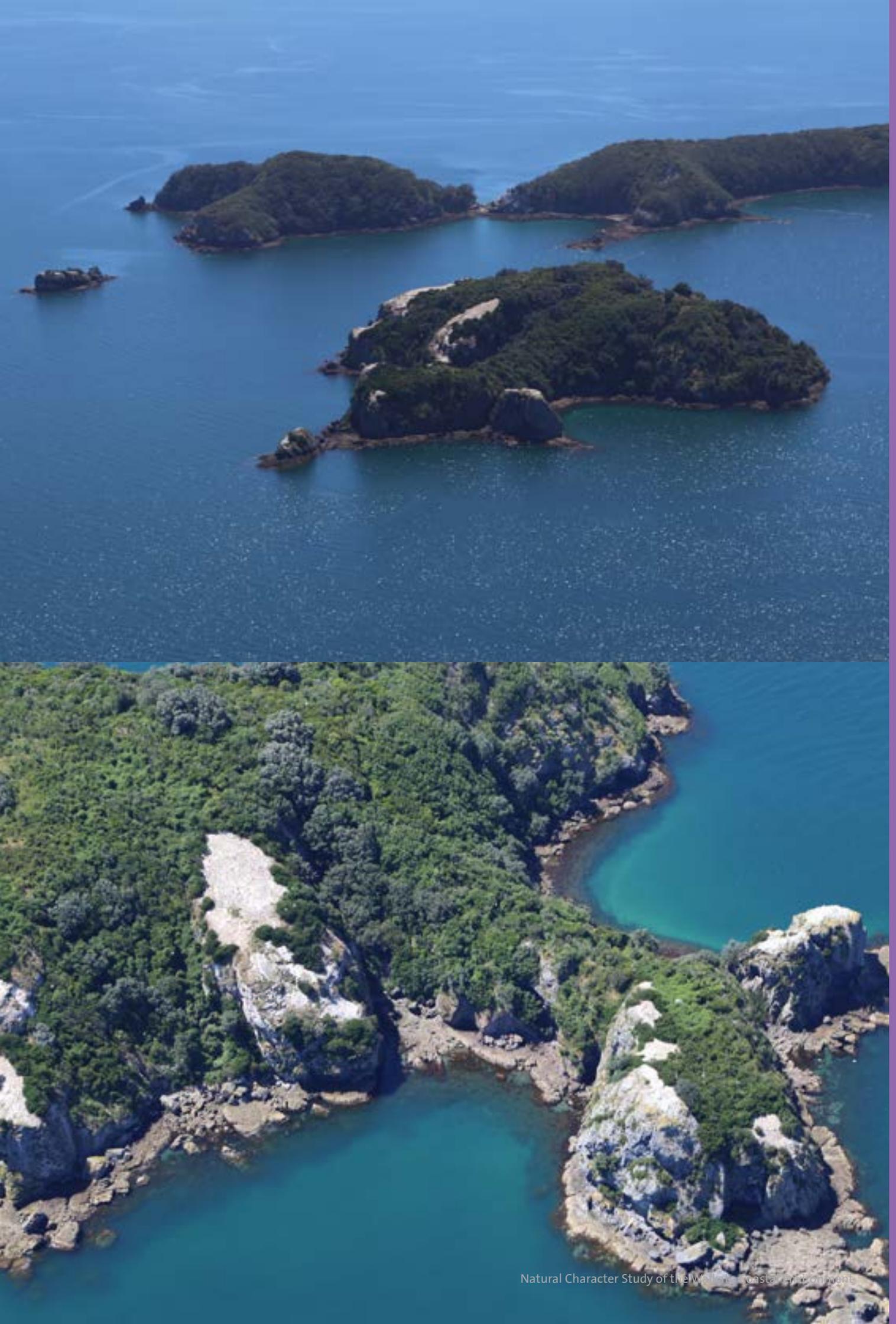
Map 36



Motukawao Island Group Outstanding Natural Character Attributes (Level 4)	
CTA and rating (Level 3)	Colville (Moderate- High)
CMA and rating (Level 3)	Western Coromandel (High)
Values	
Abiotic	<ul style="list-style-type: none"> <li>Islands are surrounded by unmodified rocky shelves and open waters.</li> <li>Prominent and unmodified volcanic island group.</li> </ul>
Biotic	<ul style="list-style-type: none"> <li>Area of very high conservation value for demersal fish occur around Motuoruhi Island.</li> <li>Unmodified vegetation sequences between islands and sea floor.</li> </ul>
Experiential	<ul style="list-style-type: none"> <li>A sense of isolation and remoteness.</li> <li>High levels of perceived naturalness due to lack of modification.</li> </ul>
<p><b>Mapped extent</b></p> <p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows uses bathymetric data to inform the extent of the identified Coastal Marine Area of the Outstanding Natural Character Area.</p> <p>Although not always the case, it was concluded that this would be appropriate for this Outstanding Natural Character Area. This extent includes the marine farm off Moturua Island (Rabbit Island).</p> <p>Terrestrially, this covers the entire Motukawao Group, as identified at the Level 4.</p>	
Motukawao Island Group Rating	Outstanding

*Right (above):  
Motukaramarama Island  
(Bush Island), foreground,  
with Motuwi Island (Double  
Island) in the background*

*Right (below): Exposed,  
unmodified rocky shores*

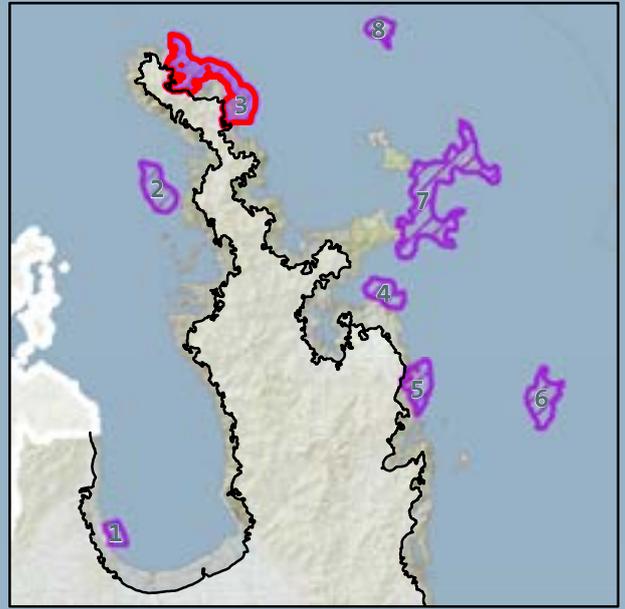




## Coastline between Fletcher Bay and Kennedy Bay

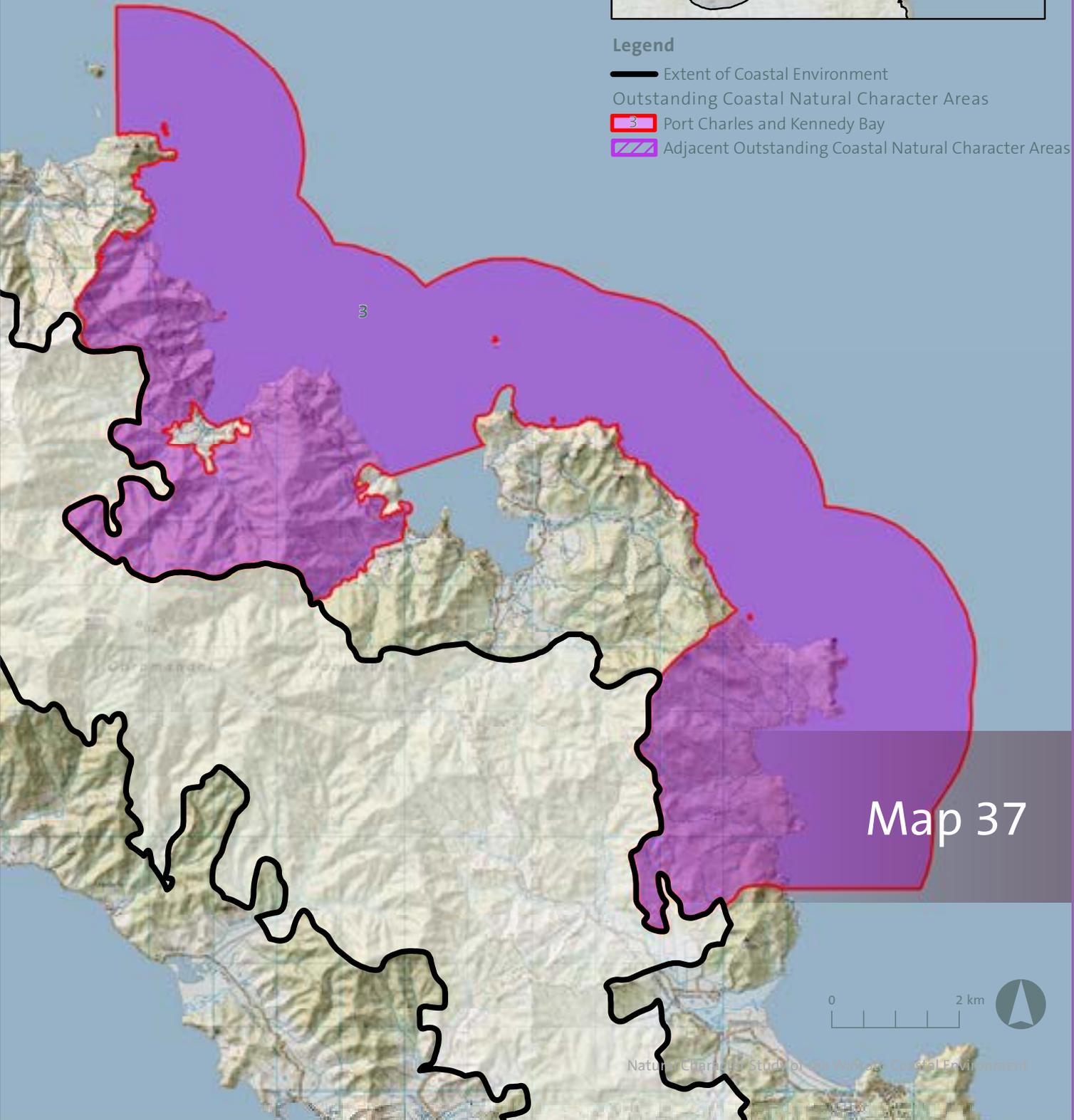
*This area of Outstanding Natural Character includes the most remote and unmodified parts of the mainland, encompassing a steep and dramatic coastline where vegetation sequences are broadly intact.*





Legend

- Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
  - 3 Port Charles and Kennedy Bay
  - Adjacent Outstanding Coastal Natural Character Areas



Map 37



## Coastline between Port Charles & Kennedy Bay Outstanding Natural Character Attributes (Level 4)

<b>CTA and rating (Level 3)</b>	Port Jackson (Moderate-High); Kennedy Bay (High)
<b>CMA and rating (Level 3)</b>	Eastern Coromandel (High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Limited modification to wild and rugged coastline.</li> <li>Dramatic cliffs and exposed rocky shores amplify areas unique geology.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Entire coastal near shore indented coastal waters hold an array of high biotic habitats with limited modification.</li> <li>High reef fish richness between Port Jackson and Tuataewa.</li> <li>Steep valleys and spurs contain a mixture of unmodified native shrub land and forest.</li> <li>Extensive areas under formal protection in Conservation Areas, QEII covenants. The Moehau ecological area in particular, supports an almost complete altitudinal sequence of plant and animal communities from near sea level to sub-alpine conditions. It is home to a number of rare or endangered endemic species (e.g. land snails, Archey's frog).</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>Unmodified coastal edge forms majority of coastline, amplifying perceived naturalness.</li> <li>Wild and remote feel within more open waters.</li> </ul>
<p><b>Mapped extent</b></p> <p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows the high marine mapping at the Level 4 scale, which is approximately 2km off shore. The 2km limit was decided by the marine experts as an appropriate offshore distance with respect to understanding the marine environment, where greatest knowledge is around the areas closest to land. Although not always the case, it was concluded that this would be appropriate for this Outstanding Natural Character Area.</p> <p>For the terrestrial component, the extent follows the very high Level 4 mapping, which is delineated broadly by the extent of intact indigenous forest. Areas of modification have been excluded from this area.</p>	
<b>Coastline between Port Charles &amp; Kennedy Bay Rating</b>	<b>Outstanding</b>

*Right (above): Sequences of vegetation from land to water are in many cases unmodified*

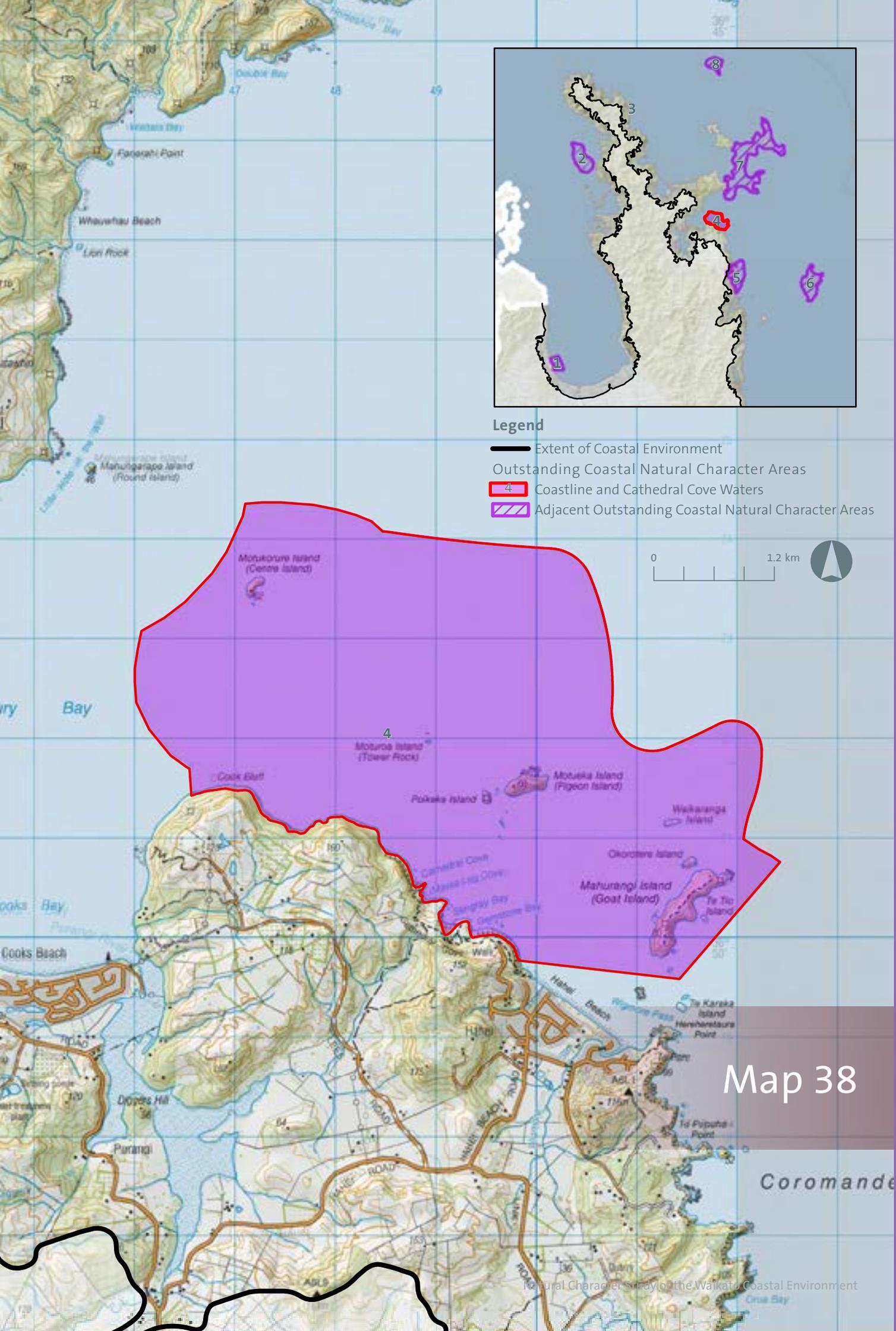
*Right (below): Exposed, unmodified rocky shores*





## Coastline, coastal waters and islands off Cathedral Cove

*Ecologically rich coastal waters of this marine reserve are defined by unmodified forest clad islands and dramatic natural sculptural landforms that exemplify outstanding degrees of naturalness.*



## Coastline, coastal waters and islands off Cathedral Cove Outstanding Natural Character Attributes (Level 4)

CTA and rating (Level 3)	Whitianga (Moderate)
CMA and rating (Level 3)	Eastern Coromandel (High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Spectacular coastal arch, isolated stack (Te Horo Rock) and impressive cliffs of white ignimbrite at Cathedral Cove cumulatively read as an extremely well defined set of landforms of scientific and educational value that are unmodified</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Te Whanganui-A-Hei (Cathedral Cove) Marine Reserve contains a variety of habitats including hard rock, soft sediment, caves and arches with high levels of ecological naturalness.</li> <li>Ribbon of indigenous bush skirts the steep coastal fringe.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>Cumulatively, the offshore islands hold high degrees of perceived naturalness due to their modified form.</li> <li>High experiential values due to the bush lined white sands and recognisable landforms of Te Horo Rock and Cathedral Cove.</li> <li>Visually dramatic eroded coastal landforms that are etched into the psyche of New Zealanders and visitors.</li> </ul>
<b>Mapped extent</b>	
<p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>Includes the entire Te Whanganui-A-hei (Cathedral Cove) Marine Reserve including adjacent Mahurangi Island (Goat Island) and the bathymetric data of the sea floor.</p>	
<b>Coastline, coastal waters and islands off Cathedral Cove Outstanding Natural Character Attributes Rating</b>	<b>Outstanding</b>

*Right (above): Picturesque Cathedral Cove*

*Right (below): Wave-cut peninsulas pepper this coastline*

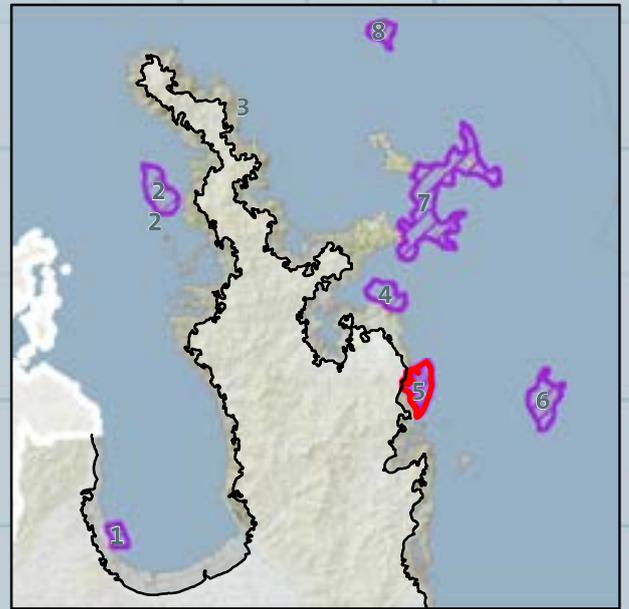




## Remote coastline and coastal waters off Taupuaetahi

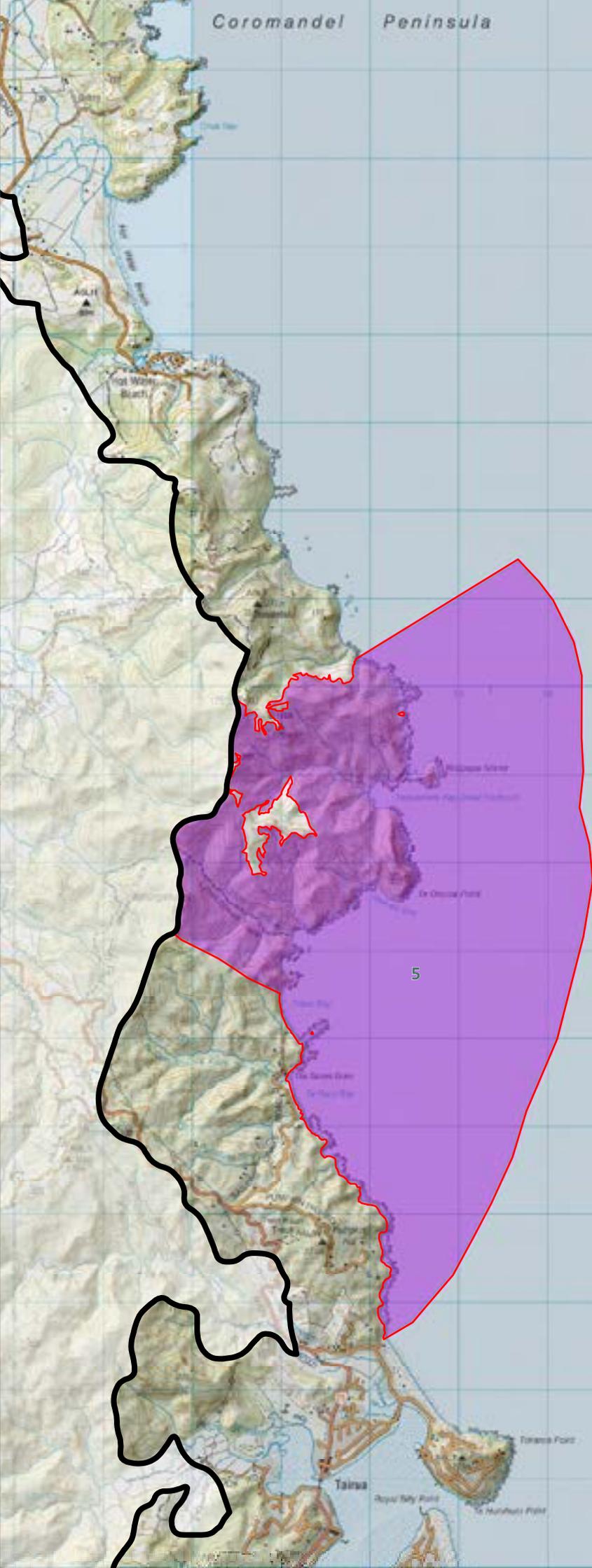
*Unmodified forest clad slopes extend towards remote coastline holding comprising rugged and heavily eroded headlands and small intimate sandy bays with rich coastal waters*





Legend

-  Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
-  5 Tapuaetahi Bay and Coastline
-  Adjacent Outstanding Coastal Natural Character Areas



Map 39



## Remote coastline and coastal waters off Taupuaetahi Outstanding Natural Character Attributes (Level 4)

<b>CTA and rating (Level 3)</b>	Hot Water Beach (Moderate- High)
<b>CMA and rating (Level 3)</b>	Eastern Coromandel (High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Exposed rocky cliffs, shores and beaches are representative of natural processes.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Comprised mainly of Coromandel State Forest Park (notably southern sections) and numerous areas of QEII land.</li> <li>Strong unmodified sequential link between land and sea.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>Access is difficult to gain with a rugged shoreline which amplifies perceived naturalness.</li> <li>Very high degree of experiential values due to limited modification and extent of indigenous bush cover.</li> <li>Wildness and remote experiential values along the rocky and indigenous bush-clad coastline.</li> </ul>
<b>Mapped extent</b>	
<p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows the very high marine mapping at the Level 4 scale, which is approximately 2km off shore. The 2km limit was decided by the marine experts as an appropriate offshore distance with respect to understanding the marine environment, where greatest knowledge is around the areas closest to land. Although not always the case, it was concluded that this would be appropriate for this Outstanding Natural Character Area.</p> <p>The terrestrial component is contained by the very high terrestrial mapping at the Level 4 scale which is determined primarily by the extent of indigenous intact mature bush (i.e. Coromandel State Forest Park)</p>	
<b>Remote coastline and coastal waters off Taupuaetahi Rating</b>	<b>Outstanding</b>

*Right (above): Rocky shores*

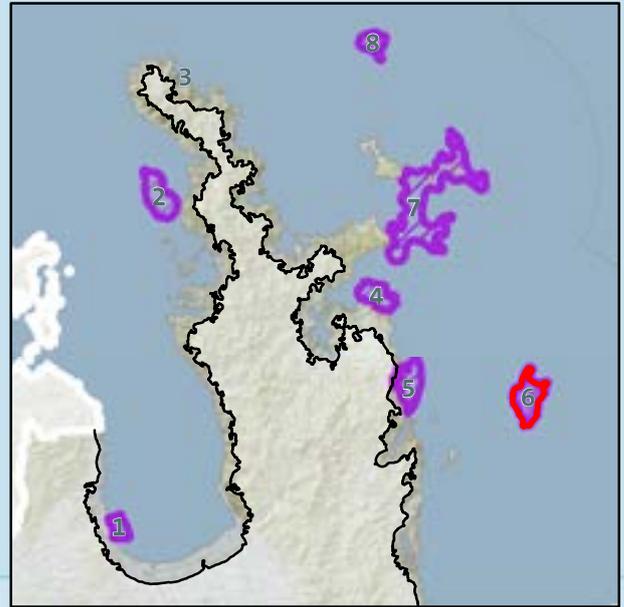
*Right (below): Wave-cut peninsulas pepper this coastline*





## Aldermen Islands and coastal waters

*Encompassing this island group, this area of Outstanding Natural Character includes the exceptionally remote and rugged rocky islands and ecologically rich coastal waters.*



**Legend**

-  Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
-  6 Aldermen Islands
-  Adjacent Outstanding Coastal Natural Character Areas



Map 40



Aldermen Islands and coastal waters Outstanding Natural Character Attributes (Level 4)	
CTA and rating (Level 3)	Outer Island Group (Very High)
CMA and rating (Level 3)	Eastern Coromandel (High)
Values	
Abiotic	<ul style="list-style-type: none"> <li>• Forms part of a larger submarine platform that has been eroded almost entirely by wave action.</li> <li>• Steep rhyolite features provide a range of spectacular rocky coastal landforms such as spires, needles and vertical bluffs that extend through the archipelago.</li> </ul>
Biotic	<ul style="list-style-type: none"> <li>• A nature reserve/wildlife sanctuary comprising five main islands with high reef fish.</li> <li>• Contains threatened and endangered species including tuatara, giant centipedes; lizards (geckos and skinks) and tusked weta and giant weka. These islands also support large populations of seabirds, notably petrels, storm petrels and shearwaters.</li> <li>• High diversity and richness of demersal reef fish.</li> <li>• Strong unmodified sequential link between land and sea.</li> </ul>
Experiential	<ul style="list-style-type: none"> <li>• Very high remote values evident, including darkness of the sky</li> </ul>
<p><b>Mapped extent</b></p> <p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows uses bathymetric data to inform the extent of the identified Coastal Marine Area of the Outstanding Natural Character Area.</p> <p>Terrestrially, this covers the entire Aldermen Island Group, as identified at the Level 4.</p>	
Aldermen Islands and coastal waters Rating	Outstanding

*Right (above): Impressive wave-cut rock formations*

*Right (below): Jagged rocks and secluded bays*

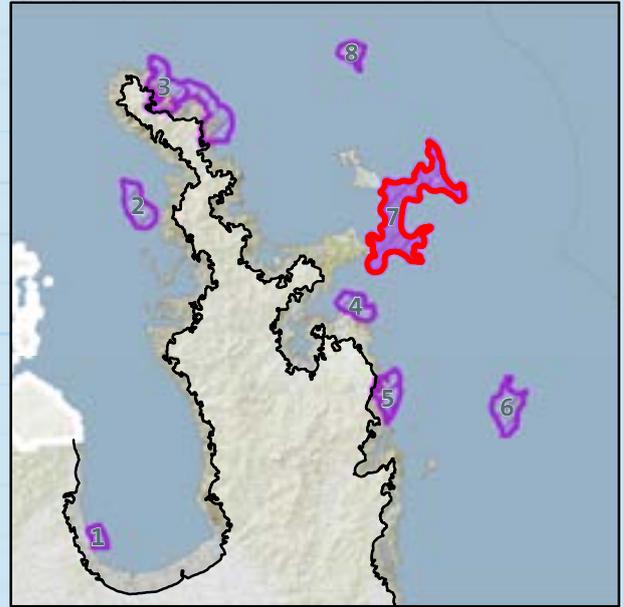




## Mercury Islands and associated coastal waters

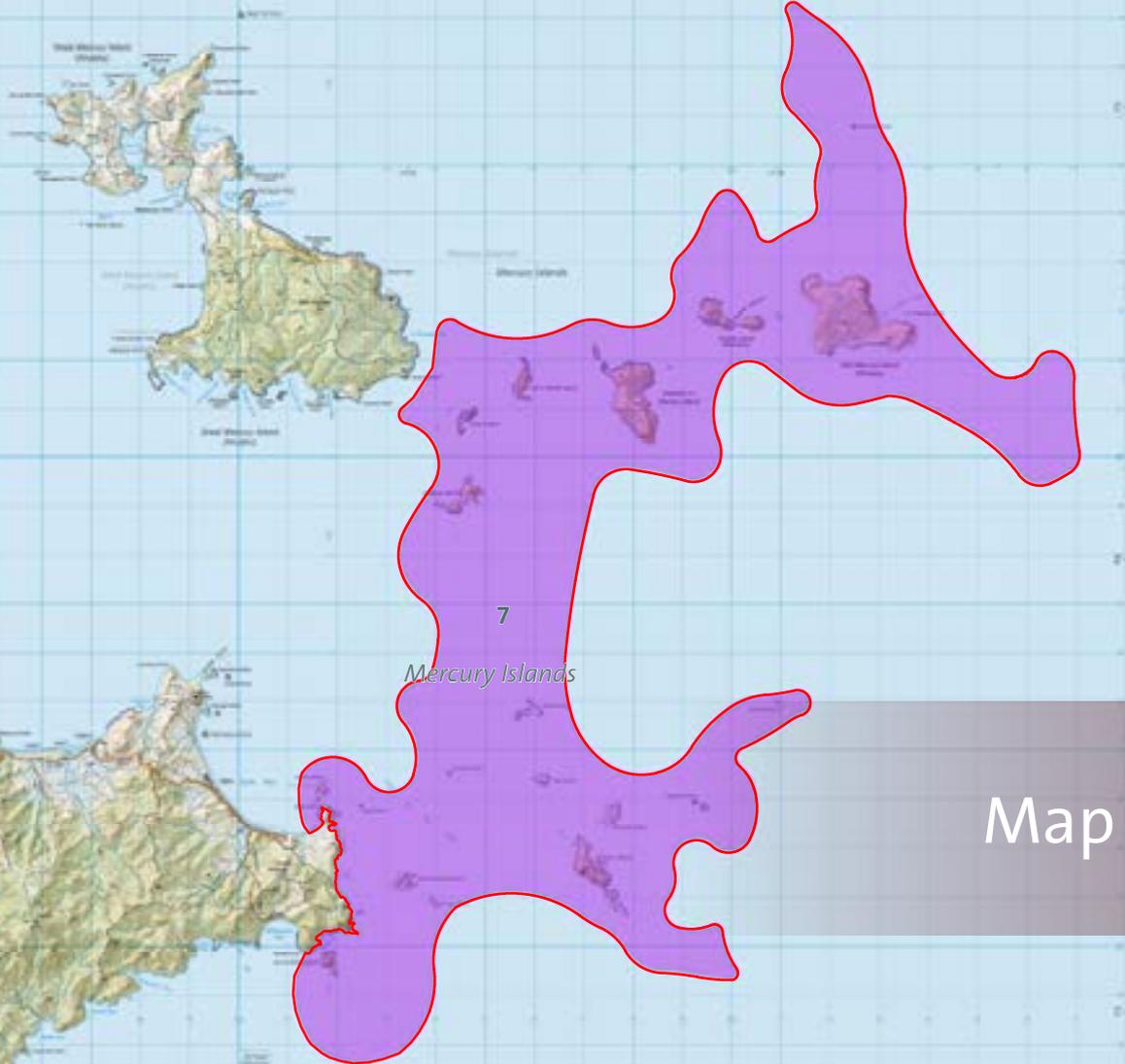
*This area of Outstanding Natural Character encompasses the remote and ecologically rich islands associated with the Mercury Group. The unmodified and spectacular coastal landforms retain outstanding degrees of naturalness as well as holding a diverse range of ecological biota.*

Cuvier Island Repanga



Legend

- Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
- 7 Mercury Islands
- Adjacent Outstanding Coastal Natural Character Areas



Map 41



## Mercury Islands associated coastal waters Outstanding Natural Character Attributes (Level 4)

CTA and rating (Level 3)	Outer Island Group (Very High)
CMA and rating (Level 3)	Eastern Coromandel (High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Exposed and rocky shorelines are devoid of modification.</li> <li>Spectacular exposed geology and coastal landforms exemplify coastal processes including the Korapuki Sea Arch; the Stanley Island basalt vents and cone; and Red Mercury Island basalt.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Six of the Mercury Islands (excluding Great Mercury Island) are nature reserves.</li> <li>High species of reef fish and intact habitats around islands</li> <li>These Islands contain threatened and endangered species including tuatara, giant centipedes; lizards (geckos and skinks) and tusked weta and giant weka. These islands also support large populations of seabirds, notably petrels, storm petrels and shearwaters.</li> <li>Strong unmodified sequential link between land and sea</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>High perceived naturalness values due to limited modification.</li> </ul>
<p><b>Mapped extent</b></p> <p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows uses bathymetric data to inform the extent of the identified Coastal Marine Area of the Outstanding Natural Character Area.</p> <p>Terrestrially, this covers the entire Mercury Group (apart from Great Mercury Island) and Cuvier Island, as identified at the Level 4.</p>	
<b>Mercury Islands associated coastal waters Rating</b>	<b>Outstanding</b>

*Right (above): Red Mercury Island (Whakau)*

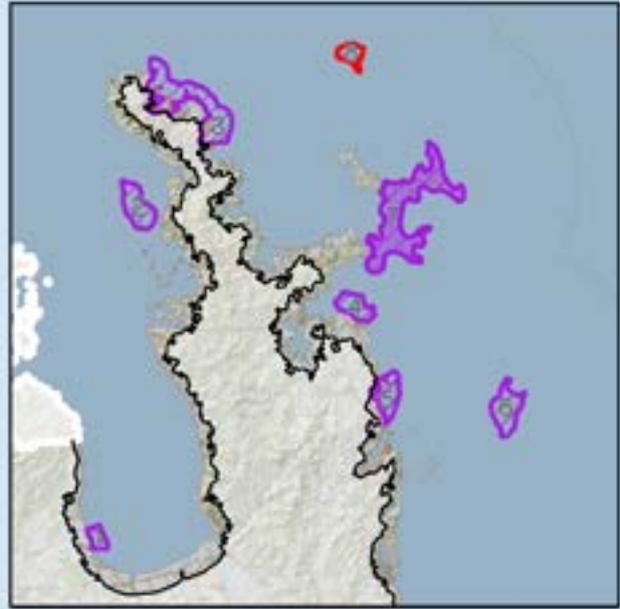
*Right (below): Exposed red rock on Red Mercury Island (Whakau)*





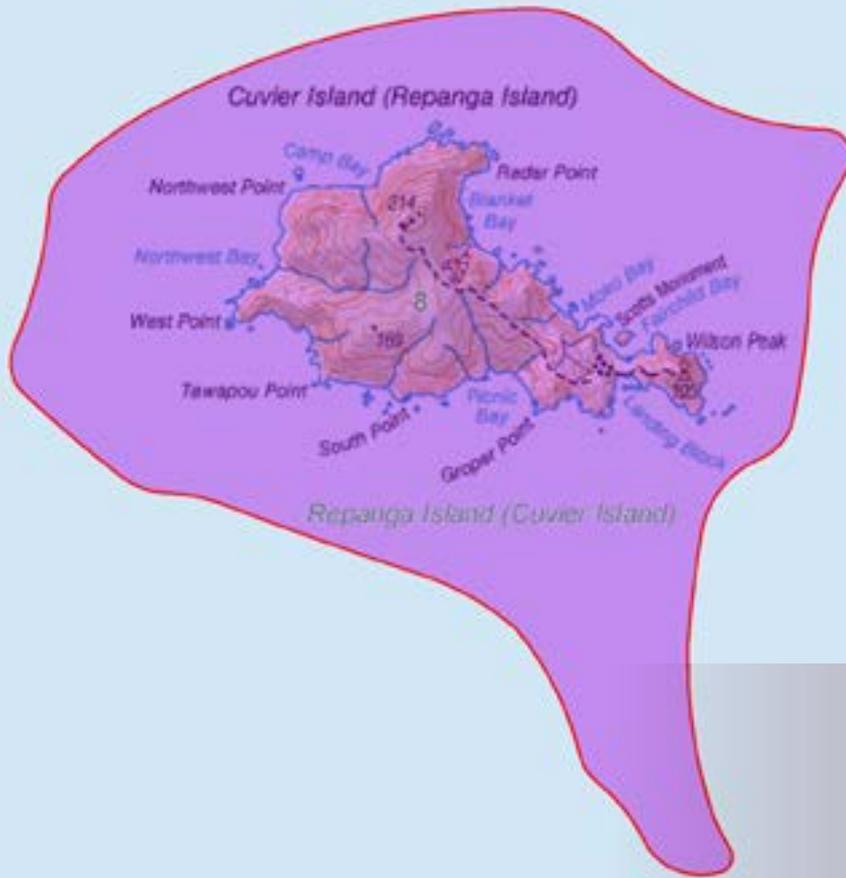
## Repanga / Cuvier Island and associated coastal waters

*This area of Outstanding Natural Character encompasses the remote and ecologically rich island of Cuvier Island. The unmodified and spectacular coastal landforms retain outstanding degrees of naturalness as well as holding a diverse range of ecological biota.*



**Legend**

-  Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas**
-  Repanga Island (Cuvier Island)
-  Adjacent Outstanding Coastal Natural Character Areas



Map 42

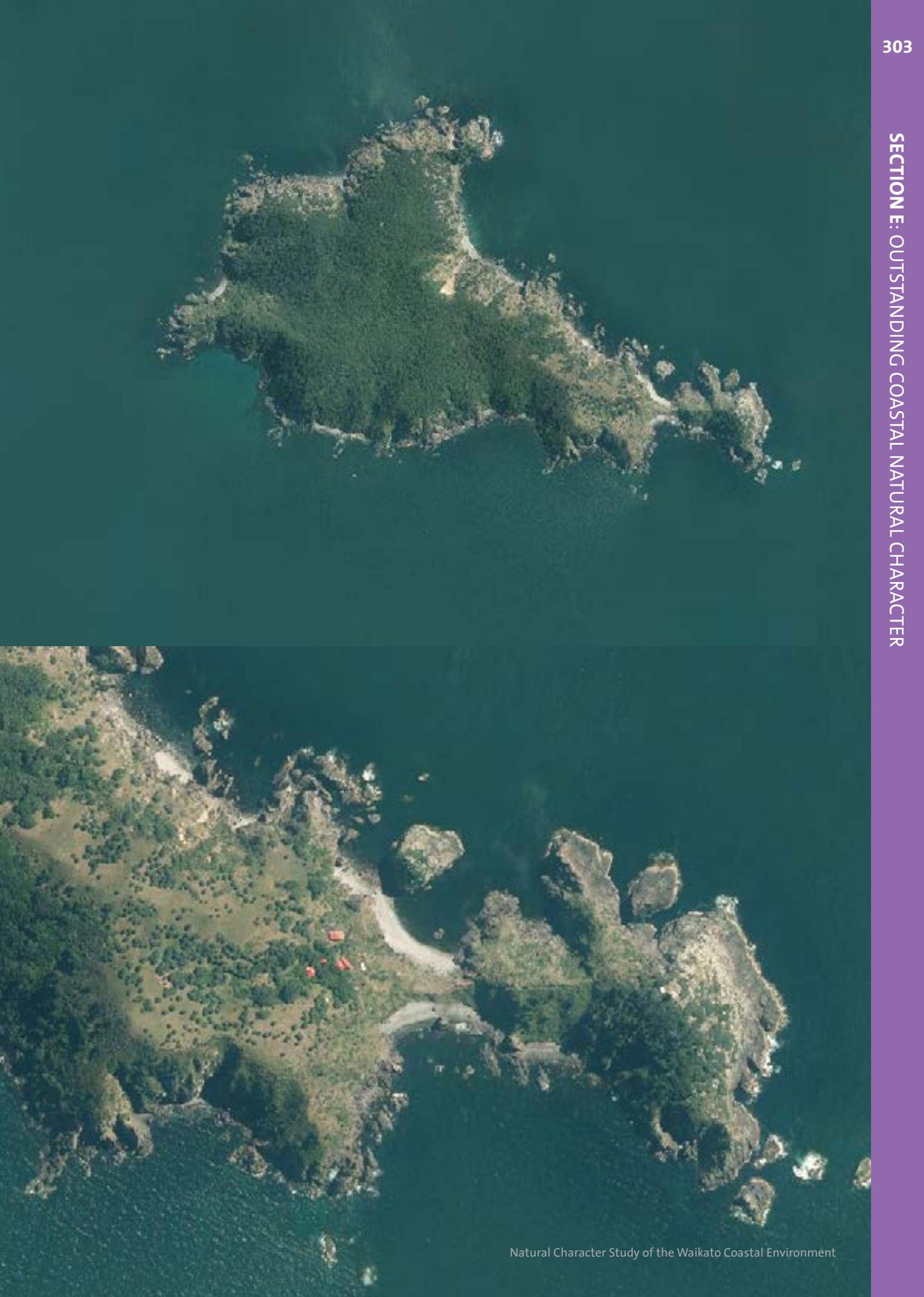


## Repanga / Cuvier Island and associated coastal waters Outstanding Natural Character Attributes (Level 4)

CTA and rating (Level 3)	Outer Island Group (Very High)
CMA and rating (Level 3)	Eastern Coromandel (High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Exposed and rocky shorelines are devoid of modification.</li> <li>Repanga / Cuvier Island tourmalinised rocks represents a good example of exposed large black crystals of tourmaline evident from the shoreline.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Repanga / Cuvier Island is a nature reserve.</li> <li>High species of reef fish and intact habitats around the island.</li> <li>Contain threatened and endangered species including tuatara, giant centipedes; lizards (geckos and skinks) and tusked weta and giant weka. These island also support large populations of seabirds, notably petrels, storm petrels and shearwaters.</li> <li>Strong unmodified sequential link between land and sea.</li> <li>Regenerating native bush cover.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>High perceived naturalness values due to limited modification.</li> <li>Strong sense of remoteness due to distance from mainland.</li> <li>Modification associated to DOC cabins and historical light house.</li> </ul>
<p><b>Mapped extent</b></p> <p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows uses bathymetric data to inform the extent of the identified Coastal Marine Area of the Outstanding Natural Character Area.</p> <p>Terrestrially, this covers the entire Cuvier Island, as identified at the Level 4.</p>	
<b>Repanga / Cuvier Island and associated coastal waters</b>	<b>Outstanding</b>

*Right (above): Red Mercury Island (Whakau)*

*Right (below): Exposed red rock on Red Mercury Island (Whakau)*



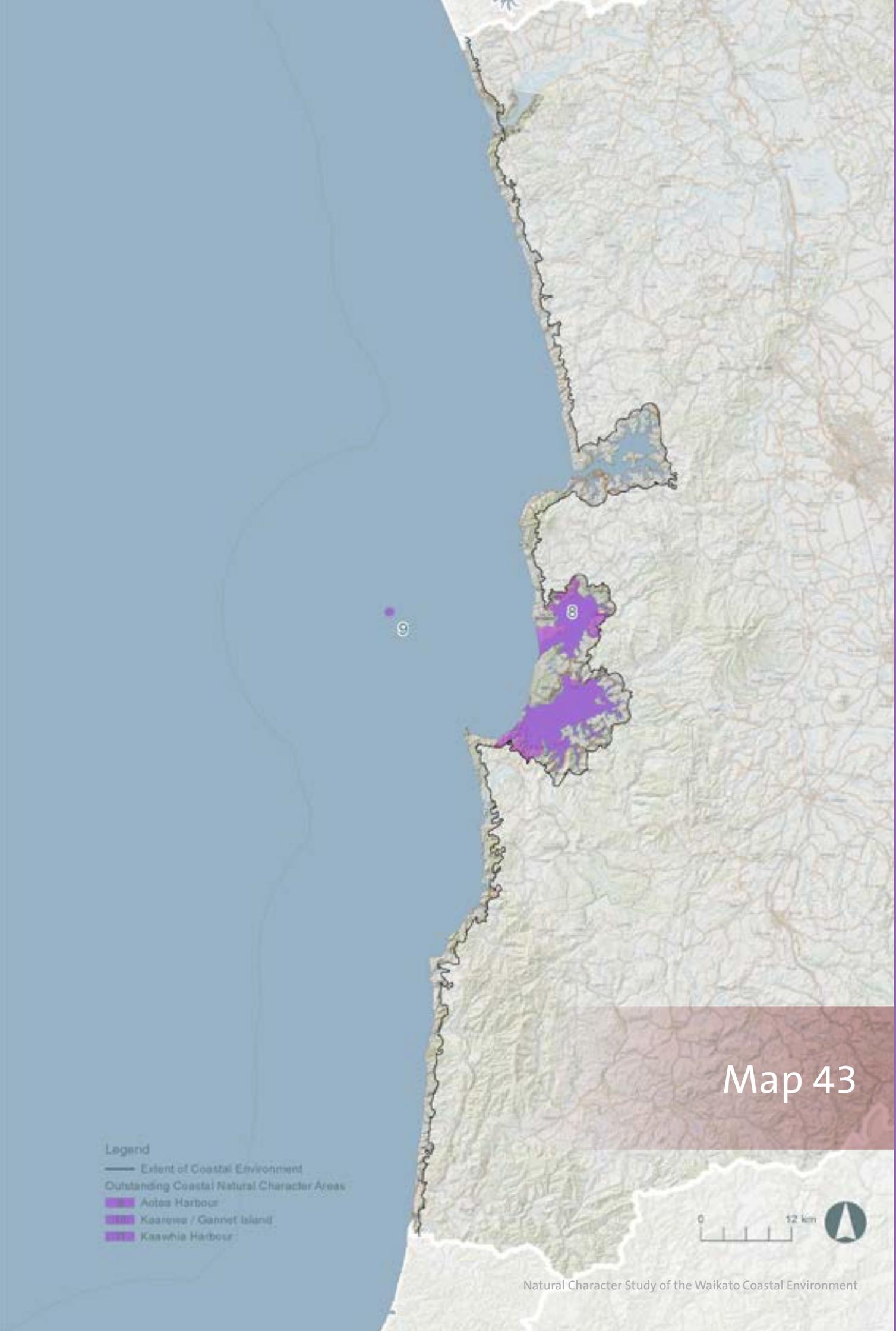
# Waikato’s West Coast

On Waikato’s West Coast, three Outstanding Natural Character Areas (ONCs) have been identified. They are listed in the table below, identified collectively on the facing map and described in the following es.

Outstanding Natural Character Areas for Waikato’s West Coast	
9	Coastal waters & margins of Aotea Harbour (Map 44)
10	Kaarewa Island / Gannet Island (Map 45)
11	Coastal Waters and Margins of Kaawhia Harbour (Map 46)

*Below: Potahi Point and Aotea Harbour*





Map 43

- Legend
- Extent of Coastal Environment
  - Outstanding Coastal Natural Character Areas
    - Aotes Harbour
    - Kaarewa / Gannet Island
    - Kaawhia Harbour



## Coastal waters & margins of Aotea Harbour

*This area of Outstanding Natural Character encompasses the remote and ecologically important Aotea Harbour, coastal dunes, and harbour estuarine and bush margins. The unmodified and spectacular coastal landforms retain outstanding degrees of naturalness as well as holding a diverse range of ecological biota.*



## Coastal waters and margins of Aotea Harbour Outstanding Natural Character Attributes (Level 4)

CTA and rating (Level 3)	Aotea Harbour Margins (Very High),
CMA and rating (Level 3)	Aotea Harbour (Very High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>Dramatic and highly dynamic large active dune system at the harbour mouth. Considered a geopreservation site the abiotic processes are an excellent example of the unmodified coastal processes of the west coast.</li> <li>The shallow harbour and its intertidal zone remain largely unmodified except for the margins of the residential settlement. The fluvial processes remain largely unmodified excluding some culverts at the southern edges of the harbour where vehicle access is provided for. The remainder of the harbour retains the natural estuarine and wetland features which contribute to the movement of water into and out of the harbour.</li> <li>Inner harbour islands are remnants of the harbour margins.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Some 930ha of regenerating forest and indigenous scrubland borders the harbour, with seven ecological sites registered by Waikato Regional Council.</li> <li>Potahi Point sand dunes provides an excellent example of native vegetation sequencing from dune to coastal shrubland to estuarine vegetation. This is a key ecological site.</li> <li>Rauiri Head dune scrubland is also a registered ecological site.</li> <li>Large areas of the harbour margin are heavily vegetated with native bush cover transitioning to estuarine vegetation and wetlands upstream. The natural patterns and their connectedness highlight the natural landform and microclimate present in each area of the harbour.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>High perceived naturalness values due to limited modification.</li> <li>High experiential values associated with the interpretation of the dominant abiotic and biotic processes occurring within the harbour and on its margins. The experience of the 'entire dune process' from coast to inner harbour is memorable and recognised as completely natural and unmodified.</li> <li>The lack of access and in turn remoteness is apparent in the mid to northern parts of the area.</li> <li>The lack of human modification within the identified area is a significant part of the experience of the naturalness of the area.</li> </ul>
<b>Mapped extent</b>	
<p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>For the marine area, the extent follows the very high marine mapping at the Level 4 scale, which excludes the modified coastal edge and waters around Aotea village.</p> <p>Terrestrially, this covers Potahi Point dunes including large areas of native bush cover and excludes smaller pockets of narrow native bush along the harbour margin.</p>	
<b>Coastal waters and margins of Aotea Harbour Rating</b>	<b>Outstanding</b>

*Right (above): Potahi Point*

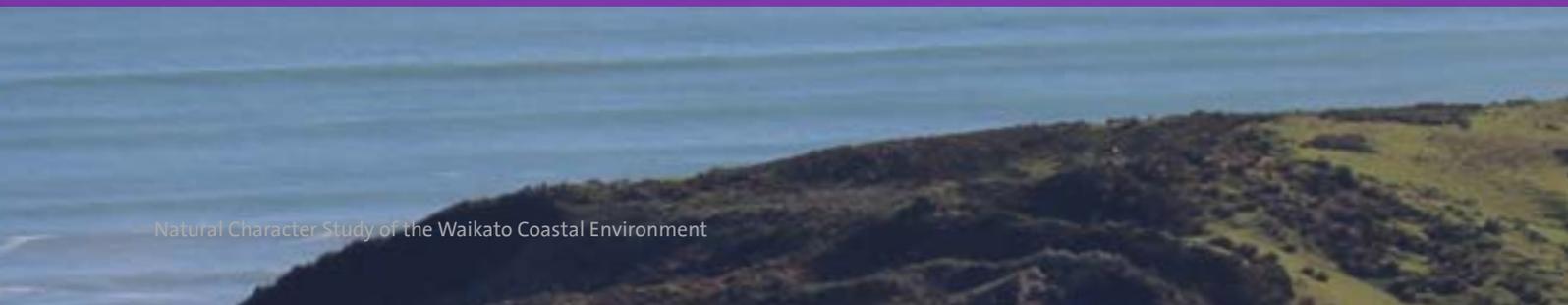
*Right (below): Pirau Native Bush and Aotea Harbour*





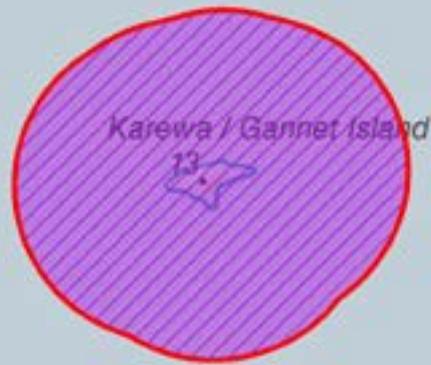
## Kaarewa Island / Gannet Island

*This area of Outstanding Natural Character encompasses the very remote and ecologically important rock cone of Kaarewa Island. The unmodified and spectacular feature retains its outstanding degree of naturalness, as well as providing a colony for gannet seabirds and a haul out for furseal.*



**Legend**

- Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
- ▭ Kaarewa / Gannet Island
- ▨ Adjacent Outstanding Coastal Natural Character Areas



Map 45



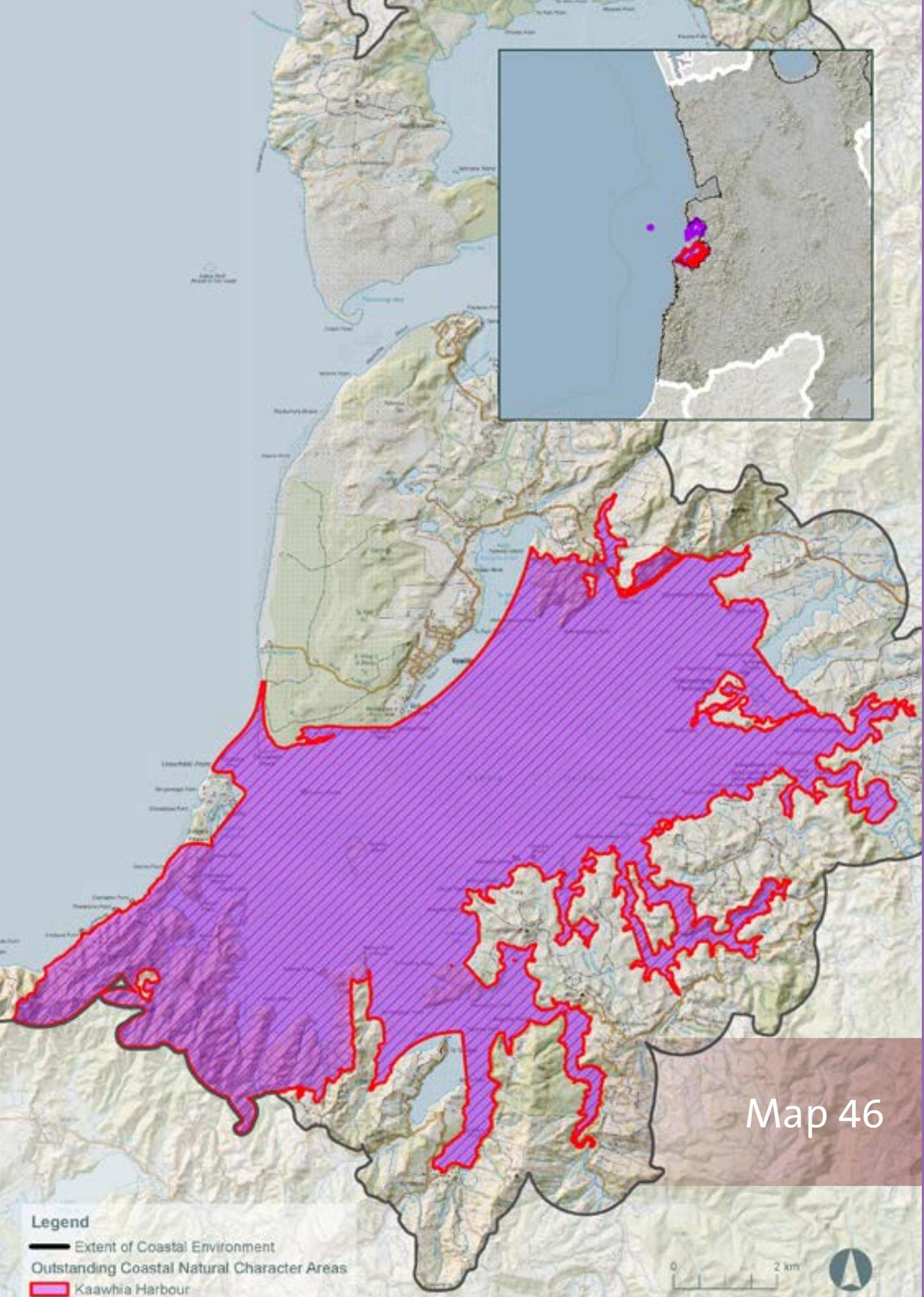
Kaarewa Island / Gannet Island Outstanding Natural Character Attributes (Level 4)	
CTA and rating (Level 3)	Kaarewa Island / Gannet Island (Very High)
CMA and rating (Level 3)	Kaarewa Island / Gannet Island (Very High)
Values	
Abiotic	<ul style="list-style-type: none"> <li>• Located 19 kilometers off the coast the island is 2ha in size rising some 15m above sea level from a 65m base. The island is an eroded tuff ring that erupted about half a million years ago.</li> <li>• The conditions are harsh with no permanent fresh water.</li> <li>• The low-lying nature of the island means that in big swells the island can be entirely washed over.</li> <li>• Guano is present and was mined in the late 1800's for a short period of time.</li> <li>• Dynamic and exposed island expressive of the natural abiotic processes which formed it and continue to erode it.</li> </ul>
Biotic	<ul style="list-style-type: none"> <li>• A wildlife sanctuary and New Zealand's largest breeding colony for Australasian gannet birds (<i>Morus serrator</i> / takapu), holding about 8000 breeding pairs.</li> <li>• It is a haul out for NZ Fur Seal.</li> <li>• Sealife is abundant and is popular destination for diving and bird watching.</li> <li>• Extreme isolation and exposure results in an absence of vascular plants and flora.</li> <li>• Vegetation is limited to a small area (3m<sup>2</sup> on the summit cliffs) comprising <i>Prasiola</i>, <i>Xanthoria</i>, <i>Tortula</i> and <i>Xanthoparmelia</i>, primarily lichen, moss and green alga.</li> </ul>
Experiential	<ul style="list-style-type: none"> <li>• High perceived naturalness values due to extremely minimal modification.</li> <li>• High sense of remoteness and experience of the daily natural processes from abiotic and biotic factors.</li> <li>• Experiential values are highly associated with isolation and observation of natural wildlife and dynamic coastal processes.</li> </ul>
<b>Mapped extent</b> The mapped extent of this Outstanding Natural Character Area is defined by the following: For the marine area a 500m offset around the island extent and including the entire 2ha of the terrestrial area.	
Kaarewa Island / Gannet Island Rating	Outstanding





## Coastal Waters and Margins of Kaawhia Harbour

*This area of Outstanding Natural Character encompasses the remote and ecologically important Kaawhia Harbour and bush margins. The unmodified and spectacular coastal landforms retain outstanding degrees of naturalness, as well as holding a diverse range of ecological biota.*



Map 46

**Legend**

- Extent of Coastal Environment
- Outstanding Coastal Natural Character Areas
  - Kaawhia Harbour
  - ▨ Adjacent Outstanding Coastal Natural Character Areas



## Coastal Waters and Margins of Kaawhia Harbour Outstanding Natural Character Attributes (Level 4)

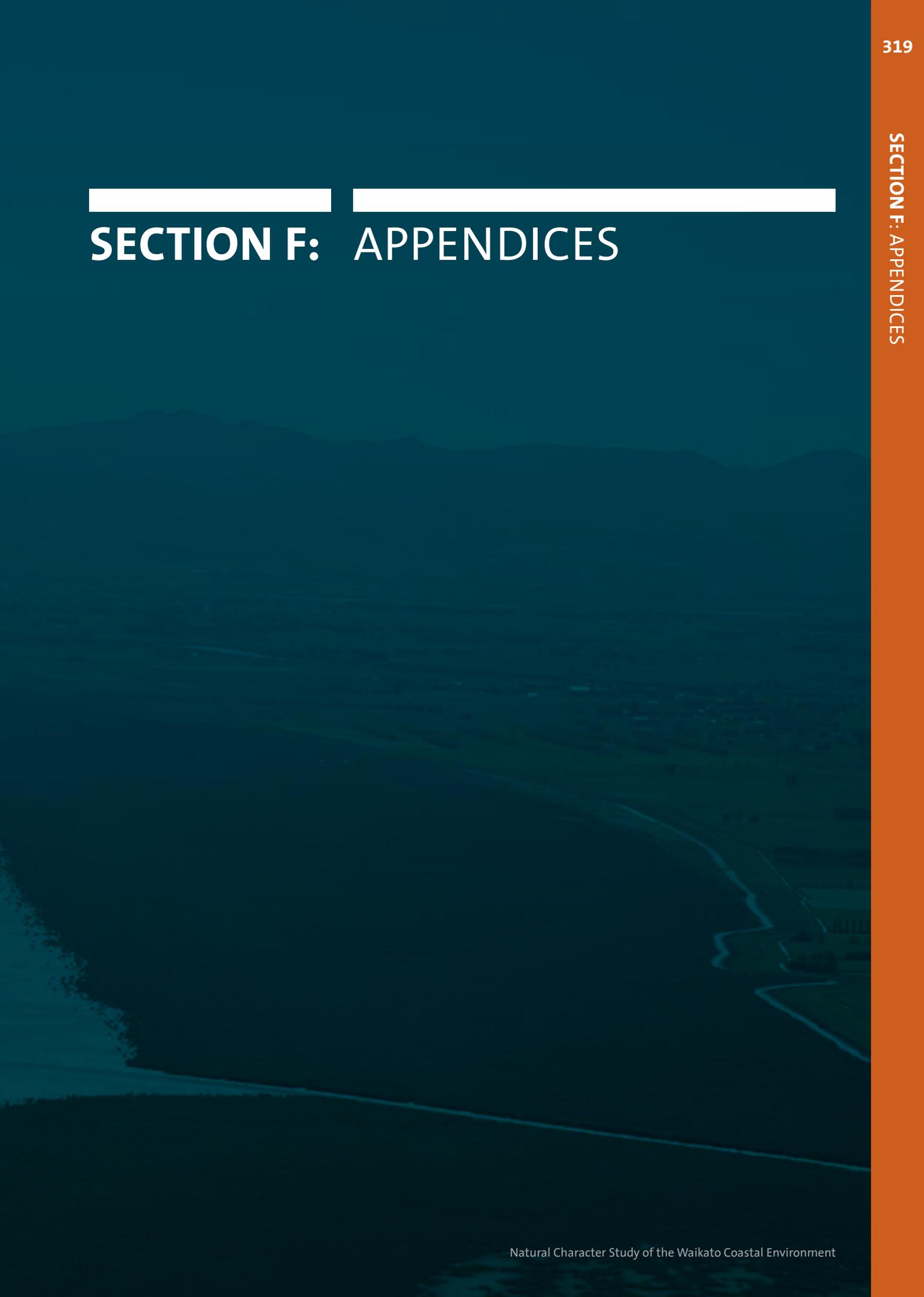
<b>CTA and rating (Level 3)</b>	Kaawhia Harbour (High and Very High)
<b>CMA and rating (Level 3)</b>	Kaawhia Harbour (Very High)
<b>Values</b>	
<b>Abiotic</b>	<ul style="list-style-type: none"> <li>The shallow harbour and its intertidal zone remain largely unmodified except for the margins of the residential settlement. The fluvial processes remain largely unmodified excluding some culverts at the southern edges of the harbour where road and vehicle access is provided for. The remainder of the harbour retains the natural estuarine and wetland features which contribute to the movement of water into and out of the harbour.</li> <li>The heavily vegetation southern extent of the harbour demonstrates impressive sequencing of native vegetation through to estuarine vegetation.</li> </ul>
<b>Biotic</b>	<ul style="list-style-type: none"> <li>Known for containing sites of national importance for wintering indigenous and international migratory shorebirds.</li> <li>The harbour is identified as being an Area of Significant Conservation Value (ASCV) by Waikato Regional Council.</li> </ul>
<b>Experiential</b>	<ul style="list-style-type: none"> <li>High perceived naturalness values due to limited modification on the southern extents of the harbour margin and the mid to southern portions of the harbour body itself.</li> <li>High experiential values associated with the interpretation of the dominant abiotic and biotic processes occurring within the harbour and on its margins.</li> <li>The lack of access and in turn remoteness is apparent in the southern areas of the harbour.</li> <li>The lack of human modification within the identified area is a significant part of the experience of the naturalness of the area.</li> </ul>
<b>Mapped extent</b>	
<p>The mapped extent of this Outstanding Natural Character Area is defined by the following:</p> <p>Much of the harbour and its native bush margins excluding the settlement area and modification of the harbour edges and channels around Kaawhia settlement.</p>	
<b>Coastal waters and margins of Kaawhia Harbour Rating</b>	<b>Outstanding</b>







# SECTION F: APPENDICES



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## Appendix 2: Glossary

Name	Description
Active Coastal Interface	<i>Part of the Coastal Significance Zone (CSZ) (or Coastal Terrestrial Zone) that is generally a slender component of the CSZ where the sea is the dominant element and the primary or significant influence on landform, vegetation and perception.</i>
aggradational	<i>Is the term used in geology for the increase in land elevation due to the deposition of sediment. Aggradation occurs in areas in which the supply of sediment is greater than the amount of material that the system is able to transport. The mass balance between sediment being transported and sediment in the bed is described by the Exner equation. (Wikipedia)</i>
alluvium / alluvial	<i>Sediments such as sand, silt or gravel that have been deposited by streams, rivers and other running waters</i>
ascidians	<i>Sessile filter-feeding invertebrates. Also known as sea squirts or tunicates. May be solitary or colony forming.</i>
backswamp	<i>backswamps are wetlands, at or near mean sea level, that form part of the coastal floodplains</i>
barrier spit	<i>A long elongate sand and gravel ridge above the high tide and connected at one end to the mainland, extending generally parallel with the shore but separated from it by a lagoon</i>
benthic	<i>The surface of the seabed</i>
brachiopods	<i>Small clam-like animals which superficially look like bivalve molluscs</i>
brackish	<i>Water which is a mix of freshwater and saltwater; e.g. estuarine water</i>
basal	<i>Base as in basement rock</i>
bryozoans	<i>Colonial mound-forming animals which superficially look like corals but which belong to a totally different group of animals</i>
Carpophyllum	<i>Large brown macroalgae, also known as flapjack</i>
coastal environment	<p><i>An environment in which the coast is a significant part or element taking account of an assessment of Policy 1 of the NZCPS 2010 and includes:</i></p> <ul style="list-style-type: none"> <li><i>The coastal marine area;</i></li> <li><i>-Islands within the coastal marine area;</i></li> <li><i>-Areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, -coastal wetlands and the margins of these; (Study Team emphasis)</i></li> <li><i>-Areas at risk from coastal hazards;</i></li> <li><i>-Coastal vegetation and the habitat of indigenous coastal species including migratory birds;</i></li> <li><i>-Elements and features that contribute to the natural character, landscape, visual qualities or amenity values;</i></li> <li><i>-Items of cultural and historic heritage in the coastal marine area or on the coast;</i></li> <li><i>-Inter-related coastal marine and terrestrial systems, including the intertidal zone; and</i></li> <li><i>-Physical resources and built facilities, including infrastructure, that have modified the coastal environment</i></li> </ul>

Name	Description
colluvium / colluvial	<i>A general term for weathered soil and rock material mantling slopes which has been transported primarily by gravity and sheet wash.</i>
cuestas	<i>Hill or ridge with a steep slope on one side and a gentle slope on the other – an asymmetric ridge</i>
Cusplate Forelands	<i>The largest sharp, seaward-projecting point of beach material, built up by wave action, occurring as a cape or as a broadly triangular point of sand or shingle</i>
Cystophora	<i>Large brown seaweed</i>
dendritic (drainage pattern)	<i>A drainage pattern in which the streams branch randomly in all directions and at almost any angle, resembling in plan the branching habit of certain trees</i>
depauperate	<i>An ecosystem that is lacking in numbers or variety of species, often because it lacks enough stored chemical elements required for life.</i>
dunes	<i>Dunes: An accumulation of sand built by wind or water.</i>  <i>Foredune: The more active part of dunes located closest to the sea.</i>  <i>Backdune: the backshore areas of a beach.</i>
Eelgrass	<i>Marine plant that primarily grows in the intertidal zone. Also known as seagrass.</i>
echinoderms	<i>Includes species like starfish, brittle stars, urchins and sea cucumbers</i>
ephemeral	<i>Water ways or waterbodies that are not permanent. Their surface expression changes depending on rainfall events or groundwater levels.</i>
ecological naturalness (also indigenous nature)	<i>In relation to the understanding of the term ‘natural character’ and separate but complementary to landscape naturalness. Ecological naturalness is an understanding of naturalness based on the level of intactness of indigenous ecosystems. Refer to Section B.</i>
estuarine	<i>Pertaining to or formed or living in an estuary, especially said of deposits and the sedimentary or biological environment of an estuary</i>
eutrophication	<i>The process of excessively increasing nutrient levels in water bodies through natural or artificial means. Artificial elevation of natural nutrient levels may be caused by human activities- e.g. livestock defecating on river banks, septic tank discharges.</i>
fans	<i>Gently sloping, fan-shaped masses of material formed along the margins of hills and mountain ranges by streams that drain their slopes. A fan commonly occurs where there is a marked decrease in gradient, for example where a stream meets the gentler floodplain or river terrace</i>
fetch	<i>(Also called Fetch length) is the length of water over which a given wind has blown.</i>
foliation	<i>The planar arrangement of textural or structural features, especially that which results from the flattening of constituent grains of metamorphic rocks</i>
Geopreservation Inventory	<i>Inventory and Maps of Important Geological Sites and Landforms in the Nelson and Marlborough Regions, including the Kaikoura District. Compiled by the Joint Earth Sciences’ Societies Working Group on the New Zealand Geopreservation Inventory. Lists the best examples of the wide diversity of natural and physical features and processes that characterise each part of New Zealand.</i>
galaxiids	<i>Native fishes belonging to the family Galaxiidae-consisting of migratory (whitebait species such as inanga, kokopu’s) and non migratory species (e.g. dwarf galaxias)</i>
herbfields	<i>A plant community where herbs are the dominant life-form. Herbs are defined as non-woody plants other than grasses, sedges and rushes and are usually small-leaved and prostrate.</i>

Name	Description
Holocene	<i>An epoch of the Quaternary period, from the end of the Pleistocene, approximately 8000 years ago, to the present time; also, the corresponding series of rocks and deposits.</i>
hydroids or hydroid trees	<i>Colonial animals related to jelly fish that form upright feather-like structures.</i>
Intertidal	<i>The area of the shore which is covered and uncovered by the rise and fall of the tide</i>
indurated	<i>To make harden (i.e. soils that had been indurated by extremes of climate.</i>
Lagoon	<i>A shallow body of water separated from a larger body of water by a barrier.</i>
Laminae	<i>The thinnest recognisable layers in a rock, differing from each other in colour, composition and/or particle size</i>
Landscape	<i>The cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations.</i>
landscape naturalness	<i>Also referred to as 'perceptions of nature' within the understanding of the term 'natural character'. Landscape naturalness refers to the experiential/ perceptual component of natural character (as interpreted by the study team). Essentially it is an understanding of naturalness based on the degree of visible human modification which is present in the landscape (i.e. the perception and appearance of naturalness rather than the more specific interpretation of indigenous). The remaining, yet complementary term 'ecological naturalness' is the (natural science) component of natural character. Refer to Section B of this study.</i>
Land Types systems	<i>Land types distinguish major physiographical landform units 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.</i>
Lithology	<i>The nature and composition of rocks</i>
macroalgae	<i>Large seaweeds.</i>
macrocystis	<i>A very large brown seaweed also known as giant kelp or giant bladder kelp</i>
Mica	<i>A mineral group consisting of phyllosilicates with sheet-like structures and characterised by very perfect basal cleavage</i>
natural character	<i>Is the term used to describe the natural elements of all coastal environments within the NZCPS. Refer to Section A of this report.</i>
naturalness	<i>A measure of the degree of human modification of a landscape/ seascape or ecosystem expressed in terms of:</i>  <i>i) ecological naturalness (indigenous nature); and</i>  <i>ii) landscape naturalness (perceptions of nature).</i>
offshore reef	<i>A ridge of rock with the top just below or just above the water surface which is located at some distance from the shore.</i>
outstanding natural character	<i>An area of outstanding natural character must be: 'those areas that 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'. (BML statement)</i>
Pleistocene	<i>An epoch of the Quaternary period, after the Pliocene of the Tertiary and before the Holocene. It began 2 to 3 million years ago and lasted until the start of the Holocene some 8000 years ago</i>
Phyllite	<i>A metamorphic rock, intermediate in grade between a slate and a schist, in which minute grains of sericite and chlorite impart a silky sheen to cleavage and schistosity surfaces</i>
phyllosilicates	<i>Silicate structures in which the SiO<sub>4</sub> tetrahedra occur linked together in infinite two-dimensional sheets. An example is mica</i>

Name	Description
Prograding (Progradation)	<i>The building forward or outward toward the sea of a shoreline or coastline (as a beach, delta, or fan) by near-shore deposition of river-borne sediments or by continuous accumulation of beach material thrown up by waves or moved by long-shore drifting</i>
Regression	<i>Is a geological process occurring when areas of submerged seafloor are exposed above the sea level. The opposite event, marine transgression, occurs when flooding from the sea covers previously exposed land. (Physical Geology: Exploring the Earth)</i>
relictual	<i>Of a natural area, community, vegetation type or population of species which is now remnant but which once had a wider, more continuous distribution and/or greater numbers.</i>
rhodoliths	<i>Unattached, branching, benthic red algae that superficially resemble coral.</i>
rocklands	<i>A plant community where exposed rock is the main cover over which plants are sparsely scattered, such as bluff faces and escarpments.</i>
segregation	<i>Compositional banding derived from an originally more homogeneous rock.</i>
Serpentine	<i>An ultramafic rock consisting almost wholly of 'serpentine' minerals which are formed by the metamorphic alteration of olivine and similar minerals.</i>
shrublands	<i>A plant community where shrubs are the dominant life-form. Shrubs are defined as woody plants less than 5m high and are usually multi-stemmed. Dense shrubland is also called scrub.</i>
Schist	<i>A strongly foliated regionally metamorphosed rock that can be readily split into slabs and coarser grained than slate or phyllite; applies to t.z.III and IV subzones</i>
Schistosity	<i>The foliation ('fissility') in schist, often due to the parallel planar arrangement of micas</i>
Semi-schist	<i>An informal term applied to a foliated metamorphic rock intermediate in textural development between a sediment and a schist; applies to t.z.IIA and IIB textural subzones.</i>
Spartina	<i>An exotic saltmarsh grass.</i>
Subtidal	<i>The area below the intertidal zone which remains permanently covered in water.</i>
supratidal zone	<i>Pertaining to the shore immediately marginal to and above high-tide level.</i>
tombolo	<i>A deposition landform in which an island is attached to the mainland by a narrow piece of land, such as a spit or bar.</i>
turbidity	<i>Discolouration of water caused typically by suspended sediment load.</i>
tombolo	<i>A sand or gravel bar or barrier that connects an island with the mainland or with another island.</i>
ultrabasic	<i>Relates to igneous rocks with very high contents of dark-coloured minerals containing iron and magnesium and less than 44% silica. The term is frequently used interchangeably with ultramafic.</i>
ultramafic	<i>Igneous rocks composed chiefly of mafic minerals.</i>
Ulva	<i>A type of green seaweed, common in areas with elevated nutrients.</i>
wave-cut platform	<i>Narrow flat area of rock often found at the base of a sea cliff, created by the erosion of waves.</i>
Wave-dominated beaches	<i>Beaches exposed to persistent ocean swell and waves and low tides (range &lt;2m). Consist of 3 types; Reflective, Intermediate (longshore bar and trough, rhythmic bar and beach, transverse bar and rip, low tide terrace) and Dissipative.</i>
Wave swash	<i>A turbulent layer of water that washes up on the beach after an incoming wave is broken.</i>





