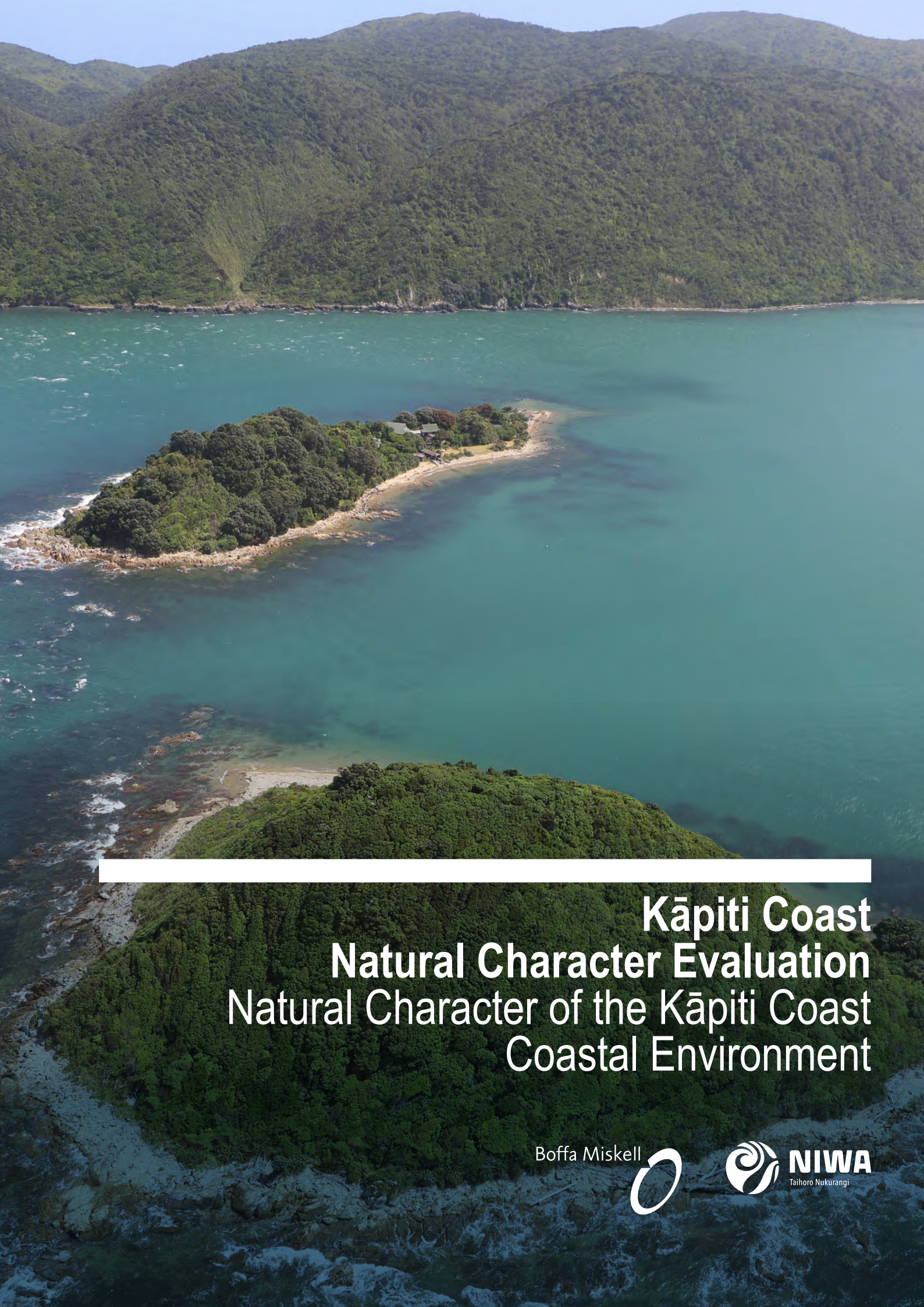

Kāpiti Coast
Natural Character Evaluation
Natural Character of the Kāpiti Coast Coastal Environment

Boffa Miskell

NIWA
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Document Quality Assurance

Bibliographic reference for citation:
Boffa Miskell Limited 2024. Kāpiti Coast Natural Character Evaluation: Natural Character of the Kāpiti Coast Coastal Environment

Report prepared by Boffa Miskell Limited for Kāpiti Coast District Council and Greater Wellington Regional Council.

Prepared by:	Boffa Miskell NIWA	
Reviewed by:	Boffa Miskell	
Status:	Revision / version: 3	Issue date: 06 May 2024

Revision History

REVISION No	DATE	STATUS	ISSUED TO
1	04 June 2021	Draft	Greater Wellington Regional Council Kāpiti Coast District Council
2	18 August 2022	Revised Draft	Greater Wellington Regional Council Kāpiti Coast District Council
3	06 May 2024	Final Draft	Greater Wellington Regional Council Kāpiti Coast District Council

File ref Indd: bm200454_KCDC_Natural_Character_Evaluation_Final_Report_2024

Front Cover: Tahoramaurea Island and Motungarara Island. Boffa Miskell, 2020.
Inside cover page: Kāpiti Island Settlement. Boffa Miskell, 2020.
Contents page: Whareroa Beach. Boffa Miskell, 2020.
Back Cover: Beach at Waiorua Bay. Boffa Miskell, 2021.

Kāpiti Coast Natural Character Evaluation

Prepared for Kāpiti Coast District Council and Greater Wellington Regional Council

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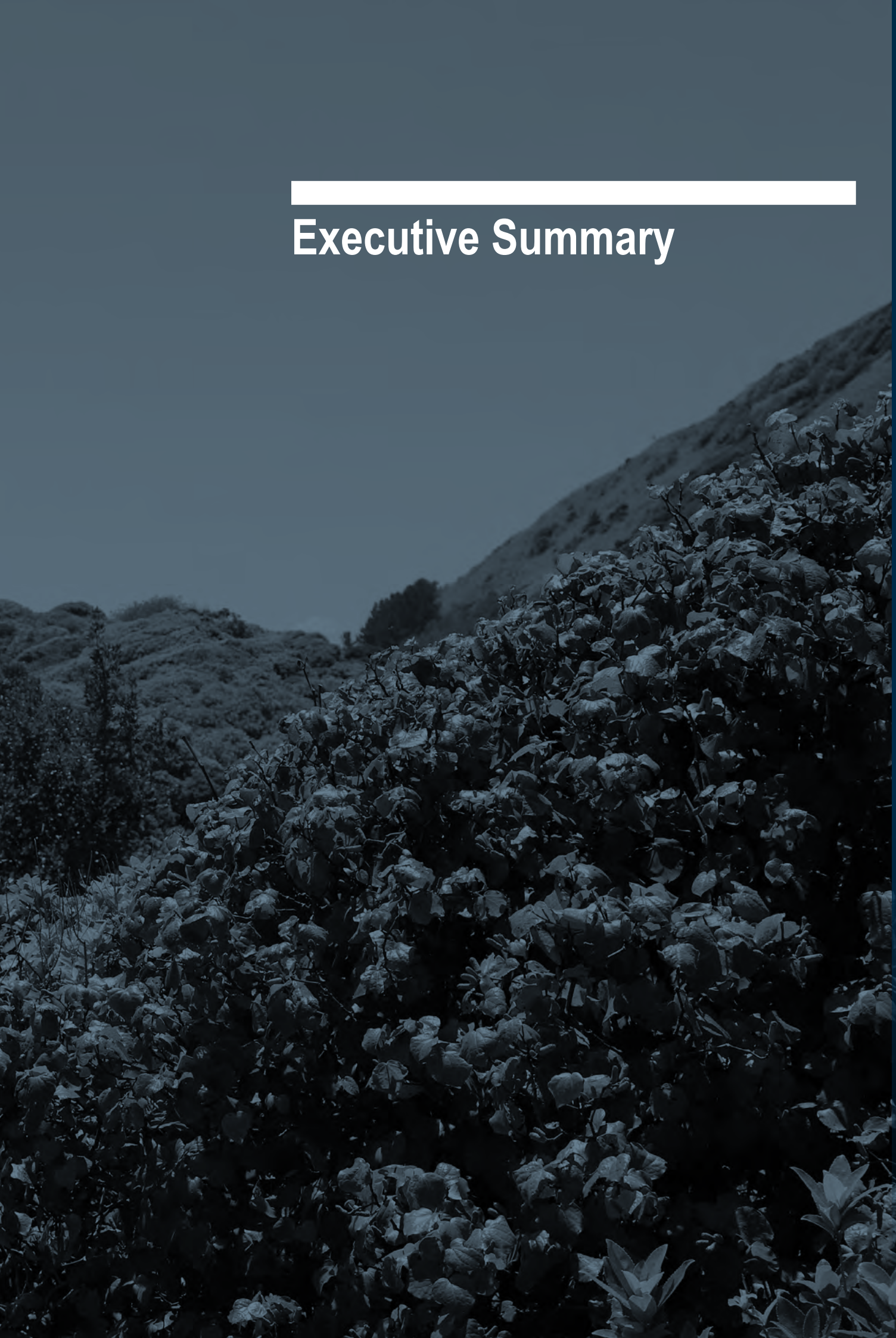


Executive Summary cover page: Ames Street Reserve Forest. Boffa Miskell, 2020.

Introduction

This assessment identifies the coastal environment of the Kāpiti Coast and evaluates levels of natural character to give effect to the requirements in the Wellington Regional Policy Statement (RPS) and the New Zealand Coastal Policy Statement (NZCPS) 2010. The study was jointly commissioned by Kāpiti Coast District Council and Greater Wellington Regional Council.

Methodology Overview

The study area comprises the coastal environment of Kāpiti Coast, including both terrestrial and marine areas. The terrestrial and marine coastal environment was evaluated by Boffa Miskell landscape architects and ecologists and marine scientists from NIWA.

The first step of this assessment identifies and maps the extent of the coastal environment. This encompasses the coastal marine area (CMA) extending out to the 12 nautical-mile limit and determines the inland extent, comprising a relatively narrow fringe of coastal land above mean high water springs (MHWS). The inland extent has been identified (with guidance from NZCPS Policy 1 (2)) as generally being the part of the coast where "coastal processes, influences or qualities are significant"[1]. That is, coastal processes, influences or qualities are not just present but significant.

The assessment of natural character has responded to NZCPS (Policy 13 – Preservation of natural character) and considers the extent to which existing natural elements, patterns and processes exist, and the level of human modification. This assessment has been considered in terms of abiotic, biotic and experiential attributes within a series of workshops with the study team[2]. Such natural character aspects have been described then rated in terms of the degree of biophysical modification alongside experiential aspects which exist as a result of the levels of modification remaining apparent.

To facilitate this assessment, the study area was considered to comprise 7 coastal areas (4 coastal terrestrial areas and 3 marine coastal areas). Each of these areas were evaluated in relation to relevant groupings of NZCPS attributes[3]. The natural character ratings for each attribute were then combined to determine the overall level of natural character (Map 2). Each terrestrial and marine area was then assessed at a finer scale to identify components which have high or very high levels of natural character, alongside a description of relevant abiotic, biotic and experiential attributes (Map 3).

The final step of this assessment considers whether any parts of the Kāpiti Coast's coastal environment have outstanding natural character. During this phase of the assessment, marine and terrestrial components with at least high natural character were considered together in the context of the Greater Wellington Region.

1. NZCPS Policy 1 (2)(c).

2. Refer to Tables 2 and 3 in Appendix 1 for the abiotic, biotic and experiential attribute descriptions for the coastal marine and coastal terrestrial environment

3. Attribute groupings based on the NZCPS Policy 13(2) list of items that may contribute to natural character.

Study Findings

The Kāpiti Coast coastal environment is largely characterised by the expansive dune system which extends along the lower west coast of the North Island. This coastal environment includes sandy beaches, wetlands, and estuaries including features such as the Otaki River and Waikanae Estuary and contains the main townships of Waikanae Beach, Paraparaumu Beach and Paekākāriki. To the north smaller residential settlements include Otaki Beach, Te Horo Beach and Peka Peka Beach. Offshore, Kāpiti Island is greatly different from the rest of the coast. The island is formed from the same underlying geology as the Marlborough Sounds and remains clad in indigenous forest surrounded by rocky reefs.

The CMA along the Kāpiti Coast occurs within the Central New Zealand marine region. The d'Urville ocean current is a prevalent feature of the Central region which connects the Tasman Sea and Pacific Ocean, and influences transport connectivity in the Kāpiti coastal region. This CMA traverses a wave-graded continental shelf that contains an active long-shore sand belt or inner shelf that is regularly resuspended by the wave climate driven by westerly winds. The muddier middle and outer shelf is broad. Kāpiti Island is a significant geomorphic feature surrounded by rocky reefs, small islets and Rauoterangi Channel along its eastern shore. In this context, the CMA typically retains higher levels of natural character than terrestrial areas except for Kāpiti Island. This is primarily due to higher levels of settlement and associated modification, particularly near Waikanae, Paraparaumu and Paekākāriki.

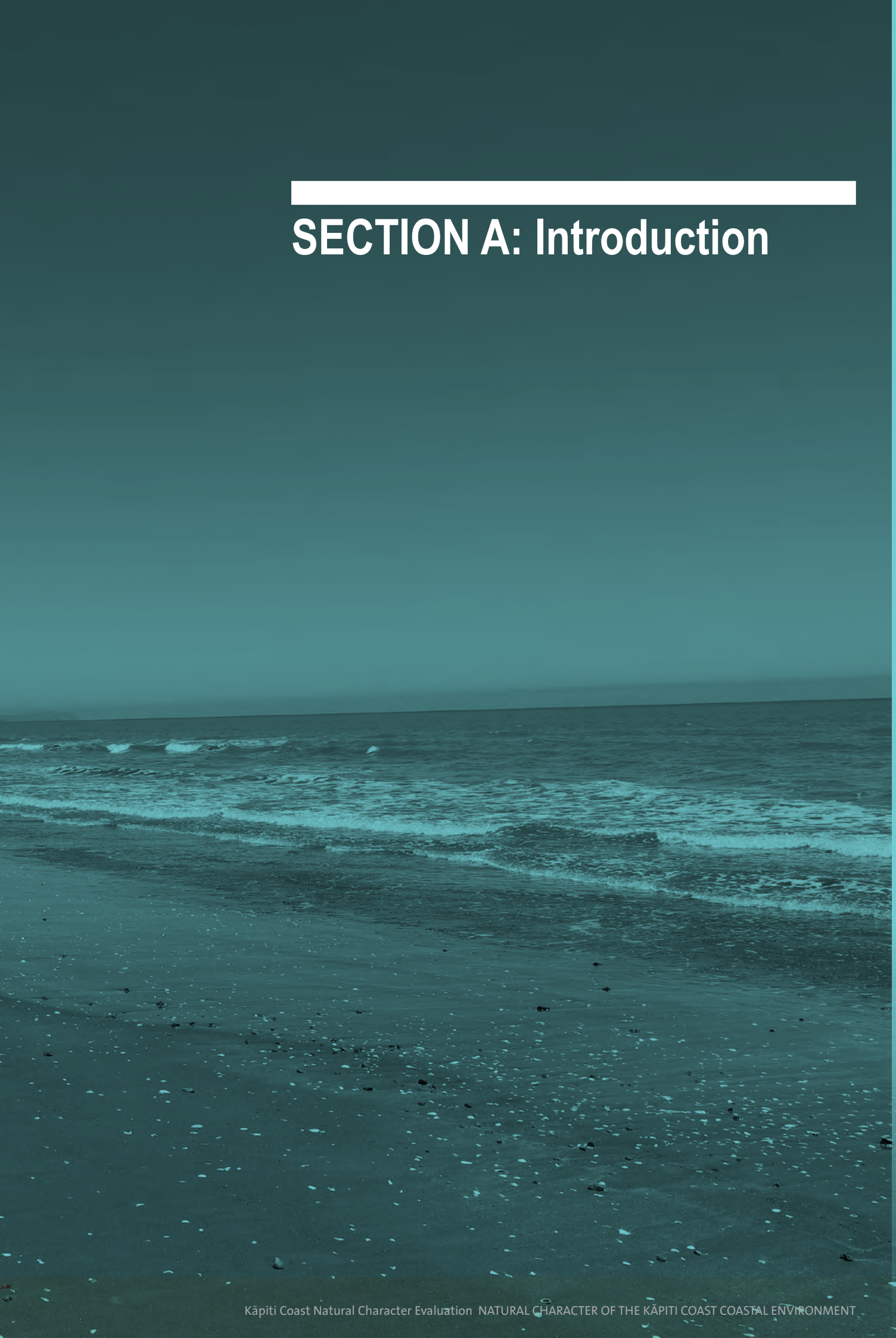
Within Kāpiti's coastal environment there are six marine components and eleven terrestrial components. Whilst the CMA does not contain the same number of high and very high natural character components, the components recognised cover a greater area. These components are predominantly associated with waters around Kāpiti Island and the offshore continental slope. Terrestrial components are predominantly associated with intact dune systems found along the length of the coast and enclaves associated with the Ōtaki River mouth and Waikanae Estuary. Kāpiti Island and its waters are identified as an area of Outstanding Natural Character.

The table below summarises the overall study findings.

Summary of Findings

HIGH NATURAL CHARACTER (number of components)	VERY HIGH NATURAL CHARACTER (number of components)	OUTSTANDING NATURAL CHARACTER (areas within components)
13	3	1

SECTION A: Introduction



Introduction cover page: View overlooking Paekākāriki Beach. Boffa Miskell, 2020.

Purpose & Background

The NZCPS 2010, requires local authorities under Policy 13 to map or otherwise identify (at least) areas of high natural character in the coastal environment. The NZCPS 2010 also refers to areas of outstanding natural character, necessitating an additional evaluation.

Kāpiti Coast District Council (KCDC) and Greater Wellington Regional Council (GWRC) engaged Boffa Miskell Limited (BML) to undertake a natural character assessment within the coastal environment to give effect to the New Zealand Coastal Policy Statement 2010 (NZCPS 2010) and Wellington Regional Policy Statement 2010 (RPS). To complete this assessment BML engaged marine scientists from NIWA to complement BML's terrestrial ecology and landscape expertise.

This report contains the preliminary results of the study, which the respective regional and district councils will review as part of the policy development of their resource management documents.

Since the completion of the previous version of this study, proposed Change 1 within the notified Regional Policy Statement has removed the requirement for natural character assessment to assess social values, encompassing sentimental and community values (Policy 3c). This assessment does not include social values to align with this direction and the NZCPS, 2010.

In addition, a subsequent assessment considering current region wide climate change impacts was completed in 2022 following the completion of the first draft of the KCDC assessment in 2021. To ensure consistency, key authors of the combined region wide coastal natural character assessments undertook a review of study findings using available present day information to confirm any implications to identified natural character ratings. This did not include potential or predicted impacts of climate change. No adjustments to natural character ratings were identified in the context of the Kāpiti Coast District.

Study Scope

Using a methodology applied in other recent natural character assessments of the coastal environment, the BML/NIWA study team refined the approach of the assessment to ensure consistency in the way landscape, ecological and marine expertise is harnessed for this study in the context of Kāpiti, which effectively:

- Determines the inland extent of the coastal environment, as set out in Policy 1 of the NZCPS;
- Identifies areas of at least high natural character in the coastal environment, as set out in Policy 13 of the NZCPS 2010; and
- Identifies any areas of outstanding natural character in the coastal environment, also as set out in Policy 13 of the NZCPS 2010.

This study does not address Policy 11 (indigenous biological diversity), Policy 14 (Restoration of natural character) nor Policy 15 (natural features and natural landscapes). Notwithstanding this, the inland extent of the coastal environment, as identified under NZCPS Policy 1, can inform the spatial extent of where other NZCPS policies may apply.

Study Process

The study has been undertaken as an independent technical assessment by Boffa Miskell and NIWA. The output from this study includes GIS shapefiles to inform Regional and District Plans.

The methodology used has been adapted from several coastal natural character studies recently completed by BML, including:

- Wairarapa Coastal Study: Natural Character of the Wairarapa Coastal Environment (2020);
- Wellington and Hutt City Coastal Study: Natural Character Evaluation of the Wellington City and Hutt City Coastal Environment (2016);
- Porirua Coastal Study: Natural Character Evaluation of the Porirua City Coastal Environment (2018);
- Southland/Murihiku Regional Coastal Environment Study: Coastal Natural Character Assessment (2019);
- Natural Character of the Marlborough Coast (2014);
- South Taranaki Landscape Assessment (2014);
- Nelson Coastal Study (2015); and
- Natural Character Study of the Waikato Region East Coast (2015).

Refinement of some aspects of the methodology adapted from previous studies took place during a workshop on 26th February 2021. This workshop was attended by marine scientists from NIWA and terrestrial ecologists and landscape architects from BML as well as representatives from KCDC and GWRC. During the workshop, the coastal environment including its inland extent was confirmed as well as the study methodology. This methodology was then applied at a broader 'area' and finer 'component' scales to determine levels of natural character present. The methodology is detailed in Appendix 1.

The assessment used a combination of desktop research, interrogation of GIS datasets and fieldwork. Fieldwork included an aerial reconnaissance by helicopter on 14th December 2020 and site visit to Kāpiti Island by boat on 7th May 2021. This also included a review of the Kāpiti Coast District Coastal Environment Study, 2012.

The assessment process comprises five key steps:

1	Identify and confirm the extent of the coastal environment, including the inland extent (study area);
2	Identify the marine and terrestrial coastal areas within the coastal environment and provide a description and documentation of each area;
3	Evaluation of the levels of natural character for each marine and terrestrial areas and identify "hot spots" or potential components within each area that may have at least high natural character;
4	Identify and confirm the spatial extent and attribute ratings of natural character components with high or very high levels of natural character at a finer scale; and
5	Evaluate outstanding natural character; that is, assess the combination of components with high or very high natural character to determine if all or any part of the coastal environment qualifies as having outstanding natural character.

Graphic Material and Mapping Scales

The printed graphics attached to this document illustrate the mapping provided in the corresponding GIS data sets. Detailed interrogation of the mapped areas should be carried out using the GIS software.

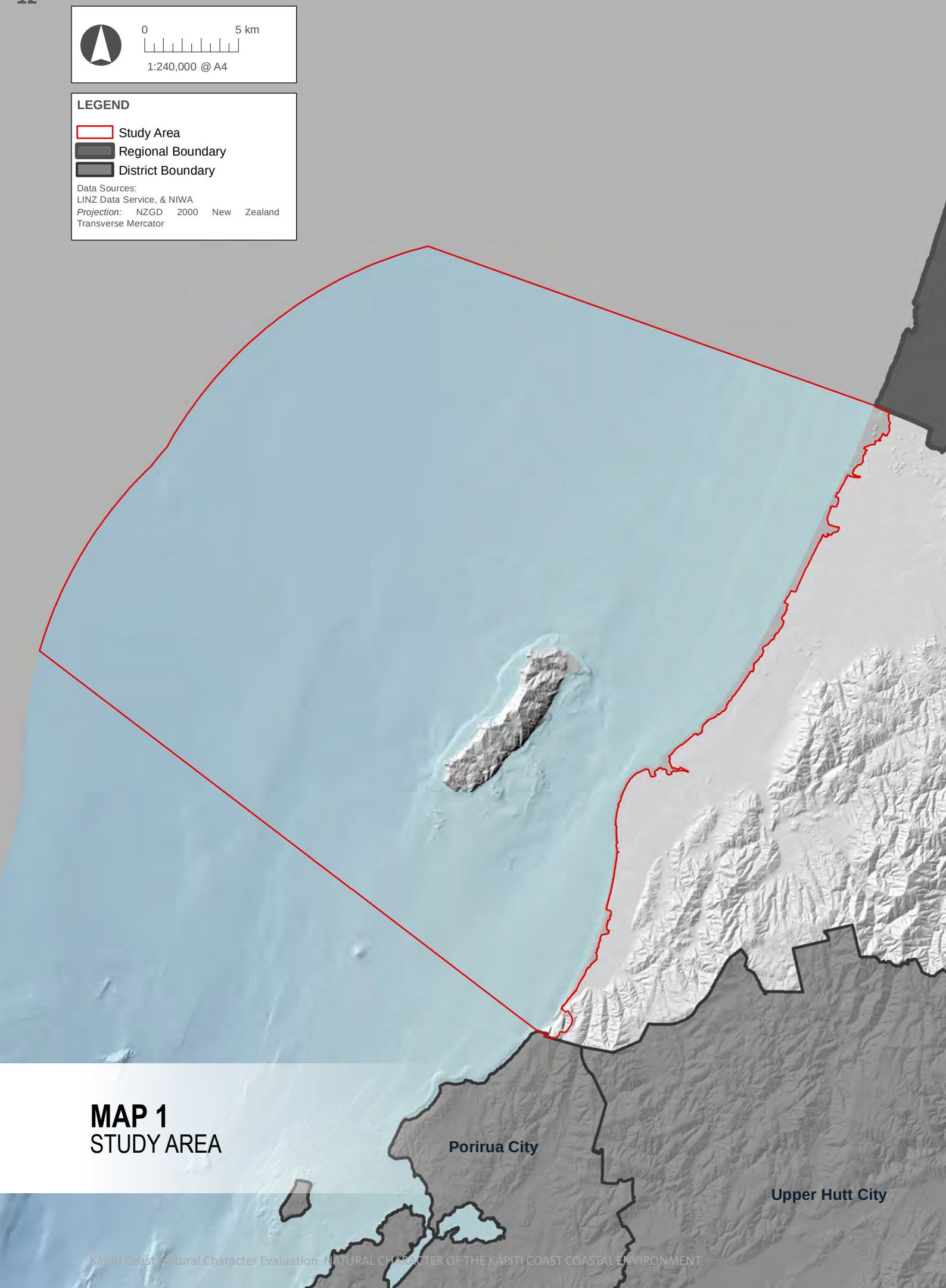
The mapping scale varies but most of the GIS base data used for this study is at scales greater than 1:50,000. Based on this, the coastal terrestrial and coastal marine areas (Section C) have been mapped at 1:50,000, following which the more detailed evaluation mapping of High and Outstanding Natural Character at 1:10,000.

Natural character assessment is necessarily context and scale related. Consequently, natural character assessments utilise different scales of reference that steadily decrease from the broad regional scale to the more detailed local scale. That is, different levels of natural character can be recognised in the coastal environment, depending on the level of detail gathered and the scale at which natural character is appreciated. Typically for very large-scale assessments a relatively coarse grain analysis is applied, with the grain of assessment generally increasing as the extent of the study area decreases.

The simplified diagram in Figure 1 illustrates the area and component scales assessed. The broader district scale, which is essentially an understanding of natural character within the context of the Kāpiti Coast. The coastal environment is described in Section B. Section C focuses on the coastal terrestrial and coastal marine areas (assessed at 1: 50,000) and includes specific recognition of components with at least high natural character (assessed at 1: 10,000).

Figure 1: Natural Character Assessment Scale

SECTION B:
The coastal environment of the Kāpiti Coast



MAP 1
STUDY AREA

Introduction to the Kāpiti Coast Coastal Environment

The Kāpiti Coast's coastal environment is largely nestled behind the wave shadow of Kāpiti Island and extends approximately 38 kilometres in length in a north south direction. The coastline is characterised by long, wide and gently sloping sandy beaches; terrestrial margins with predominantly vegetated dunes, extensive coastal erosion protection measures (e.g. wooden retaining walls or rocks); a number of small river estuaries and large intertidal flats at the Waikanae River Estuary (Stevens & Robertson, 2006). The marine environment is characterised by open waters containing the southward flowing D' Urville current and is strongly influenced by Kāpiti Island.

The coastal environment contains a variety of features including the Ōtaki River mouth, Waikanae Estuary, Queen Elizabeth Park, Paekākāriki Escarpment and offshore islands including Kāpiti Island, Motungarara Island, Tahoramaurea Island and Tokomapuna Island. The islands and the mainland are divided by the Rauoterangi Channel, an active fault line.

Much of the Kāpiti Coast has been settled or modified either through the development of Waikanae, Paraparaumu and Paekākāriki settlements in the south, and Ōtaki settlement and farming and lifestyle blocks in the north. As such, the inland extent of the coastal environment within which coastal processes, influences or qualities remains significant typically forms a narrow terrestrial area which culminates along active dunes. Notwithstanding this, much of Kāpiti Coast remains within the coastal context which coastal aspects remain present (see Figure 2). Further detail about the delineation of the coastal environment is set out in Appendix 1.

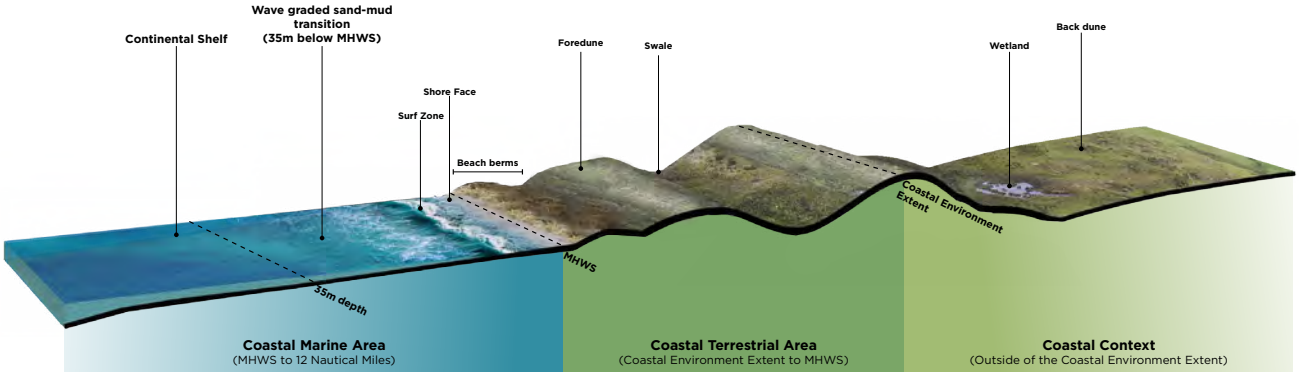


Figure 2: Typical transect of delineation of the coastal environment within the Kāpiti Coast

Abiotic Characteristics of the Kāpiti Coast Coastal Environment

Terrestrial

The abiotic characteristics of the Kāpiti Coast coastal environment range from the coastal dune fields on the mainland to the sheer rocky cliffs found on Kāpiti Island. The geology is predominantly greywacke composed of a surficial Quaternary aoelian (windblown) dune sequences underlain by older Quaternary alluvial, colluvial and marine sediments. This relatively thin sedimentary sequence is underlain regionally by bedrock of poorly bedded mudstones and sandstone Torlesse greywackes (Begg and Johnston 2000). Within the study area, greywacke bedrock is exposed on Kāpiti Island and its surrounding rocky platform. The difference in age between the surficial Quaternary sand dunes which form much of the Kāpiti Coast and the bedrock of Kāpiti Island is over 200 million years.

The majority of the coastal terrestrial environment is characterised by the Holocene dune field which stretches the length of the Kāpiti Coast and beyond into the Manawatu Region. The dunes are flanked by a coastal plain which is more extensive in northern areas of the District followed by undulating dunes reaching up to thirty metres in height. The dunes vary from low parallel dunes (dunes which have formed parallel to the prevailing wind) to barchan dunes (U-shaped dunes formed from blow outs or migration of sand). Abiotically, some of these dunes are in good condition, whereas the shape and stability of others is influenced by vegetation cover, particularly marram grass which creates steeper dunes that are more prone to blow-out. In some areas, the extent of dune systems has been greatly reduced through settlement and built development.

The Paraparaumu cuspate foreland is a defining feature of the Kāpiti Coast coastal environment. The distinctive, tapering geological feature was formed through a rapid progradation of coastal sediment due to its location within the wave shadow of Kāpiti Island. Consequently, the settlements of Waikanae and Paraparaumu Beach have been established on the sweeping geological feature. The growth of the cuspate foreland has meant that southern areas of the Kāpiti Coast do not receive as much sediment as a result of a northern longshore drift, causing erosion and scarped dunes in southern areas (Nolan, 2017). In contrast, beaches north of the cuspate foreland typically accumulate sediment.

Kāpiti Island is a dominant geological feature within the District which remains important for its biotic values. Much of Kāpiti Island remains intact except for isolated settlements to the north-east of the island and discreet walking tracks. Steep, undulating cliffs extend along the western edge of the island with significant levels of natural erosion occurring due to this part of the island being exposed to the prevailing winds. The island is surrounded by rocky reefs and three smaller islands, Motungarara Island, Tahoramaurea Island and Tokomapuna Island. Tahoramaurea Island and Tokomapuna Island remain largely intact with limited modification present. On Motungarara Island however there are two clusters of buildings at the north end, which include at least one dwelling and associated accessory buildings.

Other geological features within the Kāpiti Coast District include the Whareroa dune fields, Ōtaki beach ridges, and the Okupe uplifted lagoon on Kāpiti Island. On the mainland, much of Kāpiti Coast's coastal environment has undergone modification in the form of farms, large towns, and lifestyle blocks. Coastal protection measures are prominent throughout the coast including widespread revetment which extends approximately five kilometres south of the cuspate foreland near Paraparaumu.

Within the coastal environment there are numerous estuaries and river mouths. The Waikanae River estuary is a significant wetland area within the coastal environment. The larger Ōtaki, Manawatu and Rangitikei rivers to the north of the District carry significant dissolved and sediment loads coming from inland areas. Southward littoral currents bathe the Kāpiti coastal region in waters influenced by their riverine outputs.

The climate within the Kāpiti Coast District is one of the calmer areas in the Wellington Region. Average median annual wind speeds are approximately 5m/s however Kāpiti Island, being more exposed to Cook Strait has average wind speeds of 7 -8 m/s. Rainfall averages between 1,000 and 1,200mm annually. Sunshine hours vary between the mainland and Kāpiti Island with the mainland experiencing approximately 1,900 hours annually while Kāpiti Island experiences 1,700 hours (Chappell, 2014).

Marine

The Kāpiti coastal region lies within the Central New Zealand marine environment. The Central New Zealand region is influenced by the eastern Tasman Sea and ocean dynamics from the west coast of the South Island (Chiswell et al., 2019). Cool plumes of nutrient-rich upwelled water originate on the west coast and are carried by the d'Urville Current into Greater Cook Strait (Stevens et al., 2019). The d'Urville Current typically flows through South Taranaki Bight and then into Cook Strait. The mean flow of the d'Urville Current in the Kāpiti region is in the vicinity of Kāpiti Island.

River plumes are evident in the Kāpiti coastal region with turbid plumes regularly observed from satellites. Due to mean southeast flows of the d'Urville Current, river plumes from outside the region can be transported through the Kāpiti coastal region (O'Callaghan, 2019). The vertical extent of river plumes ranges from 5 to 40 m thickness near the surface. River plumes may be present without a sediment signal and detectable by salinity being lower than ambient ocean properties.

The Kāpiti region can be exposed to open-ocean swells and, at times, vigorous storms. Mean wave heights offshore from Kāpiti Island are typically around 2 m with wave periods between 6 to 12 seconds. Wave heights during storms that are greater than 3 m, occur around 10% of the time (Gorman et al., 2003). Swell direction is predominantly from the southern quarter. Wave heights are modulated by the island for southerly storms but storms from the northerly quarter can be of similar amplitude to southerly weather conditions.

The Kāpiti Coast is subjected to significant coastal erosion, particularly to the south of the cuspate foreland at Paraparaumu beach. During storm events the north and south of the District are the most likely to be impacted by coastal erosion due to the greater wave energy the coast is subjected to (Jacobs Engineering Group, 2021). This is due to these areas of the District being directly exposed to open ocean. Kāpiti Island creates a wave shadow, sheltering and enabling the creation of the cuspate foreland. Wave energy is dissipated by Kāpiti Island and therefore allows the accretion of sediment transported by the d'Urville current to deposit at the cuspate foreland at Paraparaumu beach (Coddington, 1972). As the cuspate foreland acts as a natural groyne, the sediment supply to the south is deflected creating an offshore sandbank therefore reducing the longshore sediment supply to the south of the coast. As the d'Urville current has deposited much of its sediment at Paraparaumu it obtains sediment from the southern coastline of the District (Coddington, 1972). This impacts the terrestrial environment, eroding the dunes from Raumati to Paekakariki (Coddington, 1972).

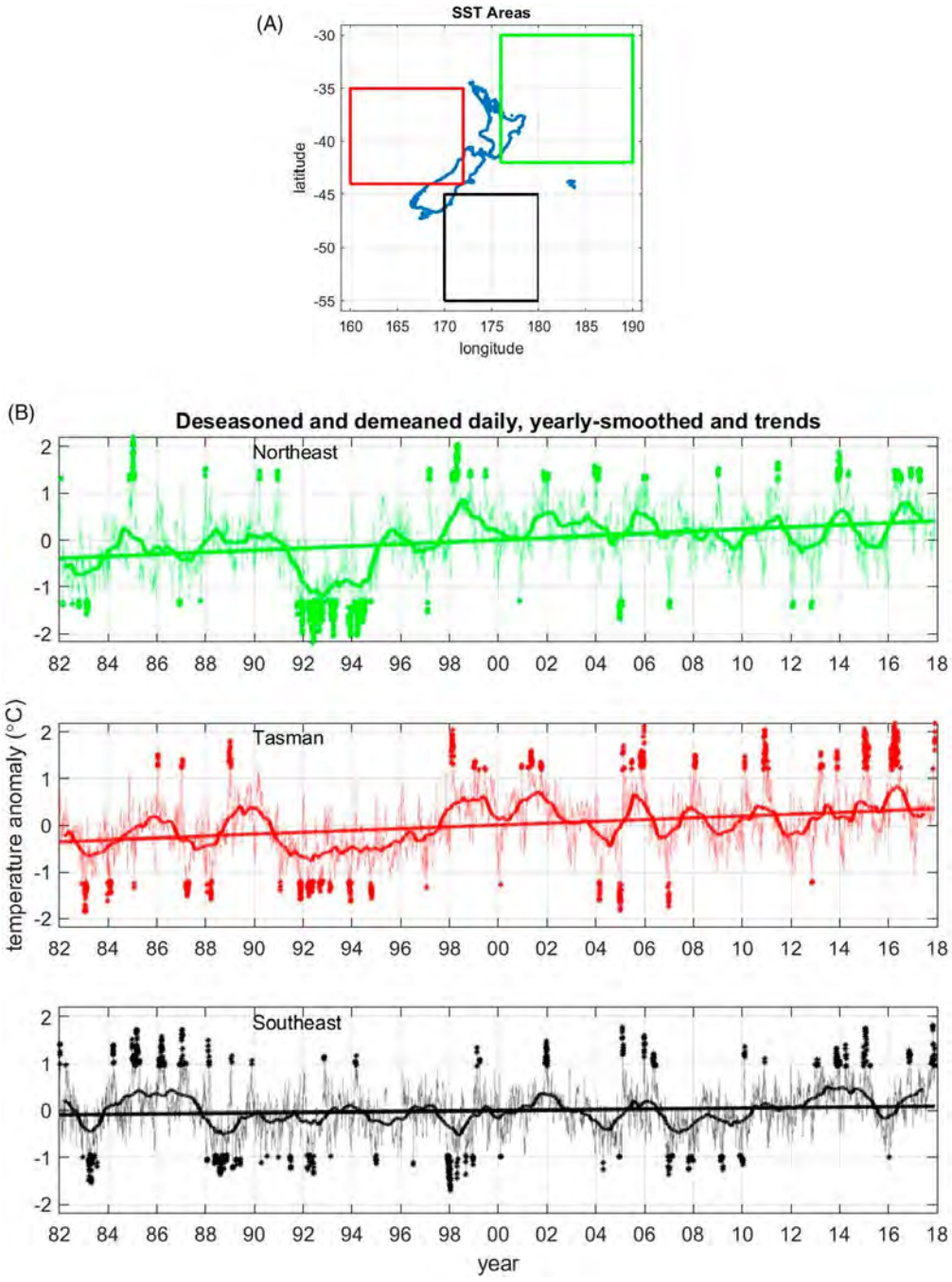


Figure 3: Spatially-averaged daily SST anomalies from Sutton & Bowen (2019, Figure 5). Annually-smoothed timeseries and linear trends for three regions around New Zealand. The Tasman region trends are most relevant for the Kāpiti Coastal Marine Environment

Climate change within the Kāpiti coastal environment

The fast-changing climate is affecting many aspects of the Earth system and subsequently can influence the degree of "natural character" in most environments. Human induced climate heating can be regarded as a direct impact on the abiotic system which then influences the biotic and experiential. For example, in support of this view, a power station that released a warmed coolant discharge into the local ocean has a direct impact. Climate heating is the same in many ways but throughout the planet's oceans.

A recent study (Sutton & Bowen 2019) shows temperature rise at a number of stations including the Tasman Region adjoining the Kāpiti Coast. The paper noted that NOAA OI SST (sea surface temperature) temperature products used in the study are in good agreement with in-situ coastal temperature records whereby offshore SSTs accurately reproduced the variability at the coastal sites for interannual timescales. The agreement was particularly good for sites along open coasts but deteriorated for sites in harbours and enclosed waters. The rate of temperature increase over the past three decades for the Greater Taranaki Bight was +0.24 °C/decade (see Figure 3, reproduced here from Sutton & Bowen 2019). This is substantially above the global ocean average of around 0.06 °C/decade and more than triple global air temperature trends of ~0.1 °C/decade.

This heating is not a very recent phenomenon as the trend can be traced back over the last three decades. It is also something that is affecting much of the upper ocean and so while the extremes of recent marine heatwaves (i.e. summer boosts of several degrees) will be mitigated by strong ocean mixing in Cook Strait, the underlying trend is impacting all continental shelf waters.

For this study, the overarching impact on present day SST is considered sufficient to pull all the abiotic marine ratings down one category, such that remote and otherwise unimpacted marine areas offshore score a maximum of 'high' for abiotic natural character. It should also be regarded as having direct cross-over for biotic natural character. Salinger et al. (2019) identified a range of biological impacts a single marine heatwave (the summer of 2017/18) had, including exceedance of thermal tolerance of presently locally dominant kelp species, similarly for farmed salmon. In addition, anecdotal information suggested tropical and warm-temperate fish were more common and snapper (Pagrus auratus) were estimated to have spawned six weeks earlier than normal.

Climate change has not unduly affected visual experiential natural character ratings, but the changes in populations observed when swimming, diving and fishing potentially will also occur.

Biotic Characteristics of the Kāpiti Coast Coastal Environment

Terrestrial

Historically, vegetation cover in the Kāpiti Coast coastal environment would have comprised of native duneland and wetland species as well as lowland podocarp/broadleaf forest. Today, much of this native vegetation has been removed or modified as a result of changes in land use, particularly farming and urban development. Exotic vegetation is common, and often dominant, and invasive species are present. The main exception to this is Kāpiti Island; although historically the vegetation has been modified on the island, it remains pre-dominantly vegetated in a high diversity of native vegetation that is in good condition and of high ecological value.

The lower reaches and mouths of several rivers and streams are present along the Kāpiti Coast coastal environment. These mouths have created estuaries. The largest of these estuaries is Waikanae Estuary; it is also the only estuary with a large area of intertidal mudflats. These waterways and estuaries have varying water quality (quality is highly

influenced by catchment land use) and have undergone varying degrees of modification, largely associated with removal of riparian vegetation, weed encroachment, erosion control and flood protection measures. Regardless, these waterways provide habitat for a number of At Risk native freshwater fish species.

The coastal environment has high habitat diversity and includes dunelands, wetlands, beaches, sandspits, farmland, native forest (Kāpiti Island), the lower extents of rivers and streams, and estuaries. These areas provide habitat for native lizard species and a very high diversity of native avifauna species. Waikanae Estuary is an important foraging and high tide roost site for coastal avifauna, including some species of international migrants, and is part of an important ecological link to the Kāpiti Island marine reserve and Kāpiti Island Nature Reserve; a biodiversity hotspot. In addition to high avifauna and lizard values, it also provides haul out areas for New Zealand fur seals (*Arctocephalus forsteri*) and potentially still provides habitat for a small, remnant population of long-tailed bats (*Chalinolobus tuberculatus*).

Marine

In contrast to marine environments elsewhere in the Wellington region, the Kāpiti district comprises of relatively uniform habitats which grade seaward from the intertidal zone to the 12 nautical mile limit, broken only by the presence of Kāpiti Island and its significant fringing rocky reefs, which are a more or less continuous feature surrounding the island. Of particular importance is Kāpiti Island Marine Reserve, established in 1992 and covering a total of 2,167 ha made up of two discontinuous sections - a smaller 342 ha western area and a larger 1,825 ha eastern area that extends from the eastern coast of the island landward, joining the Waikanae Estuary Scenic Reserve at the coast of North Island. The Reserve affords protection from human activities for a significant area of the marine zone between the island and the mainland.

The intertidal zone is a continuous stretch of sandy beach with easy access at numerous locations along the coast and significant modification at or very close to the high-water mark, particularly at several townships. The ease of access to the intertidal zone will have resulted in recreational harvesting of shellfish and other biota over a relatively long timeframe. Likewise, recreational and commercial fishing is ongoing, for recreational fishing particularly in nearshore environments and for commercial fishing particularly in an area extending northwards from Kāpiti Island to the northern extent of the district. Fishing activity represents the most important modification to marine systems in the Kāpiti district. Despite fishing activity, demersal fish diversity in the district is average when assessed at a national scale, and the rocky reef fish communities associated with the reef systems around Kāpiti Island exhibit above average species diversity.

The marine macroalgal flora in this region is predominately found around Kāpiti Island, and is similar to the coastal Porirua and Wellington floras. On the rocky, open shorelines of Kāpiti Island there are beds of the larger, canopy forming kelp species such as Ecklonia radiata, as well as fringing forests of Fucales such as *Cystophora spp.* and *Carpophyllum spp.* Rhodolith beds are known to occur adjacent to Kāpiti Island and are the only known beds in the Wellington region. Mixed algae canopies and algal turfs are also common in this area.

The broader CMA area supports a diverse assemblage of both coastal and offshore pelagic seabirds. Cook Strait to the west is a major flyway for many species of pelagic seabirds and the Kāpiti coast is a northern extension of this with many species transiting through the area en route to or from the eastern side of the country. The area is also frequented by a modest range of marine mammal species, including a suite of migratory baleen whales moving north-south through the area in deeper waters. It is possible that the nationally vulnerable Māui dolphin (*Cephalorhynchus hectori maui*) and Hector's dolphin (*Cephalorhynchus hectori hectori*) may occasionally occur in shallow waters close to the coast towards the northern extent of the district (Department of Conservation, 2019).

Experiential Characteristics of the Kāpiti Coast Coastal Environment

Terrestrial

Experiential characteristics of natural character encompass the human response to the levels of abiotic and biotic condition that exists. Policy 13 of the NZCPS identifies that such natural character associations may include the natural darkness of the night sky, places that are wild or scenic and a range of related experiential attributes, including the sounds and smell of the sea.

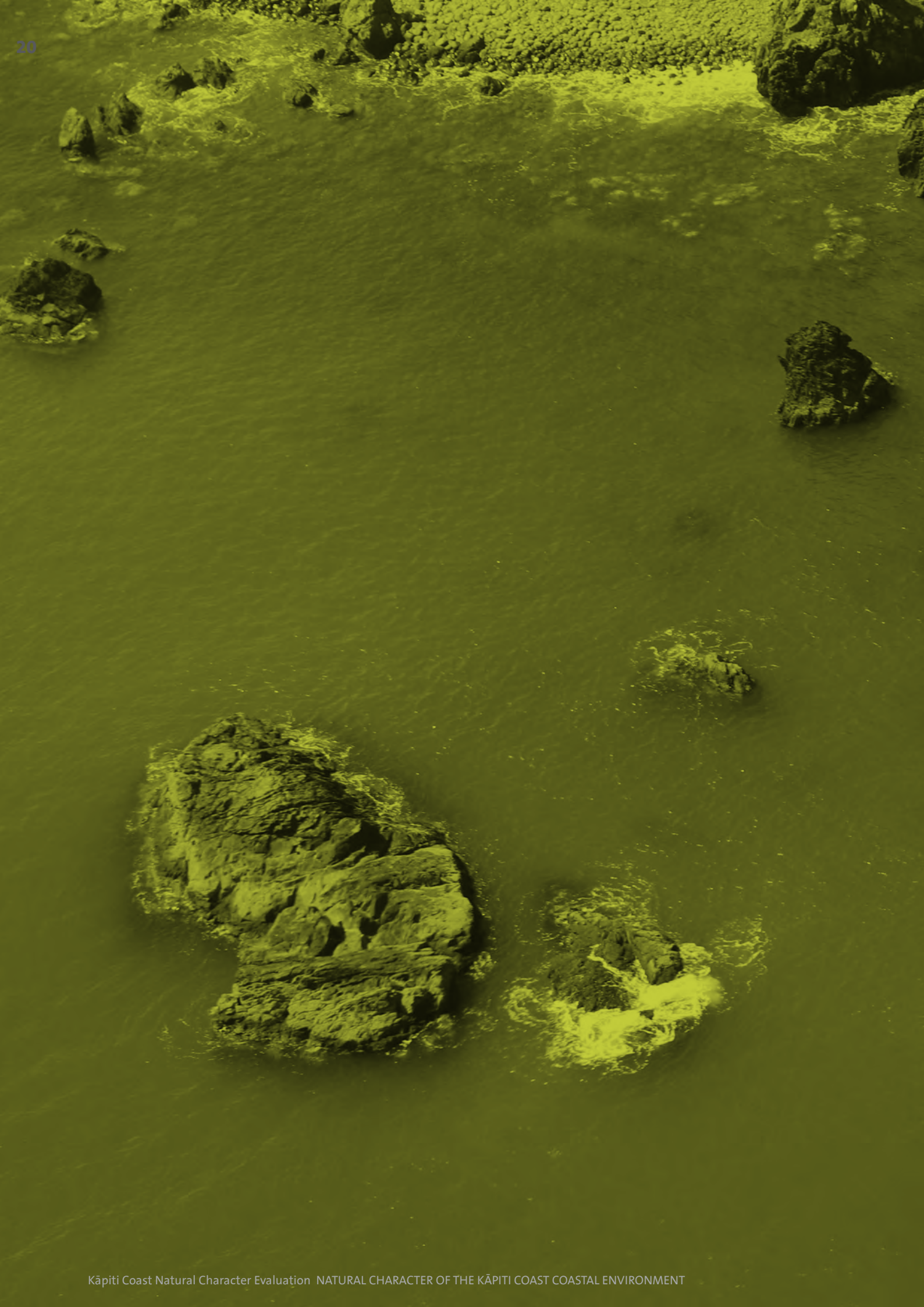
The Kāpiti Coast is renowned within the Wellington Region for its sandy beaches, sea views and Kāpiti Island. With the exception of Kāpiti Island, the coastal environment is easily accessible. Kāpiti Island is accessible by boat however no one is able to visit the island without a permit.

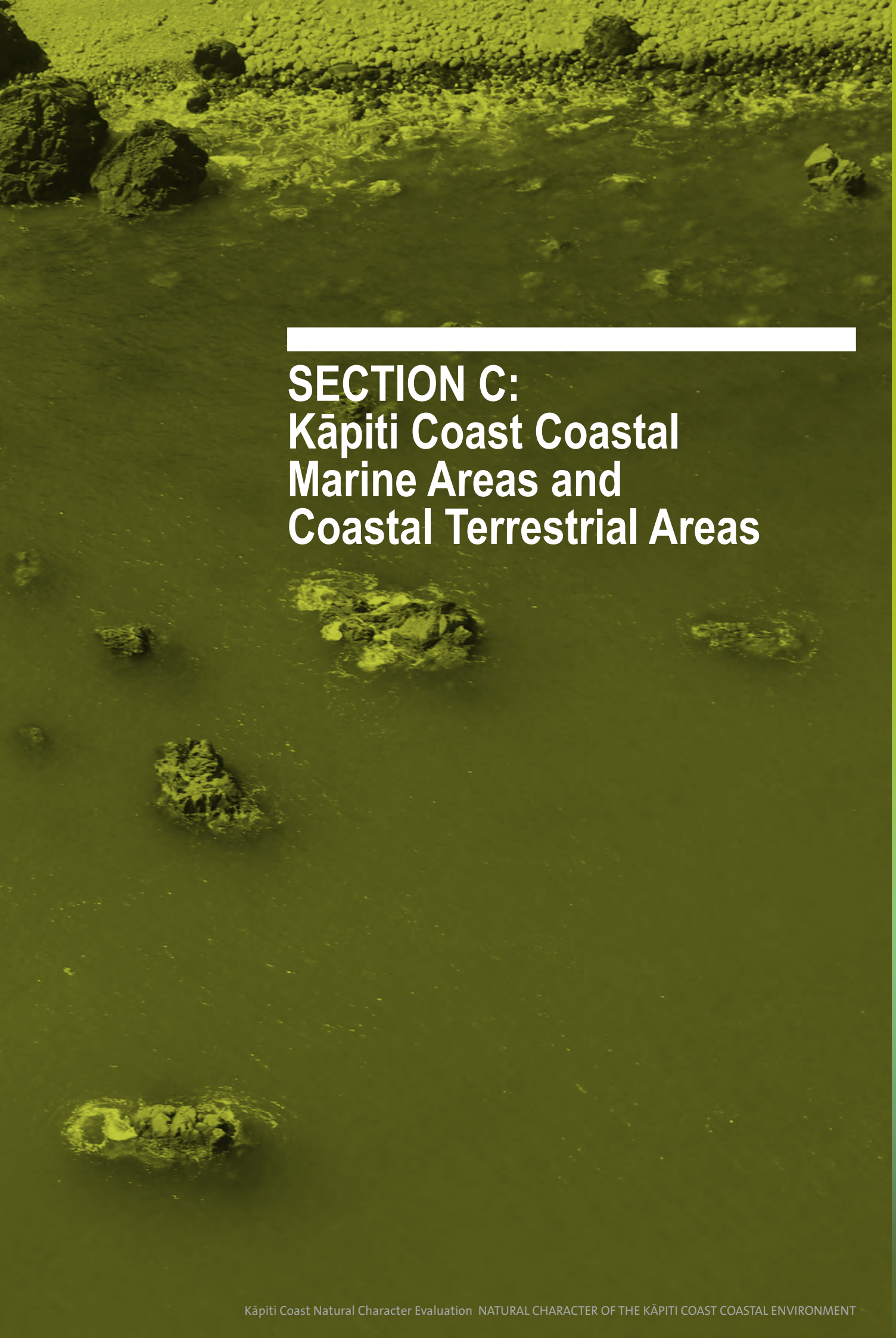
As much of the Kāpiti Coast sits within the wave shadow of Kāpiti Island the coastline offers calmer beaches popular for swimming, blow carting, horse riding, surfing, fishing and boating. Northern areas are less modified and settled therefore offering more opportunities to obtain remote and tranquil experiences. In the central and southern parts of the Kāpiti Coast this is affected by the settlements of Waikanae Beach, Paraparaumu Beach, Raumati Beach and Paekākāriki, with extensive revetment encountered below Paraparaumu Beach.

The ruggedness of Cook Strait is experienced from Kāpiti Island where the western side of the island is more exposed to the prevailing winds and storms (Chappell, 2014). The natural eroded landscape to the west of the island and prevailing climatic elements provides wild and remote experiences for visitors to the island. The east of the island is sheltered from the prevailing winds however due to the lack of modification and settlement, and intact indigenous forest there are also opportunities to obtain wild, tranquil, isolated and remote experiences. The island itself is a striking and memorable feature within the Kāpiti Coast landscape from all sections of the coastline on the mainland.

Marine

Within the marine realm, experiential values vary from very high within the offshore zone over the continental slope, declining to moderate where settlement and coastal activities characterise the nearshore zone. Modification is evident along much of the coastal fringe with townships, small clusters of dwellings and retaining walls reaching to the top of the beach in many places. Moving offshore, the impacts of modifications rapidly diminish to be replaced with a strong sense of wildness, enhanced by the presence of Kāpiti Island and its diverse coastal marine communities. The offshore areas in particular are frequently characterised by large oceanic swells and are influenced by northerly storm events. Light pollution impacting the offshore areas is minimal and when at sea the western expanse of the ocean is unbroken with uninterrupted views south to the northern reaches of South Island, and east and north to the sweeping North Island coastline towards Taranaki.





SECTION C: Kāpiti Coast Coastal Marine Areas and Coastal Terrestrial Areas

Cover page: Reef and rock outcrops at the northern end of Kāpiti Island. Boffa Miskell, 2019.

The assessment of the Kāpiti Coast's natural character has involved division of the coastal environment into 3 Coastal Marine Areas (CMA, A-C) and 4 Coastal Terrestrial Areas (CTA, 1–4), refer to Map 2. This division is based on separating the coastal environment based on broadly homogenous characteristics and levels of natural character. These have each been described and evaluated at an 'area' scale (as illustrated on Map 2) and at a more detailed 'component' (or local / specific) scale (as illustrated on Map 3).

Summary of Natural Character of Kāpiti Coast's Marine Coastal Environment

At the area scale the marine environment is divided up into three basic zones, from shallowest to deepest: the nearshore innershelf (CMA A, 0–35 m water depth), the Kāpiti continental shelf (35–100 m), and the Kāpiti continental slope (CMA C, 100–160 m). Kāpiti Island is the dominant physiographic feature offshore, and the largest offshore island off the west coast of the North Island. It occurs within the Kāpiti continental shelf zone with the continental slope zone just 0.8 km west of Tareremango Point in the south and 4 km west of Arapawaiti Point in the north.

The 6-km wide Rauoterangi Channel separates Kāpiti Island from the Paraparaumu coast, and features numerous rocky reefs and shoals and several small rocky islets along its eastern margin. The region is characterised by the southward flowing d'Urville current sweeping across from Farewell Spit (Stevens et al. 2018). The marine area is strongly influenced by the presence of Kāpiti Island (Chiswell and Stevens 2010). A vigorous wave climate is driven by the prevailing westerly winds with the influence of long periods swells diminishing to the south with progressively more shelter from Tasman Bay. Mean wave heights of approximately 1 m and periods of 7 seconds occur at Peka Peka (Perret 1990).

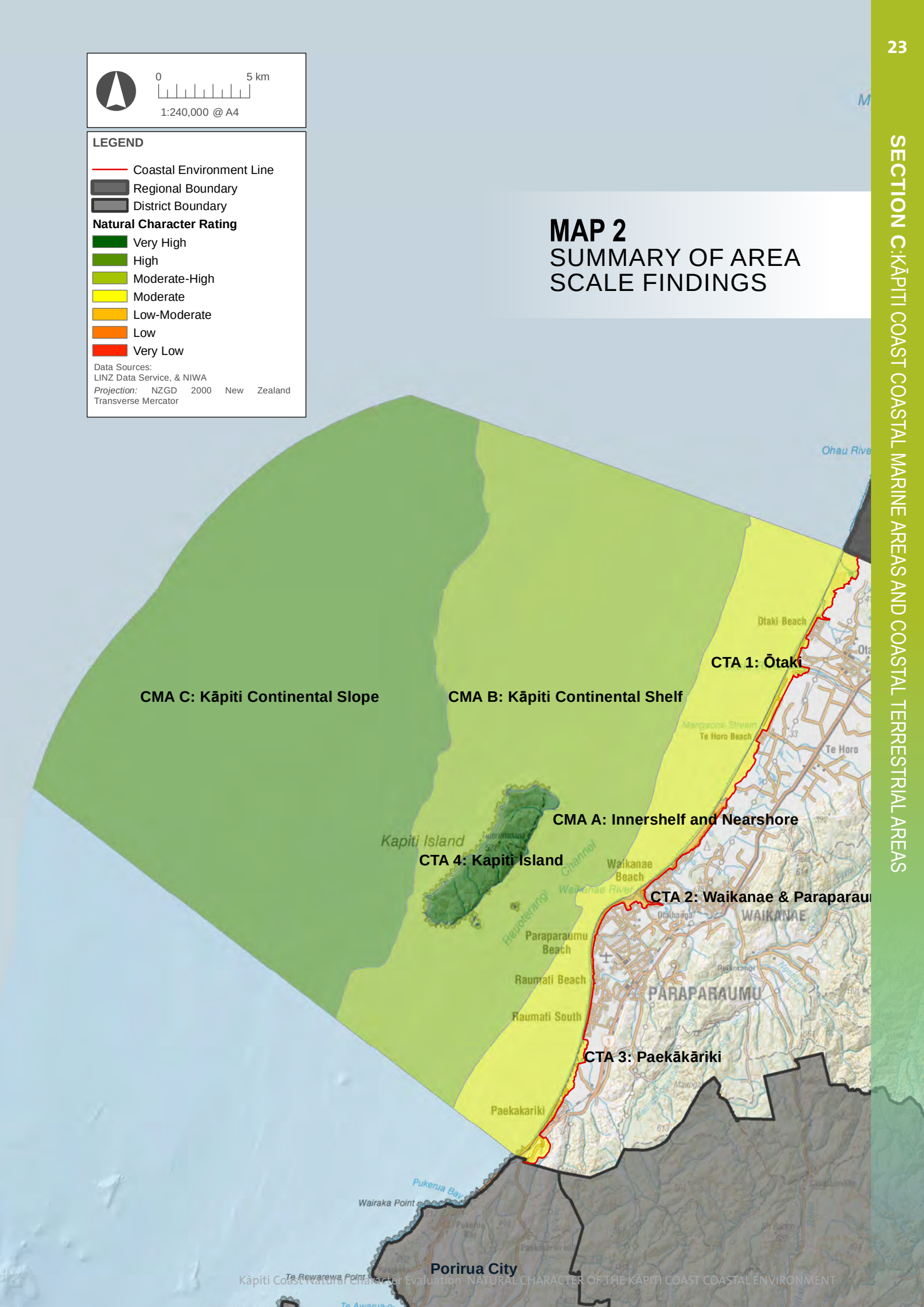
Proximity to several large rivers means that all three marine environments can be influenced by freshwater rivers (O'Callaghan, 2020). Strong signatures from freshwater discharges mix and disperse into a coastal feature known as a region of freshwater influence (ROFI). A ROFI acts as a critical interface between estuaries and the ocean, with interactions between stratification and tides dramatically affecting the transport of land-derived sediments and nutrients from degraded catchments.

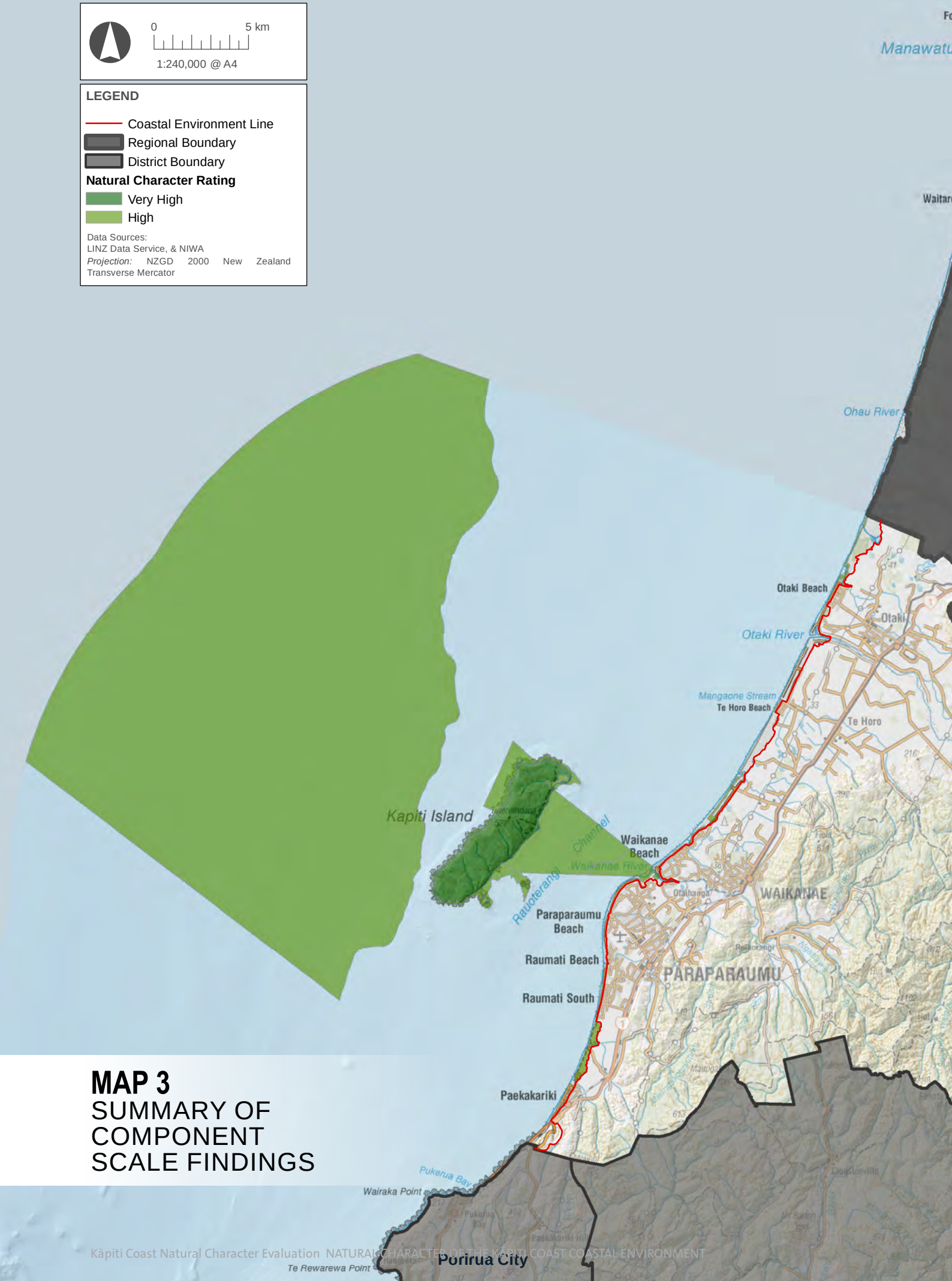
While baseline oceanic properties are poorly quantified it is unlikely that abiotic natural character attributes have been significantly modified outside of progressive change driven by global influences. This may change with an evolving climate (Law et al. 2017; Sutton and Bowen 2019). The region is exposed to north westerly wind-generated waves (Gorman et al. 2003) which could also be affected by a changing climate.

SUMMARY OF AREA SCALE FINDINGS

		LEVEL OF NATURAL CHARACTER
COASTAL MARINE AREA		
Innershelf and Nearshore	A	Moderate
Kāpiti Continental Shelf	B	Moderate-High
Kāpiti Continental Slope	C	High
COASTAL TERRESTRIAL AREA		
Ōtaki	1	Moderate
Waikanae and Paraparaumu	2	Low-Moderate
Paekākāriki	3	Moderate
Kāpiti Island	4	Very High

MAP 2
SUMMARY OF AREA SCALE FINDINGS





MAP 3
SUMMARY OF COMPONENT SCALE FINDINGS

Natural Character Components with High and Very High Natural

At a finer scale 6 components have been identified with high or very high levels of natural character within the Coastal Marine Areas. Within the Coastal Terrestrial Areas there are an additional 10 components of high or very high natural character. The components with the highest levels of natural character are typically the furthest from human occupation and encompass much of the outer marine areas as well as parts of forest parks along the coastal edge.

SUMMARY OF COMPONENT SCALE FINDINGS

MARINE AREA	MARINE COMPONENTS	OVERALL LEVEL OF NATURAL CHARACTER	MAP #
Innershelf and Nearshore	Marine Reserve (Inshore	High	4
Kāpiti Continental Shelf	Marine Reserve East Coast Kāpiti Island	High	5
	Marine Reserve West Coast Kāpiti Island	High	5
	Norther Kāpiti Island Reefs	High	5
	Southern Kāpiti Island Reefs	High	5
Kāpiti Continental Slope	Kāpiti Continental Slope	High	6
TERRESTRIAL AREA	**TERRESTRIAL COMPONENT**		
Ōtaki	Ōtaki Dunes	High	7
	Te Horo Dunes	High	7
Waikanae & Paraparaumu	Peka Peka Dunes	High	8
	Waikanae Estuary	High	8
Paekākāriki	Queen Elizabeth Park	High	9
Kāpiti Island	Kāpiti Island Settlement	High	10
	Kāpiti Island	Very High	10
	Tahoramaurea Island	Very High	10
	Motungarara Island	High	10
	Tokomapuna Island	Very High	10

Coastal Marine Area A: Innershelf and nearshore

Location and Key Characteristics

Coastal Marine Area A captures the shallow marine environment of the coastal inner shelf that is shaped and influenced by waves and currents. The area is bounded at its upper extent by the sea-level at mean high-water spring. The key physiographic elements in the nearshore include the long stretches of low-gradient sandy beaches in the near-shore zone, the mouth of the Waikanae River estuary, and the wide swath of inner shelf out to the 35 m isobath that marks the approximate depth of the sand-mud transition and seaward boundary of the nearshore area. Nearshore inter-tidal and shallow sub-tidal rocky reefs are virtually absent from the area. Paraparaumu is afforded some protection from the prevailing north-westerly winds, but for the most part the coastline to the north and south of Kāpiti Island is exposed fully to the oceanic conditions. The regional tidal range is up to approximately 2.0 m.

Abiotic

In the nearshore the seafloor sediment is dominantly sandy with higher silt content with increasing water depth, consistent with a classical wave-graded coastline (Dunbar and Barrett 2005). Here, ocean storms can generate energetic waves conditions that can disturb the seabed to ~35–40 m water depth along the northern Kāpiti Coast (Dunbar and Barrett 2005). The nearshore zone and beach are well-sorted quartzofeldspathic fine sands but rapid textural changes occur between 25 and 40 m depth, with mud contents increasing to up to 70 % offshore. A small patch of muddy sand calc-gravels occurs offshore of the Ōtaki River mouth. Bedforms (e.g. sand ripples) are likely in the nearshore and innershelf from the prevailing ocean swells and currents (Dunbar and Barrett 2005). The innershelf gradient is gentle away from Kāpiti Island, with the 30 m isobath 4 km offshore of Ōtaki Beach in the north and Paekākāriki in the south. But adjacent to Paraparaumu the 30 m isobath comes to within 1 km of the coastline, tapering the innershelf zone.

Ocean currents transport coastal waters southward around the South Taranaki Bight through to Cook Strait. Transport of oceanic and river-modified coastal water is routinely evident on the innershelf, inshore of Kāpiti Island. The littoral waters of coastal zone receive, and are frequently influenced by, riverine inputs from within the Kāpiti region (Waikanae) as well as rivers further north in the Horizons region (Manawatu, Rangitikei and Whanganui rivers, Collins & Macdonald, 2019). There are limited structures protruding into this coastal marine are along the length of the coastline. Notwithstanding this, substantial modification relating to revetment protecting against coastal erosion has been established in association with settlement along MHWS, particularly in southern parts of the district.

Biotic

The inner shelf has received relatively limited commercial bottom-trawling effort; much of shallows regionally have the lowest intensity over the last decade (Baird and Mules 2021). Over the summer months in particular, parts of the shoreline are subjected to frequent shore-based recreational harvesting of shellfish, paddle crabs (*Ovalipes catharus*) and shallow water fishes.

Demersal fish species diversity is predicted to be average at a national scale (Leathwick et al. 2006). Species that are predicted to be relatively common in this area include kahawaia (*Arripis trutta*), sand flounder (*Phombosolea plebeia*), eagle ray (*Myliobatis tenuicaudatus*), red gurnard (*Chelidonichthys kumu*), red cod (*Pseudophycis bachus*), New Zealand sole (*Peltorhamphus novaezeelandiae*), rig (*Mustelus lenticulatus*), school shark (*Galeorhinus galeus*), carpet shark (*Cephaloscyllium isabellum*), spiny dogfish

Left: Photograph of the Inner-shelf and nearshore looking north toward Paraparaumu. Boffa Miskell, 2020.

(*Squalus acanthias*), barracouta (*Thyrsites atun*) and leatherjacket (*Parika scaber*) (MacDiarmid et al. 2012).

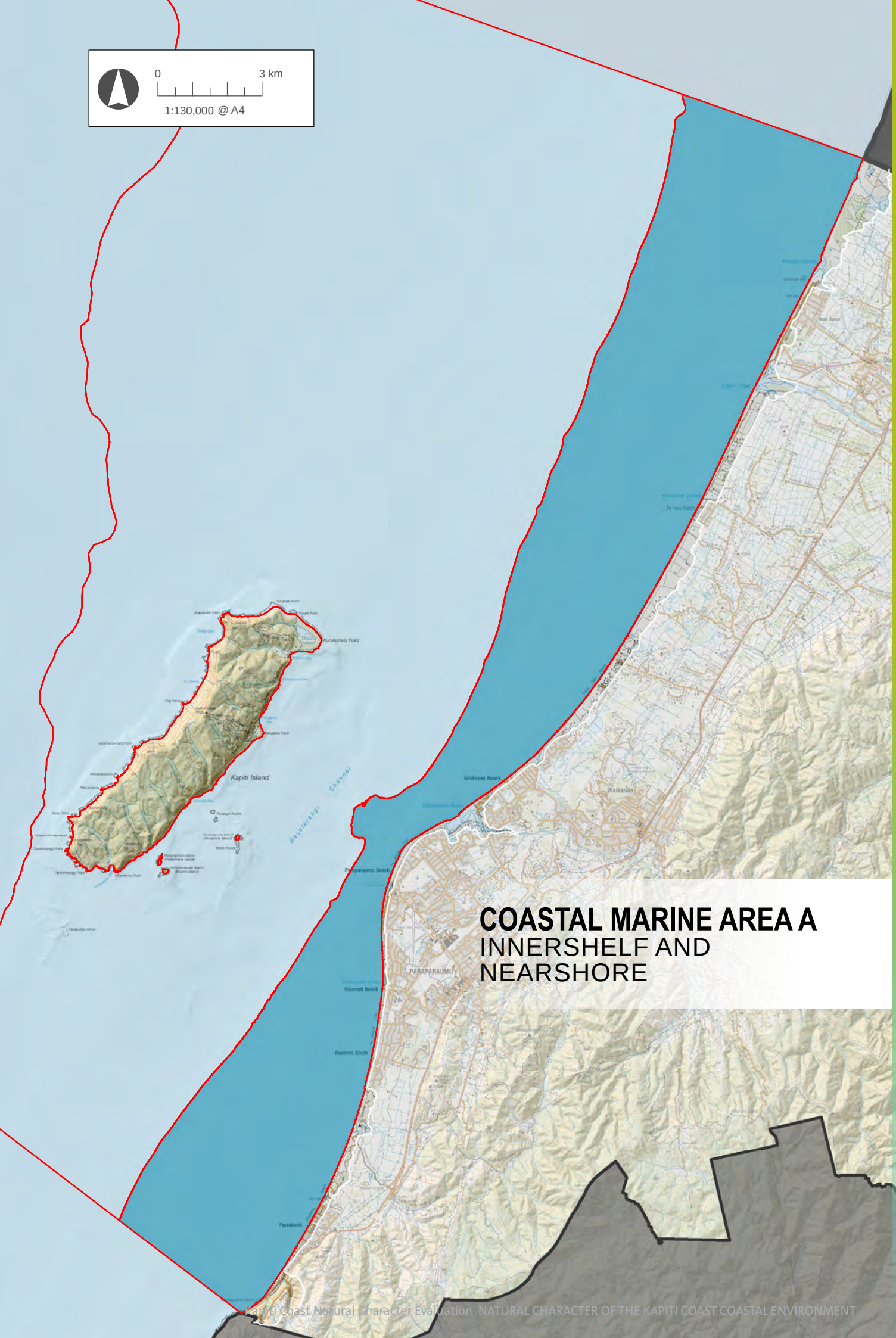
The seabird assemblage in this area will be dominated by typical coastal and inshore species, including red-billed gull (*Larus novaehollandiae scopulinus*), black-backed gull (*Larus dominicanus*), white-fronted tern (*Sterna striata*), Caspian tern (*Hydroprogne caspia*), various shag species (*Phalacrocorax spp.*), little penguin (*Eudyptula minor*) and in the austral summer Arctic skua (*Stercorarius parasiticus*), several of which have been classified as 'At Risk' (Robertson et al. 2107).

The inner shelf area supports a relatively limited marine mammal assemblage. Common dolphin (*Delphinus delphis*) and New Zealand fur seal (*Arctocephalus forsteri*) will be the most frequently encountered, with possible but rare sightings of Hector's dolphin, towards the northern extent of the region (Stephenson et al. 2020).

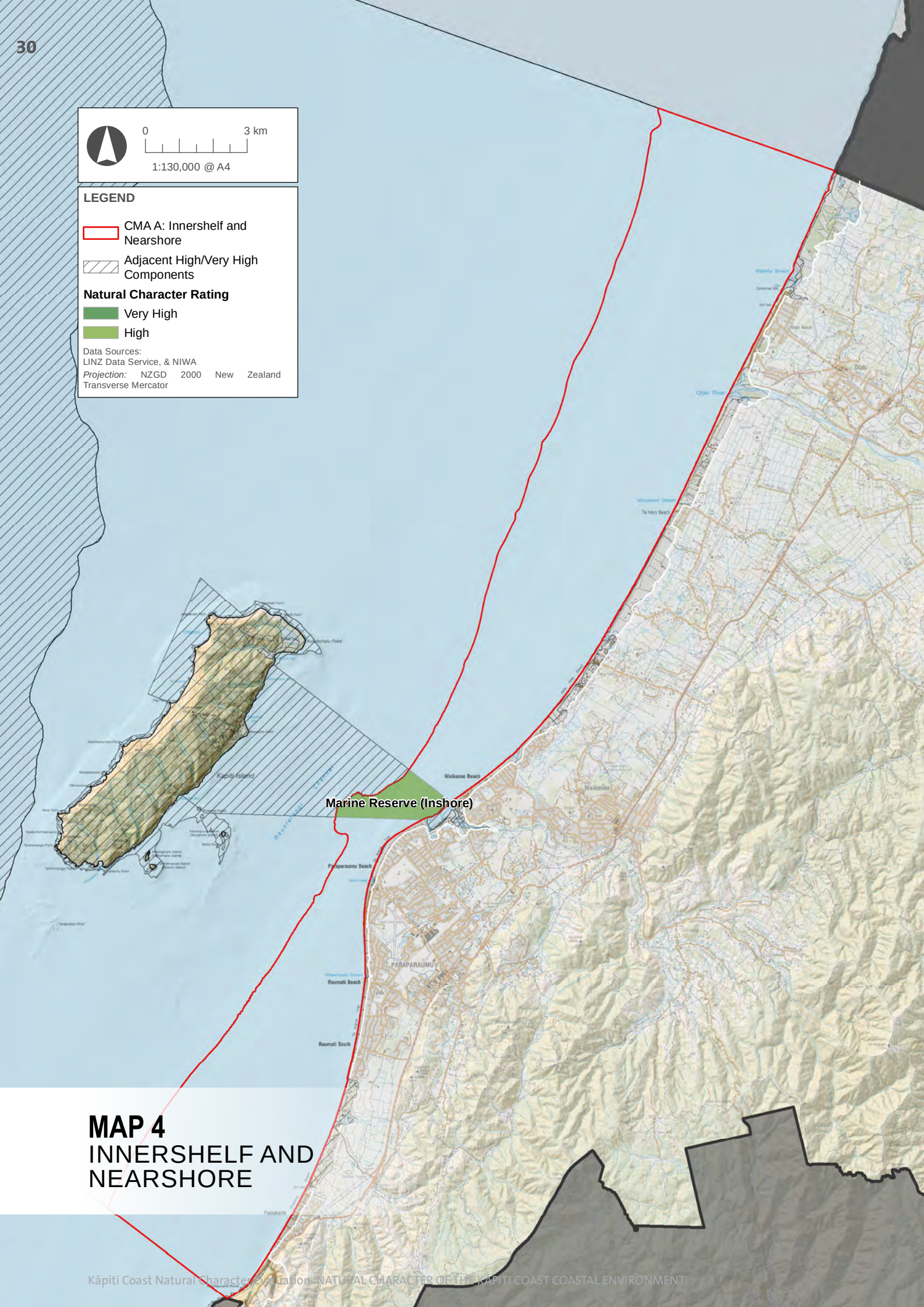
Experiential

Access, including vehicular access, to the inter-tidal zone is widespread, especially around the townships of Paekākāriki, Raumati Beach, Paraparaumu Beach, Waikanae Beach and Ōtaki Beach. Nocturnal light pollution from these townships spills into the marine zone and many stretches of the coast have been retained and modified with substantial infrastructures, all of which detract from a sense of naturalness. During storm events and when facing the ocean with Kāpiti Island in view, one is still able to gain a sense of wildness, but overall the experiential character attribute of this marine area is only moderate.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			
MODERATE TO HIGH		★	
MODERATE	★		★
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		Moderate	



COASTAL MARINE AREA A
INNERSHELF AND NEARSHORE



MAP 4
INNERSHELF AND NEARSHORE

COASTAL MARINE AREA A: INNERSHELF AND NEARSHORE

THESE ARE MAPPED WITH REFERENCE TO MAP 4

REFER TO THE COASTAL MARINE AREAS 11-13 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENTS ASSOCIATED WITH THIS AREA.

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
MARINE RESERVE (INSHORE)	High	Mod. -High	High	High	• Inshore section of Reserve, which links to Waikanae Estuary Scenic reserve • Protected, well-sorted fine sandy beach with wave-graded nearshore and inner continental shelf • Variety of seabirds present including red-billed gull (*Larus novaehollandiae scopulinus*), black-backed gull (*Larus dominicanus*), white-fronted tern (*Sterna striata*), Caspian tern (*Hydroprogne caspia*), various shag species (*Phalacrocorax spp.*), little penguin (*Eudyptula minor*) and in the austral summer Arctic skua (*Stercorarius parasiticus*) • Common dolphin (*Delphinus delphis*) and New Zealand fur seal (*Arctocephalus forsteri*) will be the most frequently encountered • Opportunities for wild experiences, particularly during storm events	Relatively limited commercial bottom-trawling effort present

Coastal Marine Area B: Kāpiti Continental Shelf

Location and Key Characteristics

Coastal Marine Area B captures the middle and outer shelf environments and deep-water surrounds of Kāpiti Island. The shoreward boundary is the 35 m isobath, marking the approximate sand-mud transition, and the seaward boundary is defined by the 100 m isobath. Shelf gradients ease to the north. Kāpiti Island occurs within the middle shelf and includes numerous islets and rocky reefs along its south eastern shores. The area that separates Kāpiti Island from the Paraparaumu Beach coast is bathymetrically more complex in comparison to the gently sloping shelf north and south of the island. Here, strong tidal flows and ocean currents that are enhanced by the topographic constriction of Kāpiti Island, have scoured and deepened the middle shelf to form Rauoterangi Channel, with four depressions in excess of 70 m water depth. This area remains oceanographically connected to land-derived inputs / flows with turbid river plumes and frontal structures regularly evident. Biotically, this area is more diverse than Coastal Marine Area A, and as noted above includes extensive fringing rocky reefs around Kāpiti Island, which support notable algae, sessile and encrusting invertebrate and fish communities. This area includes the majority of Kāpiti Island Marine Reserve, with a relatively small part of the Reserve extending into Coastal Marine Area A.

Abiotic

The seafloor sediment is principally sandy mud seaward of the 35-m sand-mud transition along the open sections of the Kāpiti coast north and south of Kāpiti Island. Patches of calc-sands occur around the 50 m isobath and transition to calc-gravels around Kāpiti Island (Lewis and Mitchell 1980). The substrates around Kāpiti Island and its submerged rock reefs are varied and include components of rock rubble, cobbles and boulders, shell debris and other biogenic components. The steep and cliffed terrain of the western and southern margins of Kāpiti Island shed rock debris onto the narrow shoreline of steep boulder-gravel beaches with boulders and coarse sandy substrates nearshore. Only the northern portion of the island at Kurukohatu Point and Waiorua Bay, along with the small promontory at Rangatira Point on the eastern shoreline, have relatively subdued shorelines with more gently sloping margins. The eastern shoreline of Kāpiti Island has a narrow and steep beach rise of sands and gravel, fringed by largely sub-tidal reefs. Submerged rocky reefs extend from the shoreline around the Kāpiti Island to form extensive submerged platforms around Tahoramaurea (Browns), Motungarara (Fisherman's), and Tokomapuna (Aeroplane) islands. The platform surrounding Tokomapuna Island is particularly broad as it envelops the shoals of Passage Rocks shoreward (northwest) and the islets of White Rocks that pinch into Rauoterangi Channel (southeast). Four scour depressions around 0.5–2 km along the length of the channel attain more than 70 m water depth, with the deepest at 80 m 1.0 km southeast off Kurukohatu Point.

Other chains of coastal islets and partly submerged rock reefs sweep westward from Tahiririmongo Point, wrap around to the exposed western shore of Kāpiti Island to as far north as Kaiwharawhara Point. Clusters of rocks also occur in Onepoto Bay and the north-facing coastal section between Arapawaiti and Tokahaki points. This rocky morphology is mirrored further offshore on the seabed with rock debris extending up to 1 km offshore. Very small levels of built modification remain apparent beyond the coastal edge including very isolated structures typically associated with marine navigation around Kāpiti Island. Notwithstanding this modification to abiotic systems has resulted from relatively extensive bottom-trawling throughout much of this area.

Biotic

The Kāpiti continental shelf has received moderate to high levels of commercial bottom-trawling effort over the last decade, with increasing intensity northeast of Kāpiti Island at 40–60 m water depth to offshore of Ōtaki Beach (Baird and Mules 2021). Additionally, recreational fishing activity is common throughout the area, excepting the Marine Reserve, and particularly so to the east of Kāpiti Island. Despite this extensive modification, the area

Right: Photograph of the Kāpiti Continental Shelf looking north-west toward Kāpiti Island. Boffa Miskell, 2020.

is predicted to support average demersal fish diversity at a national scale (Leathwick et al. 2006). Species that are predicted to be relatively common in this area include red gurnard, red cod, New Zealand sole, leatherjacket, rig, school shark, carpet shark, spiny dogfish, barracouta, lemon sole (*Pelotretis flavilatus*), common warehou (*Seriolella brama*), jack mackerel (*Trachurus novaezelandiae*) and scaly gurnard (*Lepidotrigla brachyoptera*) (MacDiarmid et al. 2012).

Predictive modelling of reef fish diversity around Kāpiti Island revealed average to above average level of species richness at a national scale (Smith et al. 2013). Relatively abundant reef fish species were predicted to include several species of triplefins (*Forsterygion spp., Karalepis stewarti, Obliquichthys maryannae*), marblefish (*Aplodactylus arctidens*), red-banded perch (*Hyploplectrodes huntii*), scarlet wrasse (*Pseudolabrus miles*), spotty (*Notolabrus celidotus*), butterfly perch (*Caesioperca lepidoptera*), rock cod (*Lotella rhacina*), banded wrasse (*Notolabrus fucicola*), butterfish (*Odax pullus*) and blue cod (*Parapercis colias*) (Smith et al. 2013). Dense beds of large brown algae/kelps occur all around the island. They are comprised predominately of *Carpophyllum spp.,* but also kelps such as *Ecklonia radiata* and *Lessonia variegata*. These beds provide important three-dimensional structure and shelter for a range of encrusting and free-living organisms. Many red algae also occur in this area including crustose and free-living coralline algae. The free-living coralline algae occur as rhodoliths, which form quite extensive beds in some areas off the south eastern part of Kāpiti Island. Nelson et al. (2020) also confirmed the presence of rhodoliths from the south east corner of the shelf, offshore from Raumati South. These rhodolith beds are the only known occurrence in the Wellington region (Nelson et al. 2020).

Although a popular area for recreational diving and hand harvesting of rock lobster including (*Jasus edwardsii*), pāua (*Haliotis iris*) and kina (*Evechinus chloroticus*), a survey of shallow subtidal reef communities that included sites in all four components of Coastal Marine Area B, Shears & Babcock (2007) reported low levels of encrusting invertebrates and considered mobile invertebrates to be rare at all sites sampled. An earlier study (Battershill et al. 1993) reported unique habitats of deep bryozoan-characterised reefs off the west shore, and bryozoan /sponge / cobble habitats in the Boulder Bank area. Recent work has confirmed the presence of extensive beds of the sea anemone Anthothoe albocincta off the north-east corner of Kāpiti Island, and particularly in the area around the three southern islands (Nelson et al. 2020).

Those seabird species identified as occurring in Coastal Marine Area A will also very

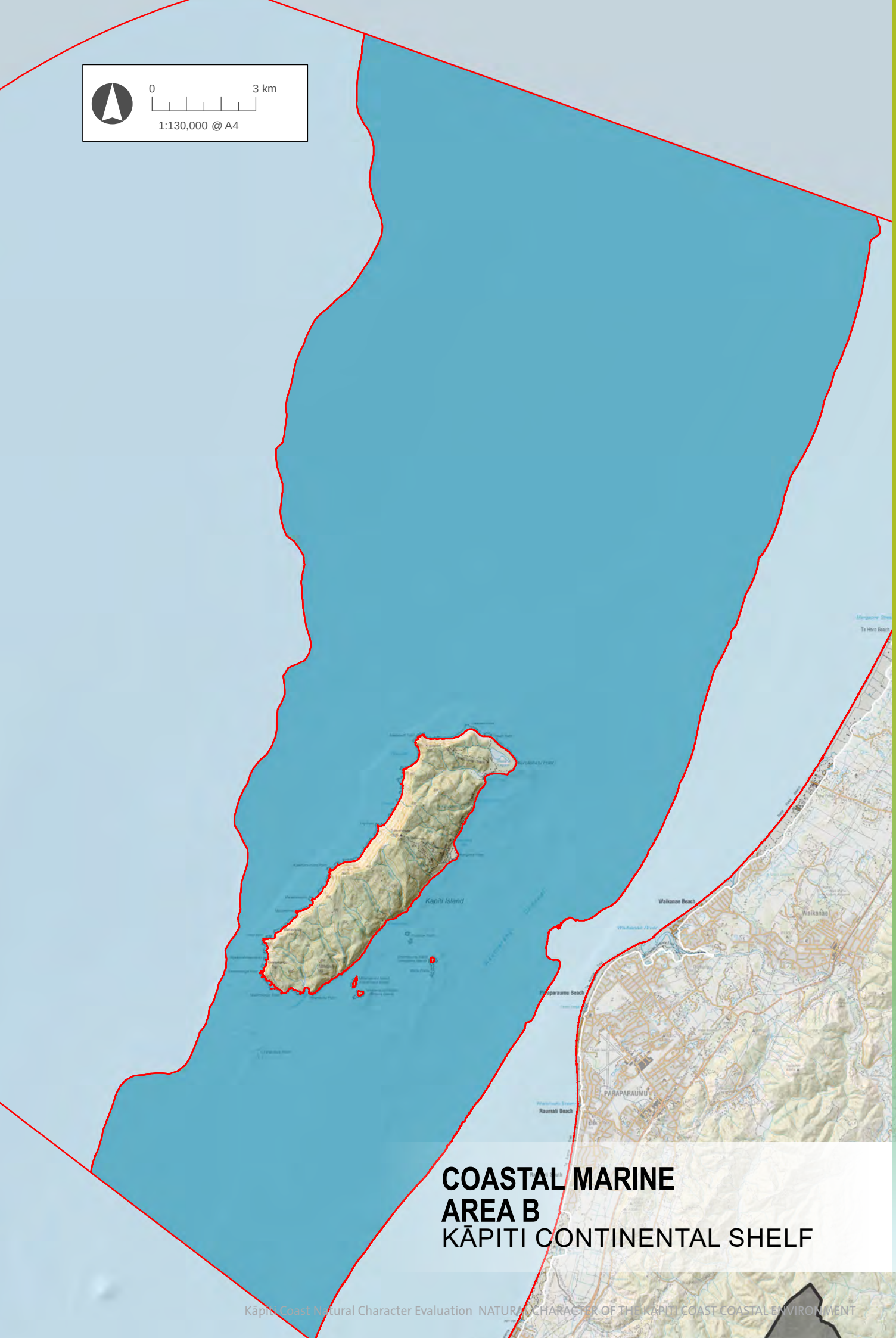
likely all occur in this area. In addition, more pelagic, offshore species will feature in Coastal Marine Area B, including albatross species (*Thalassarche spp*.), sooty (*Puffinus griseus*) and fluttering (*Puffinus gavia*) shearwaters, fairy prion (*Pachyptila turtur*) and northern diving petrel (*Pelecanoides urinatrix urinatrix*).

Common dolphin and New Zealand fur seal will occur in this area, the latter often hauling out in winter at Arapawaiti Point at the northern end of Kāpiti Island. Additionally, killer whales (*Orcinus orca*) and bottlenose dolphins (*Tursiops truncatus*) could be encountered from time to time and migrating humpback whales (Megaptera novaeangliae) occasionally pass through the area when migrating (Stephenson et al. 2020).

Experiential

Coastal Marine Area B retains high levels of experiential condition. The view to the west presents an almost unmodified vista out to Kāpiti Island and the northern approaches to Cook Strait beyond, imparting a sense of wildness, remoteness and ruggedness. Little, if any, perceived influences of the mainland would extend into this area. However, views back to the mainland incorporate human modifications, albeit distant and relatively small in scale.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			★
MODERATE TO HIGH	★	★	
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Moderate - High		



COASTAL MARINE AREA B
KĀPITI CONTINENTAL SHELF


0
3 km
1:130,000 @ A4
LEGEND
CMA B: Kāpiti Continental Shelf
Adjacent High/Very High Components
Natural Character Rating
Very High
High
Data Sources:
LINZ Data Service, & NIWA
Projection: NZGD 2000 New Zealand Transverse Mercator
Northern Kāpiti Island Reefs
Marine Reserve West Coast Kāpiti Island
Marine Reserve East Coast Kāpiti Island
Southern Kāpiti Island Reefs
Kapiti Island
Waikanae Beach
Paraparaumu Beach
PARAPARAUMU
Raumati Beach
Raumati South

COASTAL MARINE AREA B: KĀPITI CONTINENTAL SHELF

THESE ARE MAPPED WITH REFERENCE TO MAP 5

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
MARINE RESERVE EAST COAST KĀPITI ISLAND	High	High	Very High	Very High	• Riverine-influenced water column with sediment-laden surface plumes after rainfall • Scoured and current-swept mid-channel, bathymetrically more complex western margin adjoining Passage Rocks, White Rocks, Tokomapuna Island and chains of submerged rocky reefs. • Rhodolith beds and horse mussel beds • Frequent wild and remote experiences	Relatively limited commercial bottom-trawling effort present
SOUTHERN KĀPITI ISLAND REEFS	High	High	High	Very High	• Shore connected and near-shore rocky reefs and boulder reefs • Clear biotic differences between the exposed western and southern areas, and the more sheltered eastern area • Dense beds of large brown algae/ kelps occur on the western and southern reefs • Rhodolith beds, horse mussel beds and extensive anemone beds are found on off the eastern shore • Frequent wild and remote experiences	
NORTHERN KĀPITI ISLAND REEFS	High	High	High	High	• Nearshore rocky reefs and rocky shoreline habitats • Dense beds of large brown algae/ kelps occur on these nearshore reefs. • The Boulder Bank harbours a unique sponge / bryozoan/ cobble community • Large anemone beds • Frequent wild and remote experiences	
MARINE RESERVE, WEST COAST KĀPITI ISLAND	High	High	High	High	• Nearshore rocky reefs and rocky shoreline habitats • Storm- and wind influenced from western quarter • Steep sea cliffs shed material onto exposed narrow shoreline of steep boulder-gravel beaches and course substrates nearshore • Diverse and extensive beds of macroalgae • Deep bryozoan-characterised reef habitat • Frequent wild and remote experiences	

Coastal Marine Area C: Kāpiti Continental Slope

Location and Key Characteristics

The shoreward boundary of Coastal Marine Area C is the 100 m isobath, marking the outer extent of the broad continental shelf, and the seaward boundary is defined by the 12 nautical mile limit. Slope gradients are gentle to the north, but as the shelf tapers to the south as the slope merges and deepens into the northern approaches Cook Strait and the Narrows Basins, and the D'Urville Seavalley to the southwest. The silty and muddy sands and calc-gravels cover much of the outer marine area. The region is characterised by the southward flowing d'Urville current sweeping across from Farewell Spit (Stevens et al. 2018).

Abiotic

Strong tidal flows and ocean currents (d'Urville Current) dominate Coastal Marine Area C. The mean transport of waters is in southeast direction around the Whanganui Bight through to Cook Strait. Exposure to storm waves greater than 3m occurs for around 10% of the year. The northward incision into the upper slope of the Kāpiti Seavalley off the southwestern tip of Kāpiti Island forms a 2 km wide bank that shoals to 120 m, extending south-southwest to form the westward margin of the Kāpiti Seavalley. Elsewhere, the slope is largely featureless, with silty and muddy calc-gravel substrates becoming muddier offshore. The seaward limit of the occurrence of a calc-gravel component broadly coincides with the 12 nautical mile limit (Lewis and Mitchell 1980). Very small levels of modification to physical substrates, currents, and water quality with rare modification / structures are apparent through this area, noting climate change is starting to introduce some degree of modification.

Photograph from the Kāpiti Continental Slope waters looking towards Kāpiti Island. NIWA, nd.

Biotic

The Kāpiti continental slope has received low levels of commercial bottom-trawling effort over the last decade, with slightly increased intensity in the southwest approaches to Cook Strait (Baird and Mules 2021), resulting in an increased level of modification in this area. Recreational fishing occurs in the area, but probably at reduced levels compared to Coastal Marine Area B due to the greater exposure from the west. In keeping with the other marine areas, Coastal Marine Area C is predicted to support average demersal fish diversity at a national scale (Leathwick et al. 2006). Species that are predicted to be relatively common in this area include scaly gurnard, school shark, carpet shark, spiny dogfish, barracouta, hapuka (*Polyprion oxygeneios*), horse mackerel (*Trachurus declivis*) and tarakihi (*Nemadactylus macropterus*) (MacDiarmid et al. 2012).

The seabird assemblage in Coastal Marine Area C will tend to comprise pelagic and offshore species, with fewer of the coastal and inshore species that predominate in Coastal Marine Areas A and B. Typical taxa will include a range of albatross species, such as white-capped albatross (*Thalassarche steadi*), shearwaters (*Puffinus spp*.), fairy prion and northern diving petrel.

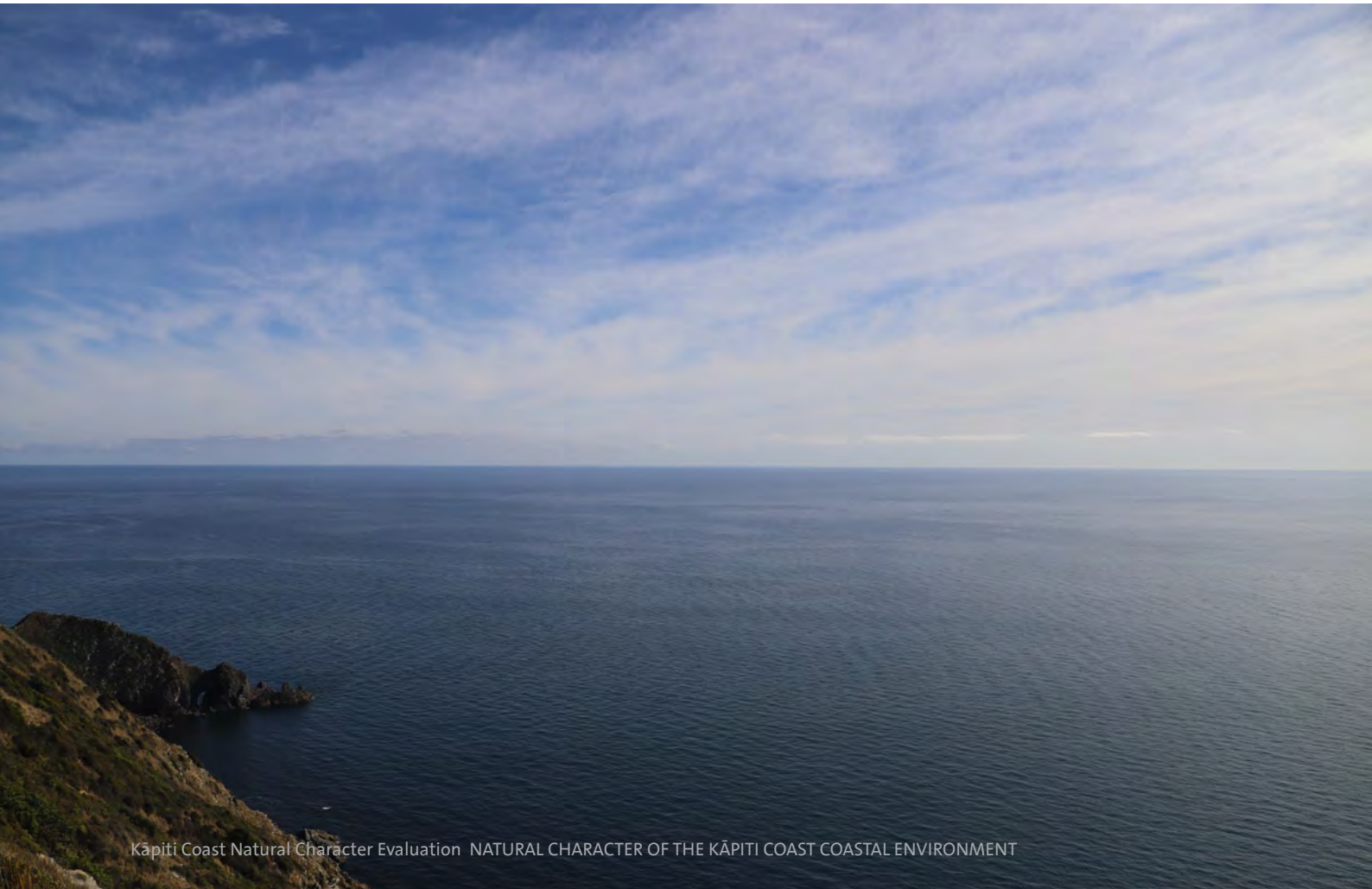
Marine mammals utilising Coastal Marine Area C will likely include those noted for Coastal Marine Area B (common dolphin, bottlenose dolphin, killer whale and humpback whale), but could also include deeper water species from time to time, including sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*) and blue whale (*Balaenoptera musculus spp and sub spp.*) (Stephenson et al. 2020).

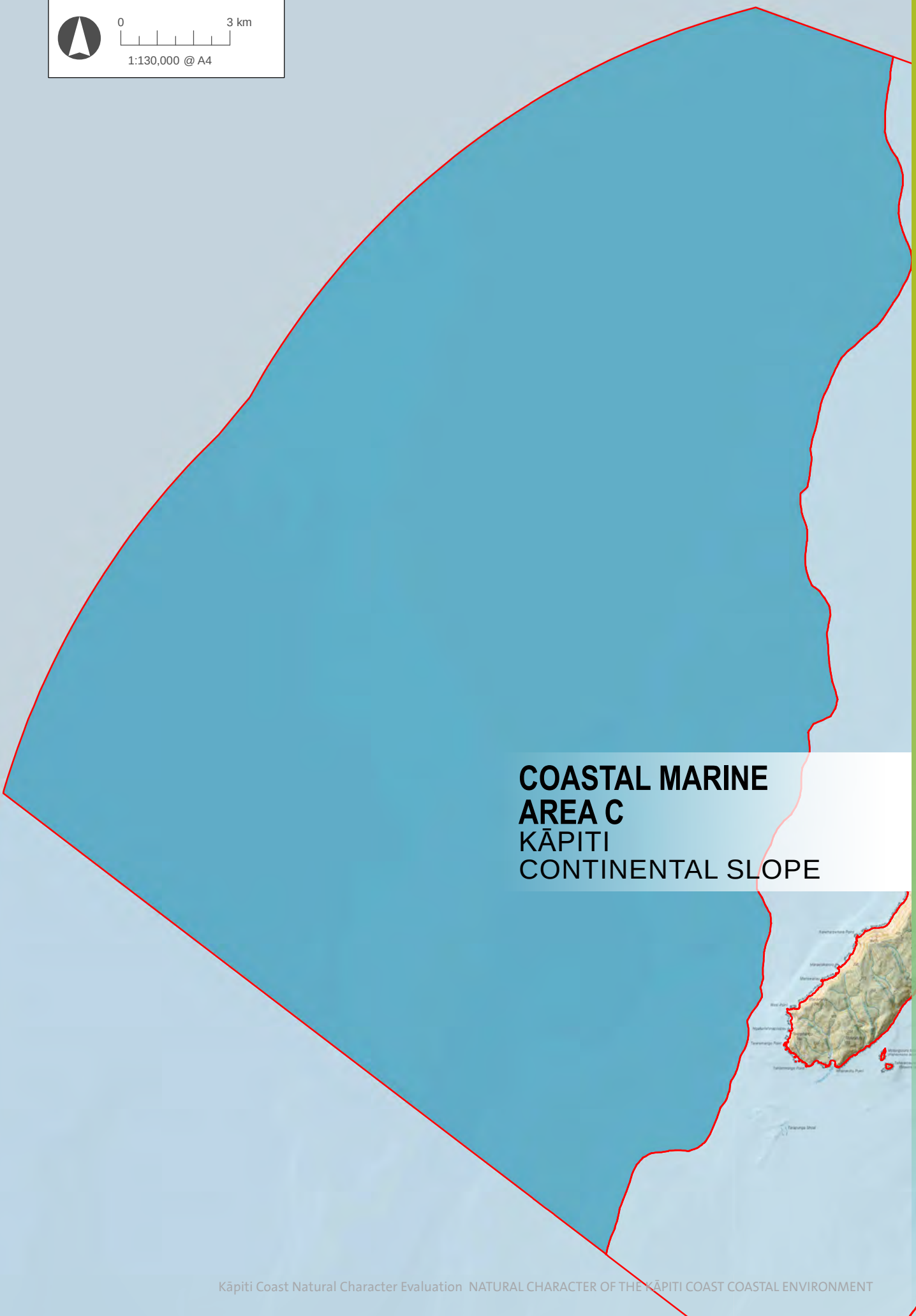
Experiential

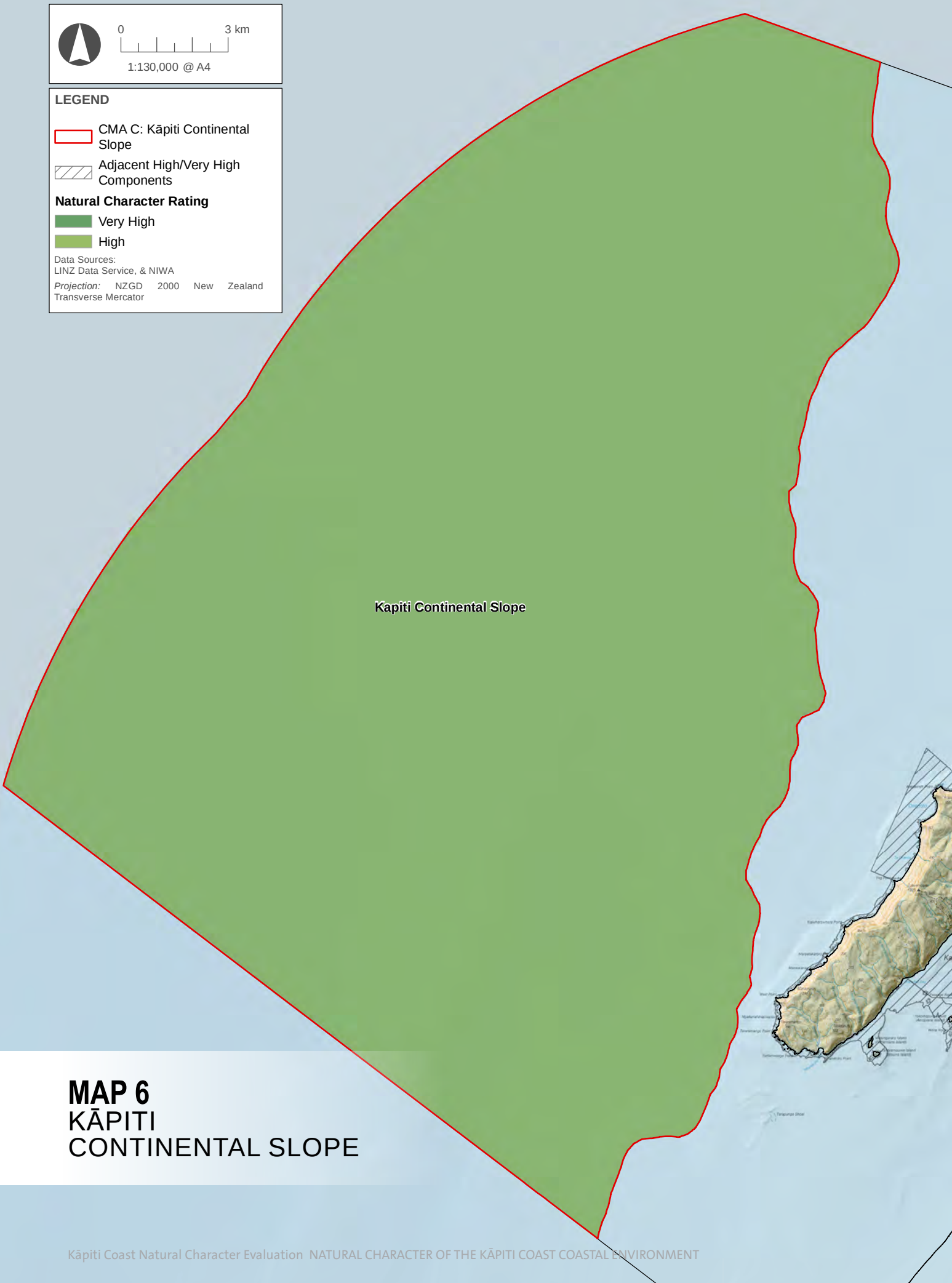
Coastal Marine Area C is an exposed and relatively wild marine space with very high levels of experiential natural character. There is very little tangible human modification: nocturnal light pollution is minimal, the views across the ocean swells are uninterrupted and encompass Kāpiti Island and the southern North Island to the east and the northern reaches of South Island to the west and southwest and the likelihood on encountering large marine animals in this space would be high.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			★
HIGH	★		
MODERATE TO HIGH		★	
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	High		

View looking west towards the Kāpiti Continental Shelf Coastal Marine Area from the Okupe Valley Loop Track. Boffa Miskell, 2021




0
3 km
1:130,000 @ A4
COASTAL MARINE AREA C
KĀPITI
CONTINENTAL SLOPE



MAP 6
KĀPITI CONTINENTAL SLOPE

COASTAL MARINE AREA C: KĀPITI CONTINENTAL SLOPE

THESE ARE MAPPED WITH REFERENCE TO MAP 6

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
KĀPITI CONTINENTAL SLOPE	High	High	Mod - High	Very - High	• Abiotic environment largely unmodified and characterised by a vigorous wave climate and strong ocean currents. • High levels of biological diversity with relatively minor impacts from commercial fishing. • Diverse megafauna assemblage, with many species of high conservation status. • Largely unmodified area leads to very high experiential values	Relatively low levels of commercial bottom-trawling effort

Summary of Natural Character of Kāpiti Coast's Coastal Terrestrial Environment

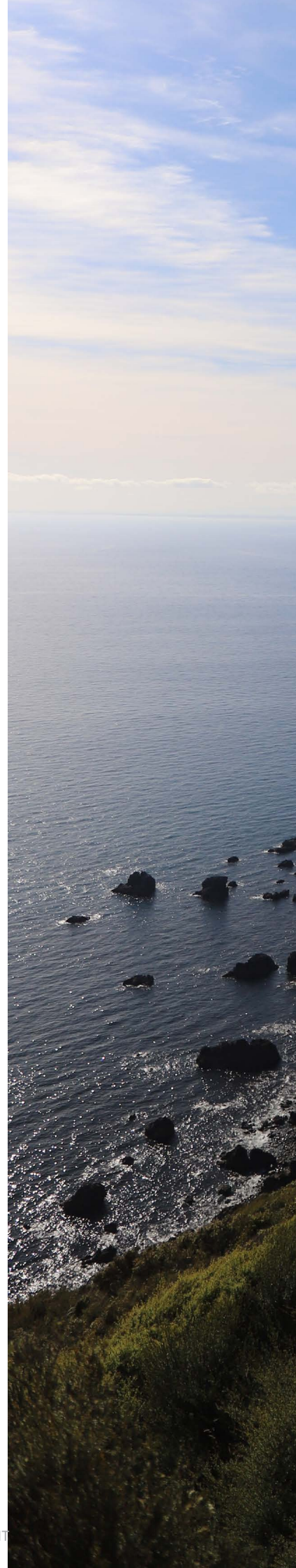
The Kāpiti Coast's Coastal Terrestrial Environment has been divided into four Coasta Terrestrial Areas (CTAs) based on apparent changes in the characteristics and qualities of each area.

At the area scale, the mainland comprises three distinct areas. An area of rural and adjoining rural lifestyle development to the north, a more modified urban area encompassing the settlements of Waikanae and Paraparaumu in the centre, and a comparatively mixed southern area which accommodates Queen Elizabeth Park alongside the settlement of Paekākāriki adjoining Paekākāriki Escarpment. In addition, Kāpiti Island and three islets form a separate CTA identified approximately 5 kilometres off the coast.

Northern areas of the coastal environment are generally more extensive due to the reduced built settlement adjoining the small coastal settlements of Te Horo and Ōtaki Beach in this area. The Ōtaki River system also forms a key natural element in this context. Through the centre of the Kāpiti Coast, the coastal environment narrows due to the intervening settlements of Waikanae and Paraparaumu. This section of the Kāpiti coastal environment is the most densely populated and where the most modification has occurred to coastal elements, patterns and processes. Nevertheless, the cuspate foreland formed from sediment being deposited by the southward flowing d'Urville current remains a defining feature of this CTA alongside the Waikanae Estuary which retains a functional aspect of the coastal environment in this context.

To the south of Paraparaumu, interactions between the terrestrial and marine environments become more apparent. Alongside Queen Elizabeth Park, the coastal environment also accommodates substantial areas of revetment due to the constant threat of coastal erosion. Further south, the township of Paekākāriki adjoining the Paekākāriki Escarpment forms the southern boundary of the District and contains areas of regenerating indigenous vegetation along steep coastal scarps.

Kāpiti Island remains one of the most unmodified parts of the Wellington Region, cloaked in indigenous forest and surrounded by rocky reefs and small offshore islands. The Island is a predator free Nature Reserve and is only accessible by boat on the north-east of the island providing opportunities for a wild and remote sense of isolation.



View looking north from the Okupe Valley Loop Track lookout. Boffa Miskell, 2021

Coastal Terrestrial Area 1: Ōtaki

Location and Key Characteristics

The Ōtaki Coastal Terrestrial Area extends from the northern boundary of the Kāpiti Coast District to the Ngawhakangutu Reserve near Peka Peka beach. This Coastal Terrestrial Area is characterised by an extensive dune system and is the least populated Terrestrial Area along the coast, primarily containing rural farmland and the small coastal townships of Ōtaki and Te Horo.

Key coastal characteristics include: the Ōtaki River Mouth and estuary, the Waitohu Stream and estuary, the Mangaone Stream and estuary, extensive Holocene dune systems, and the coastal lakes and waterbodies such as Lake Waiorongomai. Beyond this, the identified inland extent of the coastal environment follows a combination of land typing, changes in dune vegetation and land use, and takes account of an understanding of the current storm surge.

Beyond this, the coastal context in this area comprises of the settlements of Ōtaki and Te Horo, which are surrounded by farmland and lifestyle blocks. Pockets of exotic forestry are also nestled within this landscape as are very small remnants of indigenous forest and wetland (Ravine, 1992).

Abiotic

The Ōtaki Coastal Terrestrial Area is characterised by Holocene sand dunes which are part of the Waitarere Dune phase extending no further than four kilometres inland. This is the youngest found in the Kāpiti Coast District, thought to be generated by human settlement approximately 600 years ago (Shepherd & Evans, 2016). The sand dunes in this section of the Kāpiti Coast remain some of the most intact and are largely impacted by sediment from the Ōtaki River. Areas which have been eroded are largely associated with beach access, vehicle use, and limited vegetation, particularly native vegetation such as pingao and spinifex.

There are three main waterways within the Ōtaki Coastal Terrestrial Area: namely the Ōtaki River, the Mangaone Stream and Waitohu Stream. The Ōtaki River mouth is situated in the centre of the CTA and has a catchment draining over 400km2 from the Tararua Ranges (Wellington (N.Z. : Region) et al., 1998). As the Ōtaki River naturally floods, combined with human use of the surrounding land, the river poses a flood hazard to human endeavours, particularly near the river mouth. Much of the surrounding farmland is inundated in large flood events and the river's edge has been modified to include some flood protection measures such as stop-banks (Greater Wellington Regional Council, 2017).

The Mangaone Stream has been largely modified through diversion of the stream mouth in the 1950's, artificial opening of the stream mouth to manage flood risk (as the mouth is narrow and frequently blocked), channel straightening and constraining of the stream through adjacent road development. The Waitohu Stream mouth is also cut to prevent floods (Greater Wellington Regional Council, 2018). Sedimentation is an issue in most of the waterways through this area as a result of surrounding land use. Bank slumping is an additional issue for Ōtaki and Waitohu Streams because of reduced riparian cover. Consequently, a reasonable level of modification has occurred at all major river mouths due to managing the natural hazard risk they pose.

Within the Ōtaki Coastal Terrestrial area there is one geopreservation site to the south of the Ōtaki River mouth. This includes the regionally significant Ōtaki beach ridges formed from coarse sediment deposited by the Ōtaki River (NZ Geopreservation Inventory, n.d.).

The Ōtaki Coastal Terrestrial Area is one of the drier and calmer areas in the Wellington Region. Average wind speeds are approximately 5m/s, with the main prevailing wind being from the west. Spring is the windiest season for this Coastal Terrestrial Area and autumn the calmest. Average annual rainfall for the Coastal Terrestrial Area is 1,100mm, however the Ōtaki River services a catchment which can receive up to 2,000mm annually (Chappell, 2014).

View of Otaki Beach and Otaki Beach Settlement. Boffa Miskell, 2020.

Average annual temperature for the Ōtaki Coastal Terrestrial Area is 14°C and temperature range is smaller at the coast. The average summer temperature is 22°C and in winter this falls to 6°C. The area also experiences 1,900 annual sunshine hours, much less than the annual sunshine hours found in the likes of the Wairarapa and Wellington (Chappell, 2014).

Biotic

The total land area of the Ōtaki Coastal Terrestrial Area is 699 hectares of which 66.6% is cropland, 13.7% is bare or lightly vegetated surfaces, 9.5% is exotic forest, 3.7% is water, 3.4% are artificial surfaces and 3.1% is shrubland (some broadleaved indigenous hardwoods present but predominantly gorse and broom).

Originally vegetation in the Ōtaki Coastal Terrestrial Area would have included extensive swathes of dune-stabilising species (pingao, Spinifex), dune scrub (e.g. tauhinu, sand coprosma), interdune wetlands (with species such as nīkau, kahikatea and pukatea) and rushfields, and coastal forest species (e.g. rewarewa, tikoki, ngaio, kohekohe) (Ravine, 1992; Wildland Consultants Ltd, 2009).

Today, vegetation cover is largely exotic, dominated by exotic grassland (pastoral grasses in farmland and marram grass in dunelands), weed species, pine forestry and shelterbelts. Native duneland vegetation is interspersed amongst exotic species, in varying proportions along the coast. The Te Horo dunes are dominated by exotic species and are in poor condition. Some native riparian margins are also present.

Substantive modifications and/or disturbances to the CTA include:

- native vegetation clearance;
- land use change (farming, housing, pine plantations);
- land form modification;
- hydrological changes and associated habitat loss (including reduced duneland extent due to roading and housing);
- invasion of exotic plant species including ecological weeds (Stevens & Robertson, 2006; Wildland Consultants Ltd, 2009); and
- presence of pest animals, 4WD vehicle beach access and Ōtaki River flood protection measures (stopbanks, floodgates).

Approximately one-third of the Coastal Terrestrial Area is encompassed within the Ōtaki Coast Key Native Ecosystem (KNE). The KNE is 119 ha and extends along the coastline from 500m south of the Mangaone Stream estuary (by Te Horo Beach settlement) to 500m north of the Ōtaki River mouth lagoon. Habitats present include 5km of gravel/ stony beaches, the Ōtaki River mouth/estuary, the Mangaone Stream mouth/estuary and wetland areas. These habitats support a range of ecological values including uncommon ecosystem types (e.g. coastal turfs, shingle beaches), native coastal plants (e.g. knobby clubrush, sand sedge, patches of pingao, remuremu, bachelor's button) and native avifauna and fish species. The condition of the KNE is compromised by the widespread presence of exotic weed species, particularly along riparian margins, and this reduces the level of biotic integrity of the area. Other threats include pest animals, beach vehicle access and historic flood protection management. Restoration and management work are conducted and include weed control, revegetation and predator control (Greater Wellington Regional Council, 2017).

The Ōtaki Coastal Terrestrial Area also includes the Waitohu Coast and Wetland Key Native Ecosystem (KNE). The KNE is 31ha and is located just north of Ōtaki Beach. Ecosystems present include dune systems, wetlands and the lower reaches and estuary of Waitohu Stream (Greater Wellington Regional Council, 2018). The Waitohu Stream mouth and estuarine wetlands are of regional significance and listed as Ecological Sites of Importance in the District Plan (Kāpiti Coast District Council, 2021). The KNE includes several ecological values including uninterrupted sequences of different ecosystems and remnant components of former native flora and fauna (including At Risk and Threatened

avifauna and fish species). Despite these ecological values, the condition of the wetland and dune systems remain largely modified by development and historic farming practises.

In some areas, revegetation works has resulted in restoration of native foredune vegetation, particularly in the northern dune system with exotic marram grass replaced by Spinifex and some areas of pingao. Other threats to the area include:

- pine tree and macrocarpa seedlings (from mature trees planted to prevent sand encroaching into farmland) establishing in backdune habitat;
- garden dumping introducing ecological weeds;
- recreational vehicle use;
- invasion of exotic species (e.g. buck's horn plantain in coastal turf, pampas grass, marram grass, gorse, tree lupin); and
- pest animals (Greater Wellington Regional Council, 2018).

The Ōtaki River is a large, gravel braided system and the mouth includes a sandspit and two lagoons, one to the north and one to the south. The northern lagoon is being restored (weed control and native planting) and the southern lagoon includes areas of flax, three-square and cabbage trees but both are reasonably modified. The riparian margins of Ōtaki River are heavily modified and dominated by exotic species and tall fescue and Montbretia are distributed throughout the northern lagoon (Todd et al., 2016). Water quality in Ōtaki River is high as is macroinvertebrate health (Greater Wellington Regional Council, 2017).

The Waitohu Stream mouth includes areas less modified of oioi saltmarsh and a large area of sea rush and saltmarsh ribbonwood. However, tall fescue, an exotic plant, is common along most of the riparian margin. Water quality is poor because of runoff from upstream dairy farming.

The Mangaone Stream mouth is small, frequently blocked, and occasionally artificially opened. Occasional areas of native riparian vegetation are present but exotic vegetation is dominant (e.g. reed sweetgrass, tall fescue). Water quality is poor because of upstream agricultural and forestry land uses.

Within the Coastal Terrestrial Area, these waterways all provide habitat for a diversity of native freshwater and marine fish species whose assemblages are relatively unmodified, including At Risk species (Todd et al., 2016). The river mouths, while modified, still function to provide foraging and nesting habitat for coastal avifauna (including the biggest pied stilt colony in the Wellington region and important banded dotterel breeding sites (Greater Wellington Regional Council, 2017)).

Experiential

The Ōtaki Coastal Terrestrial Area remains one of the Kāpiti Coast District's least populated areas. The two small settlements of Ōtaki Beach and Te Horo overlook the beach, either side of the Ōtaki River. Access to this Coastal Terrestrial Area is well established with numerous paths and roads allowing access to the beach and the Ōtaki River mouth. Four-wheel drive access is common on Otaki and Te Horo beaches, and recreational activities include walking, horse riding, surfing, and swimming. Fishing at the Ōtaki River mouth is also popular.

Despite recreational activities being popular in this part of the coastal environment there remains frequent opportunities to experience wildness, isolation and remoteness. These include open views towards Kāpiti Island and of the Rauoterangi Channel, exposure from the ocean, sunsets, and prevailing winds. Ephemeral experiences also include opportunities to encounter native fauna including riverbed nesting by banded dotterel, black-fronted dotterel and pied stilt, particularly at the Ōtaki River Estuary.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			
MODERATE TO HIGH			
MODERATE	★		★
MODERATE TO LOW		★	
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Moderate		

COASTAL TERRESTRIAL AREA 1

ŌTAKI


0
1,000 m
1:50,000 @ A4
LEGEND
CTA 1: Otaki
Adjacent High/Very High Components
Natural Character Rating
Very High
High
Data Sources:
LINZ Data Service, & NIWA
Projection: NZGD 2000 New Zealand Transverse Mercator
Otaki Dunes
Waitohu Stream
Lake Waiorongomai
Comishman 1981
Surf club
Otaki Beach
Otaki River
Otaki
Mangaone Stream
Te Horo Beach
Te Horo
Te Horo Dunes
MARINE PARADE
TASMAN ROAD
RANGIURU ROAD
SIMS ROAD
SWAMP ROAD
LETHBRIDGE RD
ADDINGTON ROAD
OTAKI ROAD
TE HORO BEACH ROAD
PUKENAMU ROAD
MORRISON RD
PAUL FAITH LN
ARCUS RD
CATLEY RD
HAUTERE CROSS ROAD
MANGAONE ROAD
WAIORONGOMAI ROAD
OLD COACH ROAD NORTH
BENNETTS RD
CONVENT ROAD
WAERENGA ROAD
RIVERBANK RD EXTN
A3XJ
A3XF
A3XH
A3XG
A3XQ
A4NQ
B13F

MAP 7
ŌTAKI

COASTAL TERRESTRIAL AREA 1: ŌTAKI

THESE ARE MAPPED WITH REFERENCE TO MAP 7

REFER TO THE COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
ŌTAKI DUNES	High	High	Mod.	High	• Intact dunes formed during the Waitarere Dune phase • Abiotically, the Waitohu Stream and wetland remain in reasonably good condition around the estuary • Native Spinifex is the dominant vegetation in the beach berm. Elsewhere there is a mosaic of native and exotic vegetation. • Expansive views of Kāpiti Island and the Rauoterangi Channel • Opportunities to experience the sounds and smells of the open ocean with limited structures	Key Native ecosystem supporting nine bird, five freshwater fish, one invertebrate species all at risk or nationally threatened.
TE HORO DUNES	High	High	Mod - Low	High	• Intact dunes formed during the Waitarere Dune phase • Native duneland species still present, however exotic species are dominant • Expansive views of Kāpiti Island and the Rauoterangi Channel • Opportunities to experience exposure from the open ocean	

Coastal Terrestrial Area 2: Waikanae and Paraparaumu

Location and Key Characteristics

The Waikanae and Paraparaumu Coastal Terrestrial Area extends from the mouth of the Ngawhakangutu Reserve to the northern end of Queen Elizabeth Park. This section of the Kāpiti Coast coastline is characterised by the townships of Waikanae and Paraparaumu beach and the cuspate (tapering) foreland which creates the sweeping form of Waikanae, Paraparaumu and Raumati beaches.

Key coastal characteristics include: The tapering foreland at Paraparaumu and Waikanae beaches, Waikanae Estuary, Waimeha Stream mouth, dunes formed from Taupo Pumice lapilli and coastal revetment which extends from Paraparaumu beach to Raumati South. In this context, the inland extent of the coastal environment has been defined based on apparent changes in land typing and encompasses the current storm surge along this settled coastal edge.

Beyond this Coastal Terrestrial Area, the coastal context forms the most settled part of the Kāpiti Coast. The townships of Waikanae and Paraparaumu reside on ancient sand dunes which are overlooked by the ranges above.

Abiotic

The Waikanae and Paraparaumu Coastal Terrestrial Area is characterised by Holocene sand deposits and dunes (GNS Science, 2018). An important feature within this Coastal Terrestrial Area is the nationally significant Paraparaumu cuspate (tapering) foreland which extends from the Pharazyn Reserve in the north to the Wharemauku Stream near Raumati Beach in the south. This geological feature has been facilitated by the sheltered waters to the east of Kāpiti Island and the accretion of sediment near Paraparaumu (Nolan, 2017). Due to subdivision, particularly near the settlements of Paraparaumu Beach and Waikanae Beach, the dune systems have been largely modified to accommodate housing and urban development. Nevertheless, the cuspate foreland remains a legible feature within this Coastal Terrestrial Area.

The dunes in this Coastal Terrestrial Area vary in age. Peka Peka Beach is dominated by a mixture of Waitarere-Motuiti dunes. The Motuiti dunes contain a large amount of Taupo Pumice lapilli which is likely to have accumulated at the time of the Taupo eruption approximately 1,720 years ago (McFadgen, 1997). The dunes at the cuspate foreland are formed predominantly from material from the Taupo Eruption and is known as the Taupo Dune (McFadgen, 1997). The Taupo Dune extends from the true left of the Waikanae Estuary to the north of Raumati Beach. Seaward of the Taupo Dune is a small strip of the Younger Waitarere Dunes which are thought to be younger than 150 years in age.

The Waikanae Estuary is also a prominent feature within the Waikanae and Paraparaumu Coastal Terrestrial Area. The estuary is 37ha in size and is located at the mouth of the Waikanae River. At the mouth of this estuary is a large sandspit formed by longshore drift. While the resulting estuary largely contains freshwater at low tide, it is dominated by saline water at high tide with a freshwater top layer. Due to saltmarsh and seagrass reclamation, forest harvesting and surrounding development the estuary has accumulated higher levels of sediment particularly near the upper area of the estuary. The lower area of the estuary does not share the same issues due to consistent flushing from waves and dunes naturally eroding and developing. Notwithstanding this, a degree of ongoing modification remains apparent because of surrounding land use changes and flood protection measures. Key abiotic modifications include gravel management, mechanical opening of the river mouth, construction of floodgates (which has artificially created Waimanu Lagoon) and erosion protection works (Department of Conservation, 2007; Kāpiti Coast District Council, 2021; Todd et al., 2016).

To the north of Waikanae Estuary is the Waimeha Estuary, a small tidal estuary and sandy beach. While this estuary is narrow, it requires regular realignment to re-set it from flood flows, and the effects of storm surges. This is carried out two to three times annually with most material excavated being deposited in the surf zone. Upstream of the sand dunes, the stream has been channelised to allow urban development. Other historic modification includes the creation of an artificial cut to form a new river mouth to allow for urban development (historically the stream was a branch of Waikanae River) (Todd et al., 2016).

View of the Waimeha Stream and Waikanae Beach. Boffa Miskell, 2020

To the south of Waikanae Estuary is the Wharemauku stream and estuary. The estuarine system is highly modified and is entirely constrained by retaining walls and culverts; the final 100m of the reach to the stream mouth has been artificially straightened. A footbridge crosses the stream near the mouth (Todd et al., 2016).

South of Waikanae Estuary there is greater modification between the coastal marine and coastal terrestrial interface. Many of the smaller streams in the coastal terrestrial area have also been channelised and flood protection and coastal hazard measures are common. These include sea walls, retaining walls, concrete blocks, rocks, and boulders. Modification has also been required to create the coastal pathway from south of Raumati Beach to the Raumati Beach gardens.

The Waikanae and Paraparaumu Coastal Terrestrial Area is exposed to an average wind speed of 6m/s, with the main prevailing wind being from the west. Spring is the windiest season for this Coastal Terrestrial Area and autumn the calmest. Annually, the area receives approximately 1,000 -1,100mm of rainfall, however the Waikanae River services a catchment which receives 1,300 – 1,400mm of rainfall annually (Chappell, 2014).

The Coastal Terrestrial Area is subjected to approximately 1,900 hours of sunlight annually with an average daily temperature of 21°C in summer. This drops to an average daily temperature of 6°C in winter (Chappell, 2014).

Biotic

The total land area of the Waikanae and Paraparaumu Coastal Terrestrial Area is 321.7 hectares of which 35.9% are artificial surfaces, 29.3% is cropland, 16.9% is bare or lightly vegetated surfaces, 12% is scrub or shrubland, 4.9% is water, and 1.1% is forest.

Historically, the Waikanae and Paraparaumu coastal terrestrial area would have been vegetated in native duneland and wetland species and lowland podocarp/broadleaf forest in dune slacks. Today little native vegetation remains in the Coastal Terrestrial Area because of extensive land use changes (farming and subsequently residential development).

The main ecosystems with this Coastal Terrestrial Area include beach, estuaries, wetlands, streams/rivers and dunelands. Key biotic modifications and/or disturbances to these ecosystems include:

- erosion protection works (seawalls);
- beach 4WD access;
- abundant people and their pets;
- land use change, and subsequent extensive habitat loss, change in vegetative cover from native to exotic-dominated communities including an abundance of invasive species and garden escapees; and
- stormwater outlets, and flood protection works (e.g. channel realignment, bed contouring and gravel extraction).

These factors have resulted in extensive modification to the Coastal Terrestrial Area and as such the species present and carrying capacity of those habitats; the area is largely built, and remaining unbuilt areas are largely dominated by exotic species. As a result, natural elements, patterns and processes are largely modified as a result of human-induced actions.

Some modified but notable remaining biotic features within this Coastal Terrestrial Area include Waikanae Estuary, the Peka Peka dunes and Pharazyn Reserve. Waikanae Estuary is the only site along the Kāpiti Coast with a large intertidal area[4] and in 1987 it was established as a Scientific Reserve (Waikanae Estuary Scientific Reserve). The estuary has high ecological habitat and species values despite its modifications. It is an important intertidal foraging, breeding and/or high tide roost for a high diversity of coastal and seabird species, including a number of At Risk and Threatened species. It is also used as a stopover site for domestic and international migratory species (e.g. wrybill, bar-tailed godwit). The Reserve is contiguous with Kāpiti Marine Reserve and Kāpiti

4. Kāpiti Coast District Council, 2021; Stevens & Robertson, 2006

Island Nature Reserve and provides important ecological connectivity for species to move between river, land and sea habitats. Habitat types are diverse and include tidal sandflats, sandspits, sand dunes, saltmarsh and freshwater wetlands. A diverse range of native plant species are present and in areas are the dominant vegetation cover (e.g. within saltmarsh habitat). Two regionally rare Carex species are present at the estuary. Although of ecologically high value, biotic elements of Waikanae Estuary have been modified largely as a by-product of land use change.

Historically, flax-milling, farming, drainage and subsequent residential development has resulted in extensive vegetation clearance along the river and estuarine margins. Other ongoing modifications include gravel management and erosion protection works as part of flood and erosion control schemes[5]. Water quality is moderate but reduced through sedimentation and upstream discharges[6]. Vegetatively, exotic species are common in areas. As a result, natural patterns are common and natural processes remain apparent but with evidence of human modification. Restoration work is active at the estuary with management including weed control, pest animal control and re-planting of native species (Department of Conservation, 2007; Stevens & Robertson, 2006).

The Peka Peka dunes are a component of the Peka Peka coast key native ecosystem (KNE). The KNE is 39 ha and includes a 3 km section of coast between Peka Peka beach and Waikanae beach which comprises Te Kowhai Stream Estuary and beach, the Pharazyn Reserve coastal dunelands and associated wetland areas. These ecosystems support several native species, including At Risk and Threatened coastal plant and bird species (e.g. pingao, shore spurge, Caspian tern, red-billed gull, longfin eel, inanga). The sand dune and estuarine landscape is degraded but reasonably unmodified by structures and contains components of the original native vegetation cover (Greater Wellington Regional Council, 2019) (e.g. Spinifex forms a major component of the vegetation on the front face of the foredune (Wildland Consultants Ltd, 2011)).

The condition of coastal terrestrial ecosystems is frequently modified and degraded by the presence, and often dominance, of ecological weed species (e.g. marram grass, tree lupin, pampas grass, blackberry, ice plant). Such species typically outcompete native species and prevent natural regeneration. Other threats to ecosystems include pest animals, off-road driving through dunes and along the beach, informal walking tracks through dunes and dumping of garden waste. Management activities are undertaken and has the potential to restore the condition of some areas, particularly through weed control, pest animal control and revegetation (Greater Wellington Regional Council, 2019).

The Pharazyn Reserve dunes and dune swales lie within the Waikanae and Paraparaumu Coastal Terrestrial Area (the decommissioned oxidation ponds do not). The dunes have not undergone structural modification (i.e. are undeveloped), however the vegetation is highly modified with exotic plant species dominant. The exception to this is the front face of the foredunes, where native Spinifex is a dominant component of the dune vegetation (Boffa Miskell Ltd, 2005; Greater Wellington Regional Council, 2019; Wildland Consultants Ltd, 2011).

The main waterways within this Coastal Terrestrial Area include Wharemauku Stream, Waikanae River and Waimeha Stream. The headwaters of these waterways are largely forested whereas the lower extents pass through more modified agricultural and urban areas. Native riparian vegetation cover has been reduced and modified although restoration planting is apparent in areas along the Waikanae River and Waimeha Stream riparian margins. Very little indigenous vegetation remains along the lower reach of the Wharemauku Stream with only occasional sparse patches of rushes (Todd et al., 2016).

The Waikanae River has fair water quality, however the Wharemauku and Waimeha Streams have poorer water quality due to nutrient enrichment and stormwater contamination (Todd et al., 2016). These waterways are classed as significant indigenous ecosystems as they provide habitat for threatened native fish species and six or more migratory native fish species. The Waikanae River and Waimeha Stream also provide inanga spawning habitat (Greater Wellington Regional Council, 2013; Todd et al., 2016). The river/stream mouths provide foraging habitat for coastal avifauna.

5. Department of Conservation, 2007; Kāpiti Coast District Council, 2021; Todd et al., 2016

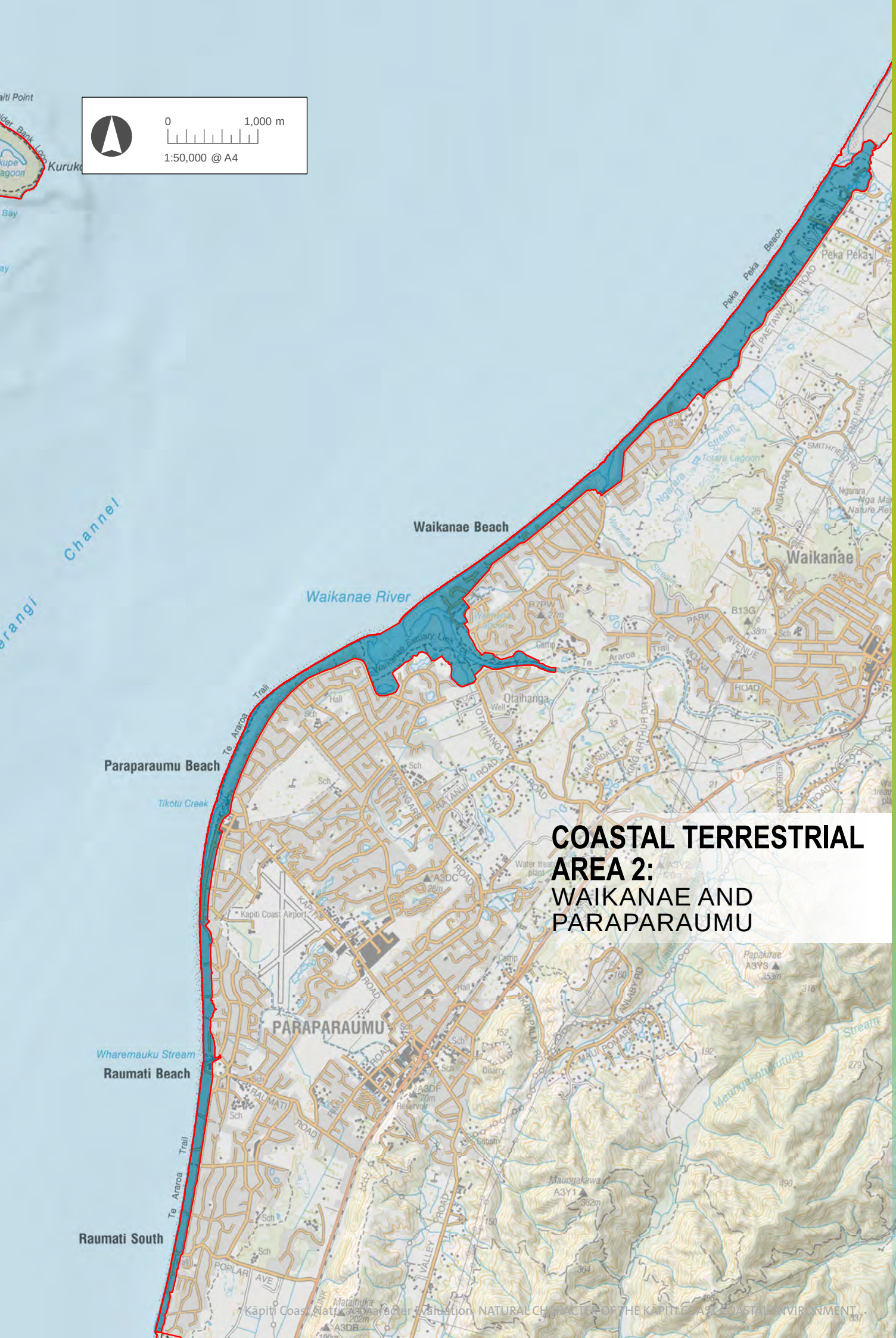
6. https://www.lawa.org.nz/explore-data/wellington-region/river-quality/waikanae-river/

Experiential

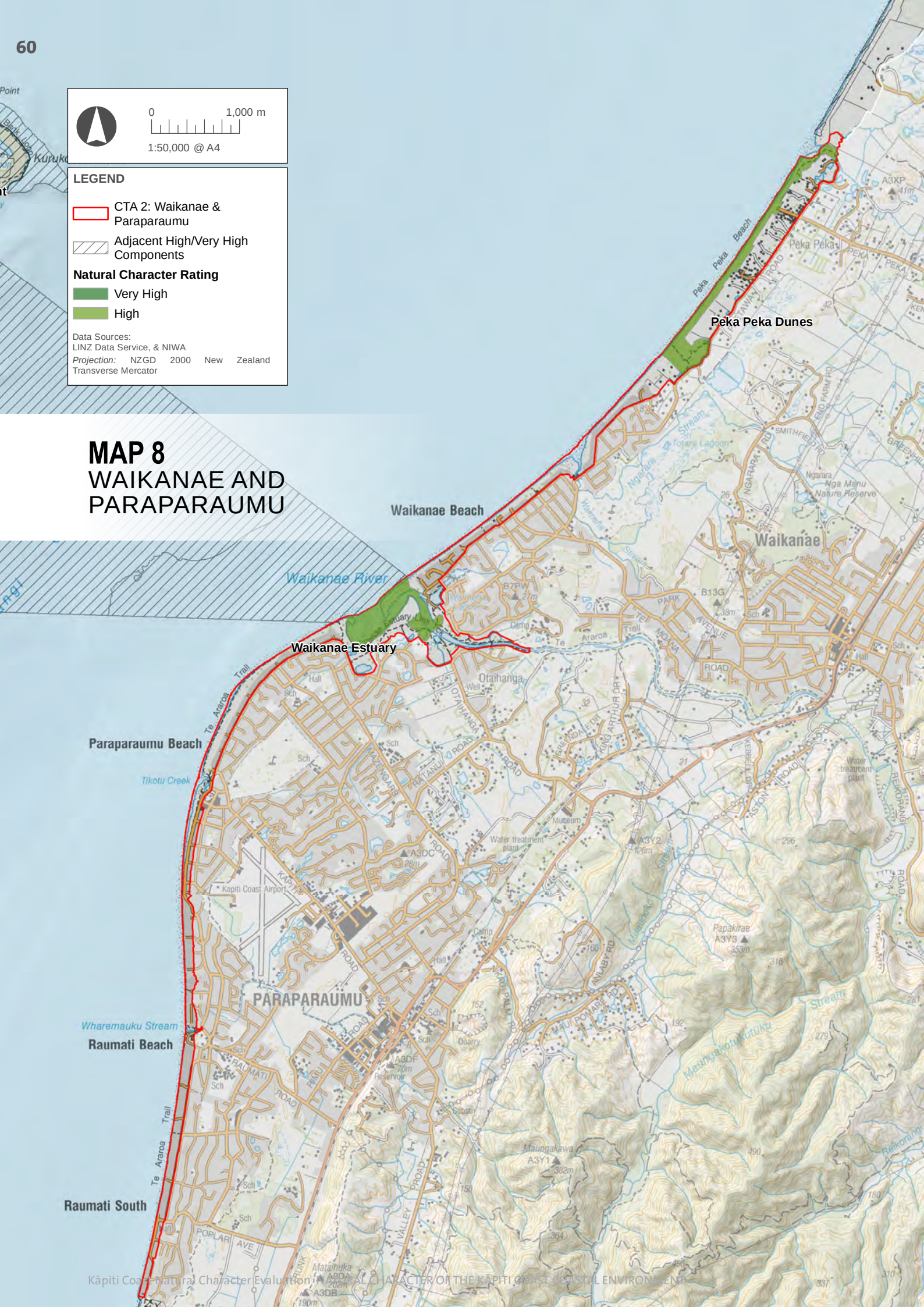
The Waikanae and Paraparaumu Coastal Terrestrial Area is the most populated area in the Kāpiti Coast's coastal environment and adjoining Coastal Context. The three main settlements include Waikanae Beach, Paraparaumu Beach and Raumati Beach. The area is popular for recreational activities, particularly associated with the beaches along the coastline and the Waikanae Estuary. Raumati, Paraparaumu Beach, Waikanae Beach and Peka Peka beaches provide opportunities for swimming, walking, blow-carting, boating, and surfing. Along the coastal edge there are numerous walkways and cycleways extending the length of the Coastal Terrestrial Area. This includes the Paraparaumu loop, Waikanae Beach to Peka Peka Loop and the Waikanae River Loop. Access to this Coastal Terrestrial Area is well established and four-wheel drive use is apparent on the beaches, particularly near Paraparaumu Beach and to the north of Peka Peka Beach.

Due to the level of development in this Coastal Terrestrial Area there are limited opportunities to experience a sense of wildness and remoteness. Nevertheless, the area provides uninterrupted and open views of Kāpiti Island and from the beach, there are opportunities to experience the prevailing westerly wind and impressive sunsets.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			
MODERATE TO HIGH			
MODERATE			★
MODERATE TO LOW	★		
LOW		★	
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Low-Moderate		



COASTAL TERRESTRIAL AREA 2:
WAIKANAE AND PARAPARAUMU


0
1,000 m
1:50,000 @ A4
LEGEND
CTA 2: Waikanae & Paraparaumu
Adjacent High/Very High Components
Natural Character Rating
Very High
High
Data Sources:
LINZ Data Service, & NIWA
Projection: NZGD 2000 New Zealand Transverse Mercator
MAP 8
WAIKANAE AND PARAPARAUMU
Peka Peka Dunes
Waikanae Beach
Waikanae River
Waikanae Estuary
Waikanae
Paraparaumu Beach
Tikotu Creek
PARAPARAUMU
Kapiti Coast Airport
Wharemauku Stream
Raumati Beach
Raumati South
Otaihanga
Te Araroa Trail

COASTAL TERRESTRIAL AREA 2: WAIKANAE AND PARAPARAUMU

THESE ARE MAPPED WITH REFERENCE TO MAP 8.

REFER TO THE COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
PEKA PEKA DUNES	High	High	Mod.	High	• Largely intact coastal dunes containing Taupo Pumice lapilli • Native vegetation cover reduced but present • Peka Peka beach provides opportunities for swimming, walking, blow-carting, boating, and surfing in a relatively open and undeveloped context • Expansive views of Kāpiti Island and the Rauoterangi Channel	• Mapped extent coincides with Key Native Ecosystem (KNE) boundary
WAIKANAE ESTUARY	High	High	Mod.-High	High	• Mouth of the estuary contains a dynamic sandspit associated with the cuspate foreland • Sustains a representative native freshwater fishery • There remains a functional intertidal foraging, breeding and/or high tide roost for a high diversity of coastal and seabird species • Opportunities for walking and birdwatching in a relatively unbuilt and dynamic coastal environment	

Coastal Terrestrial Area 3: Paekākāriki

Location and Key Characteristics

The Paekākāriki Coastal Terrestrial Area extends from the northern edge of Queen Elizabeth Park to the southern territorial boundary for the Kāpiti Coast District. A large portion of this Coastal Terrestrial Area is part of the Queen Elizabeth Park, with the township of Paekākāriki located to the south. This section of the Kāpiti Coast coastal environment is characterised by relatively intact dune systems, the established settlement at Paekākāriki and the Paekākāriki scarp located beyond the main trunk railway line and State Highway 1.

Key coastal characteristics include: The Paekākāriki Scarp, coastal settlement at Paekākāriki and Queen Elizabeth Park. In this context, the inland extent of the coastal environment has been defined using the land typing, vegetation and land use, and first ridgeline principle where this remains directly related to the coast.

Beyond this Coastal Terrestrial Area is the Paekākāriki Escarpment and a large area of farmland containing lifestyle blocks. The ridgeline above has largely been cleared although patches of regenerating indigenous vegetation can be found. The newly constructed Transmission Gully motorway also ends to the north of Paekākāriki township, bypassing the majority of the town.

Abiotic

The Paekākāriki Coastal Terrestrial Area is characterised by Holocene sand dune deposits. Much of this Coastal Terrestrial Area has been formed by the Old Waitarere Dune system (McFadgen, 1997). This system is approximately 400 years in age and is comprised of rich sea-rafted Taupo Pumice lapilli. Much of this has been eroded by the ocean following which the dunes now expose the older Foxton soils (which began accumulating 6,500 years ago) and shell middens. The Foxton Dunes form a minor section of this Coastal Terrestrial Area, particularly near Paekākāriki township and near the mouth of the Whareroa Stream (McFadgen, 1997). A small strip of the Young Waitarere Dune system can be found to the south of the Whareroa Stream and extends approximately 2.5 kilometres south towards Paekākāriki.

Within this Coastal Terrestrial Area there is one geopreservation site associated with the Old Waitarere Dune system (NZ Geopreservation Inventory, n.d.). The regionally significant Whareroa dune field forms the majority of Queen Elizabeth Park and is considered one of the best-preserved dune fields on the Kāpiti Coast.

As Queen Elizabeth Park forms a large portion of this Coastal Terrestrial Area the dunes remain largely intact and legible, however are subjected to coastal erosion occurring south of the cuspate foreland near Waikanae and Paraparaumu Beach. The shape and stability of the dunes are influenced and modified by the presence of marram grass, an exotic sand binder that creates steep, unstable dunes. Erosion is present in some areas along this section of the Coastal Terrestrial Area, and blow outs are common particularly where tracks through the park come close to the edge of the dune. Some minor modification has occurred throughout the park, including the tracks and roads which traverse these dunes, and a small retaining wall has been placed at the mouth of the Whareroa Stream to prevent further erosion to the dunes.

To the south of Queen Elizabeth Park is the township of Paekākāriki. Here the dunes become less legible and more modified. Coastal hazard protection can be found the length of the coastline, varying from timber retaining walls to rock revetments. Along the area of coastal escarpment south of Paekākāriki, the coastal foreshore has been modified through a seawall, roading and a railway line; these features modify and interfere with abiotic processes.

The main waterways within the Paekākāriki Coastal Terrestrial Area are Whareroa Stream and Wainui Stream. The south bank of the Whareroa Stream has been modified

by the installation of a wooden retaining wall to provide stability to the bank and enable adjacent development of a carpark and picnic area. The stream is also channelised and only returns to its natural state as it passes through the dune system. The mouth of the Wainui Stream is less modified and is a dynamic system that often naturally changes its' position; natural driftwood blockages often form at the mouth. Both streams are crossed by footbridges. There is also a road bridge at the tidal limit of Wainui Stream. The sediment load in Whareroa Stream is increasing as a result of soil erosion in the catchment and infrastructure works. This aggradation contributes to flooding effects and inhibits vegetation growth (Todd et al., 2016).

The Paekākāriki Coastal Terrestrial Area is exposed to an average wind speed of 6m/s, with the main prevailing wind being from the west. Spring is the windiest season for this Coastal Terrestrial Area and autumn the calmest. Annually, the area receives approximately 1,200mm of rainfall (Chappell, 2014).

The Coastal Terrestrial Area is subjected to approximately 1,950 hours of sunlight annually with an average daily temperature of 21°C in summer. This drops to an average daily temperature of 6°C in winter (Chappell, 2014).

Biotic

The total land area of the Paekākāriki Coastal Terrestrial Area is 293.3 hectares of which 60.4% scrub or shrubland, 24.4% is cropland, 12.1% are artificial surfaces, and 2.6 % is bare or lightly vegetated surfaces.

Approximately half of the Paekākāriki coastal terrestrial area includes duneland within Queen Elizabeth Park and the other half is dominated by the Paekākāriki township and part of the Paekākāriki Escarpment. Originally, the duneland vegetation in this area would have been dominated by native sand binders (e.g. Spinifex and pingao) and coastal plants (e.g. sand daphne, shore bindweed). The remaining lowlands land would have been vegetated in coastal broadleaf/podocarp forest dominated by kahikatea, pukatea and nīkau (McEwen, 1987a). The Paekākāriki Escarpment would have been vegetated in low stature forest and scrub dominated by akiraho, kohekohe and ngaio with tawa, titoki, occasional podocarps and northern rata (McEwen, 1987b). Today, the vegetation has undergone varying degrees of modification as a by-product of urbanisation, vegetation clearance and invasion of exotic species.

The Paekākāriki Escarpment (the majority of which is located in the Porirua District) is recognised as an Ecosite and a Key Native Ecosystem. The area within the Coastal Terrestrial Area is vegetated in kohekohe-mahoe-akiraho-nīkau forest with areas of grey scrub (e.g. pohuehue, mingimingi, tauhinu), exotic pastoral grasses and weed species (Greater Wellington Regional Council, 2016). Below the escarpment, large pohutukawa trees are common along SH1; this species is a non-local native (i.e. a native species outside of its natural geographic range).

A key feature of this Coastal Terrestrial Area is Queen Elizabeth Park (located between Raumati South and Paekākāriki) 167 ha of which is a Key Native Ecosystem (KNE). The three main ecosystems within the KNE include dunelands, wetlands, and a coastal forest remnant. These ecosystems have several high ecological values in varying condition. The duneland is extensive and is the largest, relatively unmodified dune ecosystem in the Wellington region. Vegetation cover is a mix of both native and exotic species, including several ecological weed species. The coastal forest is a remnant of coastal broadleaf/podocarp forest that was once extensive in the Foxton Ecological District. The stand is dominated by kahikatea and pukatea trees, however the condition of the stand is compromised by human activities and the presence of exotic weed species (Greater Wellington Regional Council, 2020).

The main wetland component that lies within the Coastal Terrestrial Area are the rivermouths / estuaries of Whareroa Stream and Wainui Stream; these are also the two main waterways within the Coastal Terrestrial Area. The headwaters of both streams are in a forested catchment in the foothills of the Tararua Range. Water quality in Whareroa Stream is reasonably poor (because of farming land use in the lower reach) and macroinvertebrate health is moderate (Perrie et al., 2012). Despite this, Whareroa Stream is recognised as having Significant Ecosystem Values as it provides habitat for more than six native freshwater fish species. The good condition of the fish community is likely due to an absence of instream barriers and proximity of the waterway to the coast (Perrie et al., 2012). Water quality is higher in Wainui Stream as more of the catchment is forested (Todd et al., 2016). The riparian margins of these streams are largely native, although Whareroa Stream has a degraded saltmarsh dominated by exotic species. The estuaries themselves are in relatively good condition (Greater Wellington Regional Council, 2020; Todd et al., 2016).

This Coastal Terrestrial Area provides habitat for several native species, including a number of At Risk and Threatened species e.g. sand coprosma, New Zealand pipit, variable oystercatcher, longfin eel (Greater Wellington Regional Council, 2016, 2020). Some expected species, particularly plant species, are missing or in low abundances with modification to population structures. Exotic and invasive pest plant species are common.

Management activities (weed control, pest animal control, native revegetation) are undertaken with the KNE sites to improve the condition of these ecosystems and their ecological values (Greater Wellington Regional Council, 2016, 2020).

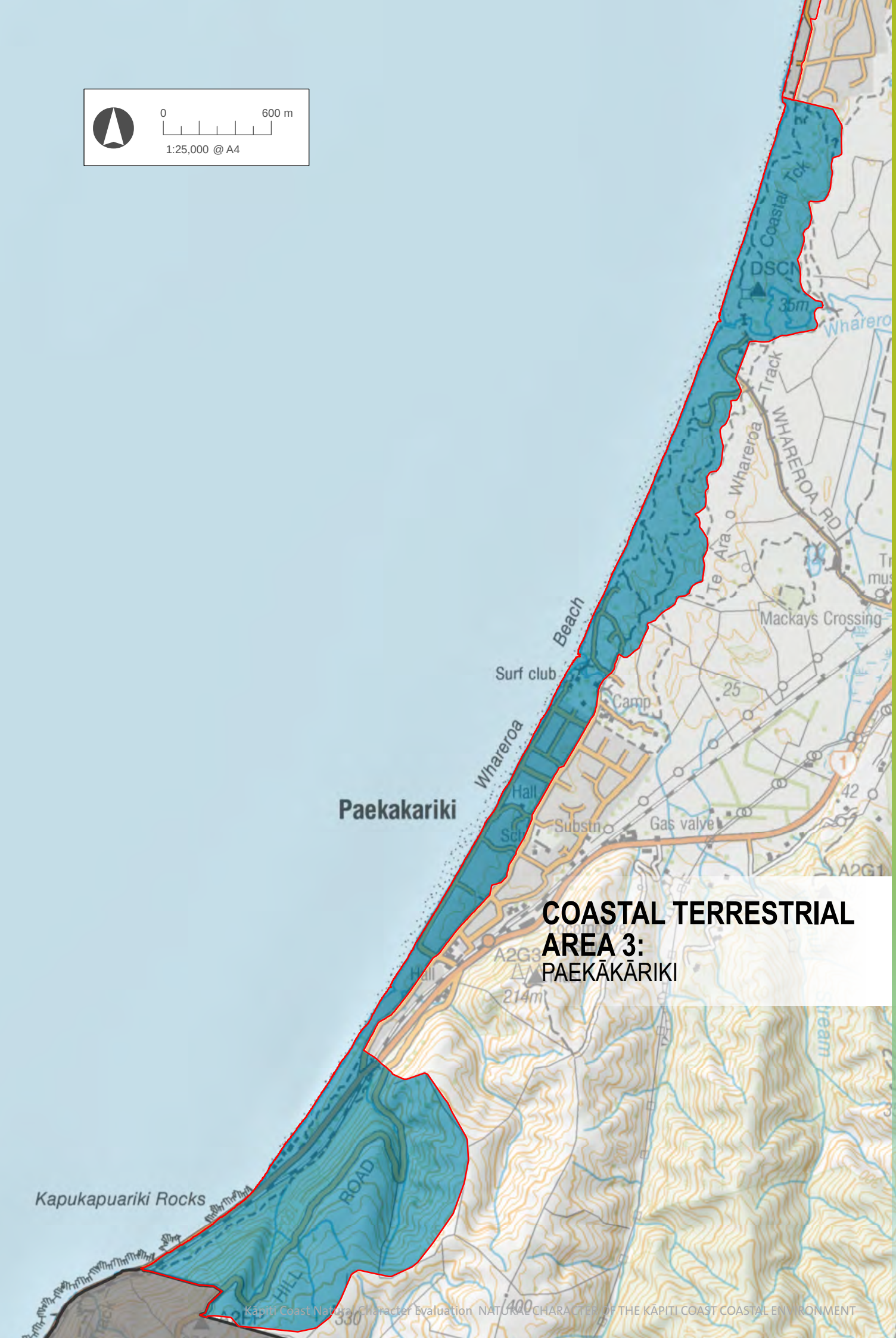
Experiential

The Paekākāriki Coastal Terrestrial Area is the gateway to the Kāpiti Coast from the south. This section of the Kāpiti Coast is easily accessed by State Highway 1 and beach access is well established at numerous points along the coastline.

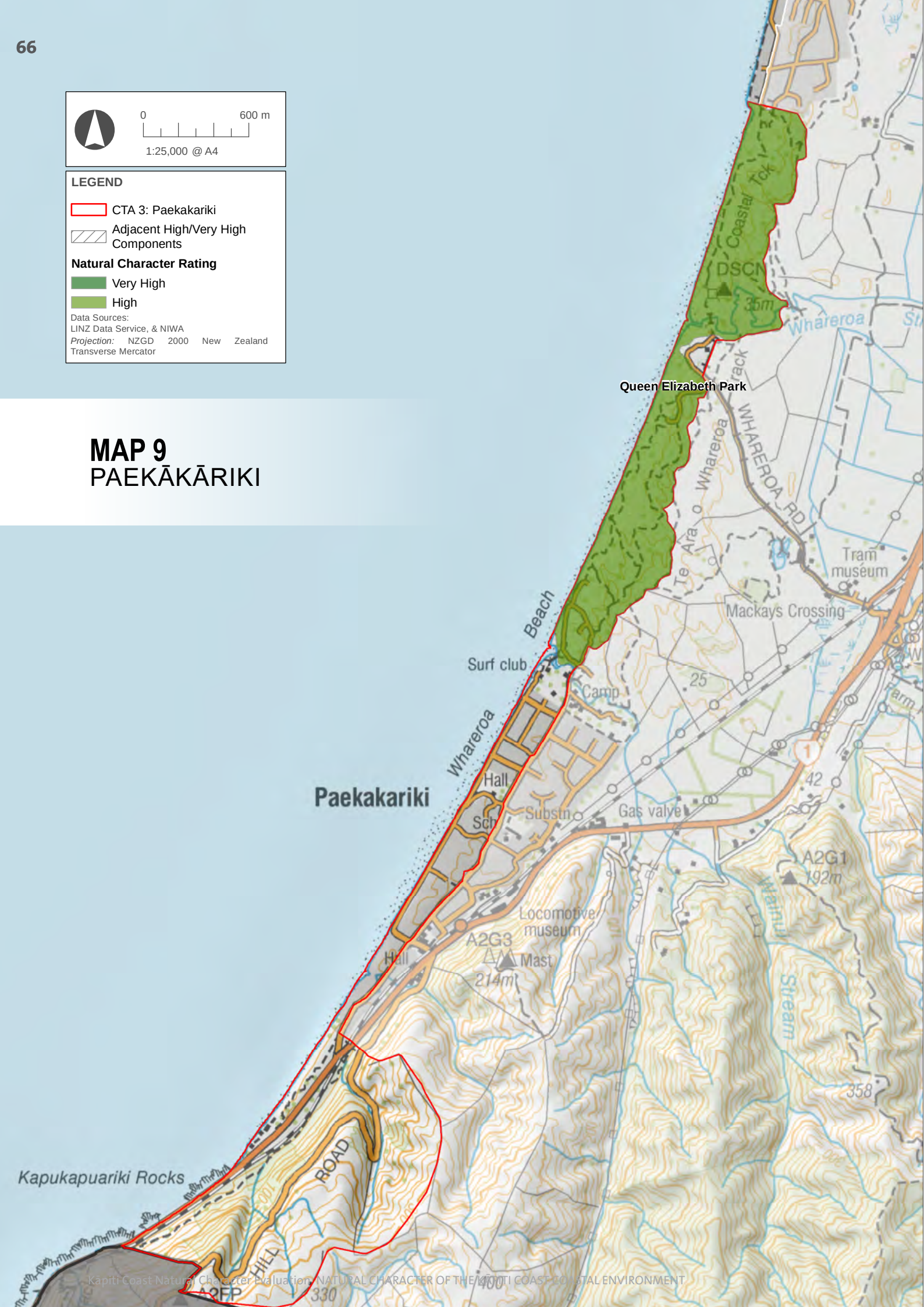
Recreational opportunities are plentiful in this coastal terrestrial area with Queen Elizabeth Park offering extensive walking and cycling trails. Surfing and swimming are also popular activities off Paekākāriki beach.

Due to development and settlement along this section of the Kāpiti Coast coastline, there are limited opportunities to obtain wild and remote experiences. Nevertheless, there are opportunities to experience the prevailing westerly winds and open views towards Kāpiti Island and the South Island. Impressive sunsets adjoining the undeveloped silhouette of Kāpiti Island can be viewed from the beach.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			
MODERATE TO HIGH			
MODERATE	★	★	★
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Moderate		



COASTAL TERRESTRIAL AREA 3:
PAEKĀKĀRIKI



MAP 9
PAEKĀKĀRIKI

COASTAL TERRESTRIAL AREA 3: PAEKĀKĀRIKI

THESE ARE MAPPED WITH REFERENCE TO MAP 9.

REFER TO THE COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
QUEEN ELIZABETH PARK	High	High	Mod.	High	• Extensive area of intact Older Waitarere-Motuiti dunes formed from rich sea-rafted Taupo Pumice lapilli • A mix of native and exotic vegetation supporting ongoing restoration. • Queen Elizabeth Park offers numerous recreational activities including walking, biking, and horse riding • Expansive, uncluttered views of Kāpiti Island and the Rauoterangi Channel	The Whareroa dune field represents a regionally significant geopreservation site Provides habitat for a number of At Risk and Threatened species e.g. sand coprosma, New Zealand pipit, variable oystercatcher, longfin eel Whareroa Stream is recognised as having Significant Ecosystem Values as it provides habitat for more than six native freshwater fish species

Coastal Terrestrial Area 4: Kāpiti Island

Location and Key characteristics

The Kāpiti Island Coastal Terrestrial Area is located approximately five kilometres west of Waikanae Beach. The Coastal Terrestrial Area comprises Kāpiti Island and its nearby offshore islands and rocky outcrops. The island is characterised by sheer and exposed rocky cliffs on the west of the island, while the east remains sheltered and covered in indigenous forest. There is a small settlement at Waiorua Bay and there are also houses found to the south of Waiorua Bay at Rangatira Point and on Motungarara Island.

Key coastal characteristics include: The offshore islands of Motungarara, Tahoramaurea and Tokomapuna, rocky outcrops, Okupe Lagoon, Mount Tuteremoana and exposed cliffs which overlooks Cook Strait. As an island within the CMA, the entirety of this Coastal Terrestrial Area is identified within the coastal environment (see Figure 4).

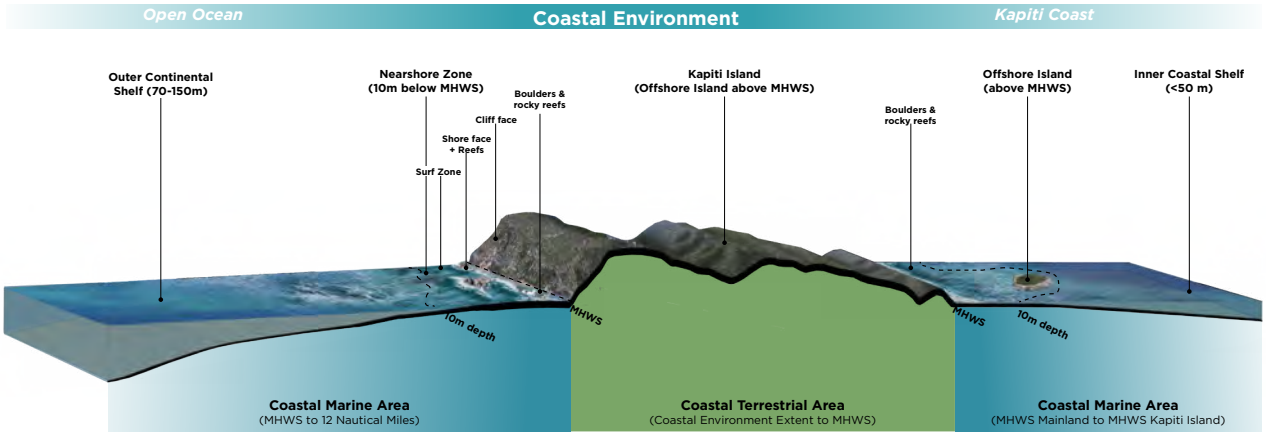


Figure 4: Transect of Kāpiti Island in the context of the coastal environment

Surrounding this Coastal Terrestrial Area are the three Coastal Marine Areas which form a part of this study. Key features include the rocky reefs which are found surrounding the island and the Rauoterangi Channel, the location of an active faultline that divides the geomorphology of Kāpiti Island from the mainland.

Abiotic

The Kāpiti Island Coastal Terrestrial Area is located just over five kilometres west of Paraparaumu Beach. The island exposes the regional bedrock of Torlesse greywacke of poorly bedded sandstones and mudstones formed during the Early Triassic to Early Cretaceous geological time periods (between 251.9 Ma and 145 Ma) (Begg and Johnston 2000; Adams et al. 2019).

The east and west of the island have different geomorphological properties. The west of the island has a rugged and exposed character with a steep topography and high levels of natural erosion. The highest point on the island is located to the west near Trig Point, with the peak Tuteremoana reaching 521 masl. The east of the island is less exposed and retains a more gradual topography, although some reefs and steep cliffs are present.

There are ten major streams which end to the east of the island with the Okupe Lagoon occupying the flattest area to the north-east of the island. The Okupe Lagoon is a brackish lagoon located approximately 1.5 metres above sea level (Goff et al., 1999). Originally thought to be a tidal inlet, lagoon has been naturally uplifted and shaped by earthquakes and tsunami events since approximately 3,360 years BP (before present) (Goff et al., 1999). The most recent earthquake event occurred approximately 1450 AD and was likely to have been caused either by the Wellington or Alpine Faults (Goff et al., 1999).

Offshore in the Rauoterangi Channel there are three smaller islands, comprising of Motungarara Island (Fishermans Island), Tahoramaurea Island (Browns Island) and

Tokomapuna Island (Aeroplane Island). Tokomapuna Island is a part of the Rakaia Terrane while Motungarara and Tahoramaurea Island are situated within the terrane boundary between the Rakaia and Waipapa terranes. This is a regionally significant boundary where two terranes are divided by a faultline along the eastern shore of Kāpiti Island (Rangatira Point) and through the Tahoromaurea and Motungarara islets (Adams et al. 2019), corresponding to a distinctive shear zone – the Kāpiti Island Phyllonite (Fleming & Hutton 1949; Moore and Francis 1988). It includes zones of fine mylonite and thin horizons of pelitic schist.

On Kāpiti Island there are four regionally significant geopreservation sites (NZ Geopreservation Inventory, n.d.). These include the Kāpiti Island phyllonite, Kāpiti Island uplifted sea caves, the Okupe Lagoon uplifted lagoon and Kāpiti Island beach ridges.

Much of this Coastal Terrestrial Area remains unmodified largely due to the inaccessibility and topography of the island. Areas of modification are isolated to Rangatira Point and Waiorua Bay. At Wairoa Bay there is a small residential settlement while at Rangatira Point there is housing for Department of Conservation staff. Both Rangatira Point and Waiorua Bay contain tracks and visitor shelters for tourists. On Motungarara Island there is also a collection of houses and structures to the northern end of the island.

The main waterways on Kāpiti Island are perennial streams and remain largely unmodified. Water quality is assumed to be high given the forested catchment and good macroinvertebrate community health (this is indicative of good water quality). Sediment loads are assumed to be low given the good riparian cover, forested land use and associated stability this provides to the stream banks.

The climate of the Kāpiti Island Coastal Terrestrial Area is more exposed than the climate of the mainland. The west of Kāpiti Island has greater exposure to the prevailing wind, with average wind speeds reaching approximately 8 m/s, while the east experiences average wind speeds of 7m/s. The north-east of Kāpiti Island receives a slightly higher level of rainfall than the west, with average annual rainfall reaching 1,000mm (Chappell, 2014).

The Kāpiti Island Coastal Terrestrial Area receives significantly less sunlight than the mainland. Lower altitude areas to the south and north east of the island receive at least 1,800 hours annually, while the likes of Mount Tuteremoana and areas of a similar elevation receive 1,850 – 1,875 hours of sunlight annually. Average annual temperatures varying between east and west with the east of the island experiencing an average annual temperature of 13°C, while the west experiences 11°C (Chappell, 2014).

Biotic

The total land area of the Kāpiti Island Coastal Terrestrial Area is 1,905.6 hectares of which 59.5% is forest, 27% is scrub or shrubland, 13% is grassland, and 0.4% is water.

Historically, the vegetation on Kāpiti Island would have been dominated by kohekohe forest at lower altitudes and rata, tawa and hinau dominated forests at higher altitudes (Boffa Miskell Ltd, 2020). The wetlands in the Wairua and Wharekohu valley bottoms would have been dominated by kahikatea and the western cliffs by coastal shrublands. Settlement of the island in the nineteenth century resulted in extensive forest clearance through fire and conversion to pastoral farming (Brown et al., 2016). In 1897 the government passed the Kāpiti Island Reserves Act which consequently meant farmers leasing crown land were given until November 1900 to leave the island and were compensated. Privately owned land Thirteen hectares at the north of the island remains in private Maori ownership. Today, extensive native regeneration has occurred with grassland remaining only around the two small settlements.

Kāpiti Island is an Ecosite and is nationally significant (Kāpiti Coast District Council, 2021). Okupe Lagoon is recognised as a Significant Natural Wetland and all rivers on the

island have significant indigenous ecosystem values for macroinvertebrate community health (this indicates that water quality is high) (Greater Wellington Regional Council, 2023). Kāpiti Island has high biodiversity values including five plant species with a national threat status, a very high diversity of birds (64 bird species are regularly seen on the island) including a number of Threatened and At Risk species, eight lizard species including four At Risk species, a New Zealand fur seal colony on the northern coast and a diversity of freshwater fish species, including two At Risk species. A small number of long-tailed bats have been recorded in old-growth forest south of Kahikatea Stream.

Most species expected to be on Kāpiti Island are present, however there have been some local extinctions (e.g. tuatara, kākāpo, short-tailed bats) (Boffa Miskell Ltd, 2020). Some exotic plant species are also present on the island (e.g. boneseed, barberry, grass) as well as some native species that have been planted outside of their natural geographic range (e.g. species from the Kermadec and sub-Antarctic Islands). However, native vegetation is dominant and is in very good condition. Natural elements, patterns and processes are virtually intact with minimal human modification and generally only in concentrated areas (settlements). Ongoing management on the island includes the elimination of pest animals (Kāpiti Island is predator free), weed eradication or control and species translocations (Brown et al., 2016).

Motungarara, Tahoramaurea, and Tokomapuna offshore islands are all Ecosites (Kāpiti Coast District Council, 2021). Vegetation is pre-dominantly native, with occasional exotic species (e.g. boneseed, karo (non-natural native)) (Blake, 2010).

Experiential

The majority of Kāpiti Island is encompassed within the Kāpiti Island Nature Reserve managed by the Department of Conservation. The island is a popular tourist attraction due to the diversity of native invertebrates, lizards, birds and marine life. Day and overnight tours are offered by local commercial operators and include activities such as kiwi spotting and guided walks. Various walking tracks are also available on the island for all fitness levels.

The island is difficult to access and cannot be accessed from the west due to extensive reefs and boulders. Access to the island is by boat and a visitor access permit is required by the Department of Conservation to prevent the introduction of pest species.

Due to the lack of modification and difficulty of access to the Kāpiti Island Coastal Terrestrial Area there are frequent immersive opportunities for wild, isolated and remote experiences including an immersive sense of isolation.

SUMMARY OF NATURAL CHARACTER			
	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	★		★
HIGH		★	
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Very High		

COASTAL TERRESTRIAL AREA 4:
KĀPITI ISLAND

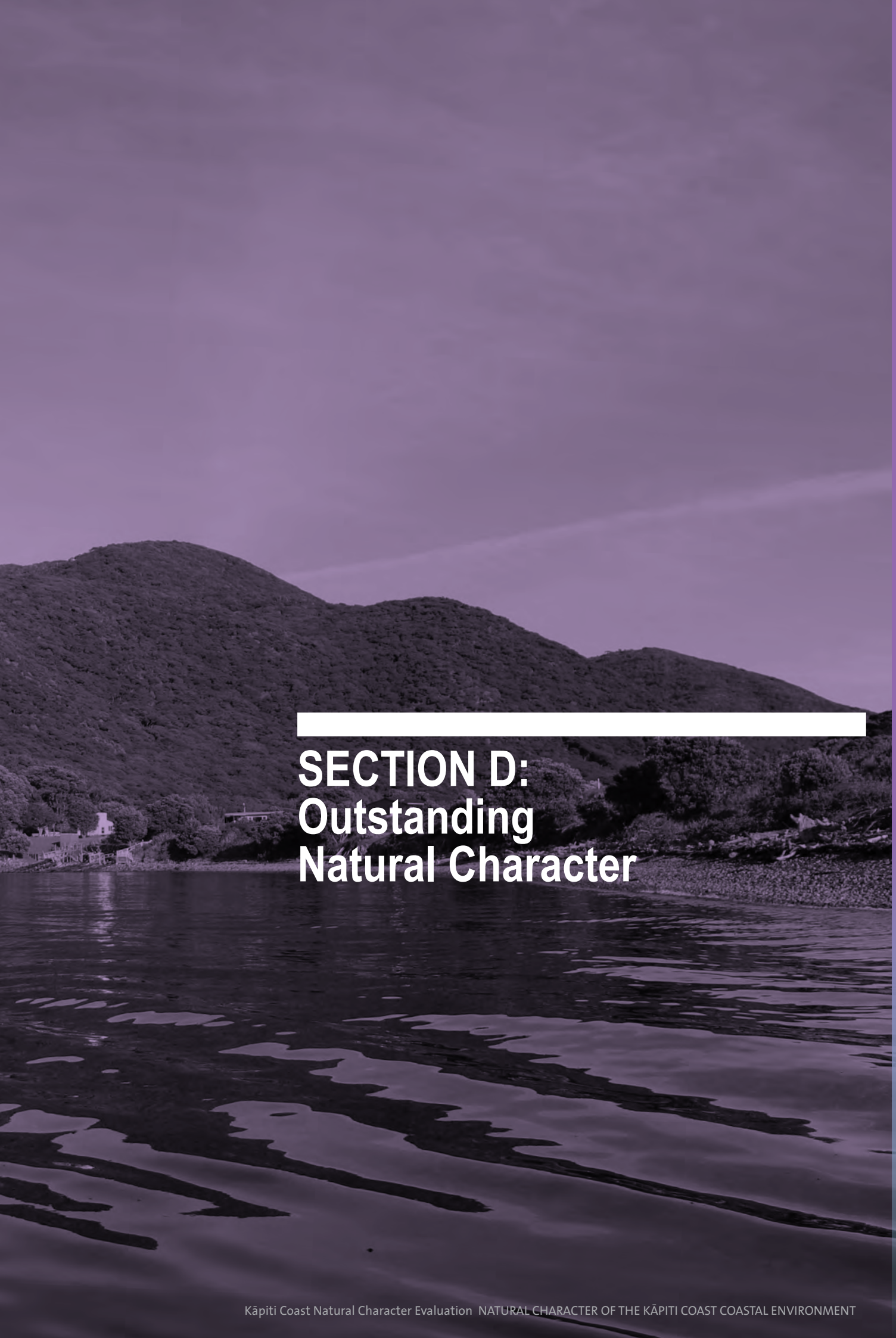
MAP 10
KĀPITI ISLAND

COASTAL TERRESTRIAL AREA 4: KĀPITI ISLAND

THESE ARE MAPPED WITH REFERENCE TO MAP 10.

REFER TO THE COASTAL MARINE AREA B FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.

COMPONENT	RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
KĀPITI ISLAND	Very High	Very High	Very High	Very High	• The geomorphology of the Island remains intact • High levels of natural erosion to the west of the island • All rivers on the island have significant indigenous ecosystem values for macroinvertebrate community health • High biodiversity value • New Zealand fur seal colony on the northern coast • Small number of long-tailed bats have been recorded in old-growth forest south of Kahikatea Stream • Kāpiti Island is predator free and has limited modification • Frequent immersive opportunities for wild, isolated and remote experiences and to experience a sense of isolation.	Four regionally significant geopreservation sites - Kāpiti Island phyllonite, Kāpiti Island uplifted sea caves, the Okupe Lagoon uplifted lagoon and Kāpiti Island beach ridges A nationally significant Ecosite Okupe Lagoon is recognised as a Significant Natural Wetland Five plant species with a national threat status, very high diversity of birds including a number of Threatened and At Risk species, eight lizard species including four At Risk species
KĀPITI ISLAND SETTLEMENT	High	High	Mod - High	High	• The geomorphology of the Island remains intact with islolated structures clustered in this area. • Kāpiti Island is predator free with a small settlement in this area • Frequent immersive opportunities for wild, isolated and remote experiences and to experience a sense of isolation.	• Part of a nationally significant Ecosite, however vegetation in this area is the most modified on the island.
TAHORAMAUREA ISLAND	Very High	Very High	Very High	Very High	• Intact and unmodified • underlying geology • Part of the Rauoterangi fault zone • Ecosite with predominantly native species • Frequent immersive opportunities for wild, isolated and remote experiences and to experience a sense of isolation.	Ecosite with predominantly native species
MOTUNGARARA ISLAND	High	High	High	Very High	• Intact and unmodified underlying geology • Part of the Rauoterangi fault zone • Some exotic plant species and modification on the Island • Frequent immersive opportunities for wild, isolated and remote experiences and to experience a sense of isolation	Ecosite with predominantly native species
TOKOMAPUNA ISLAND	Very High	Very High	Very High	Very High	• Largely intact and unmodified underlying geology • Part of the Rauoterangi fault zone • Frequent immersive opportunities for wild, isolated and remote experiences and to experience a sense of isolation.	Ecosite with predominantly native species



SECTION D: Outstanding Natural Character

Introduction to Outstanding Coastal Natural Character

The NZCPS 2010 requires that regional and district councils must identify areas of at least high natural character as per Policy 13 (1)(c). This section of the report addresses the areas of the Kapiti coastal environment which are considered outstanding. Consequently, Policy 13(1)(a) will require that adverse effects of activities on natural character within areas of outstanding natural character must be avoided. Following the evaluative work as presented in Section C of this report, a further assessment was undertaken to determine which parts of the Kāpiti Coast coastal environment may reach the threshold of Outstanding Natural Character (ONC).

The study team determined that outstanding natural character should be assessed as a separate step in the assessment process once the degree of natural character for each terrestrial and marine area and component was determined. It was also agreed that natural character must be considered exceptional at a regional scale to qualify for an area to qualify as having 'outstanding natural character', acknowledging the marine context within which the coastal natural character has been assessed. This is described further in Appendix 1 of this report.

The assessment of whether an area qualifies as having outstanding natural character combines both terrestrial and marine components. This ensures that sequences of ecological naturalness which are considered important are fully considered (such as from the top of a ridge on the land to the bottom of the adjacent area of sea). Furthermore, outstanding natural character, by its very term, determines the highest rated areas should include systems that interconnect with each and cannot simply be considered in isolation.

During the assessment of outstanding natural character, only components which have been identified as having at least high natural character were considered as candidates for outstanding natural character as illustrated on Map 3. 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 with other areas in the Wellington Region'

(Boffa Miskell Ltd)

Outstanding Natural Character Summary

The following pages outline the results of this separate assessment. Of all the components holding at least high levels of natural character, one was also mapped as outstanding.

This area was considered by the study team to meet the threshold statement above and its values are outlined within the table below. There was debate around areas rated as holding either high or very high levels of natural character but that did not reach the 'outstanding' threshold, with a key determinant relating to whether the area stood out as exceptional in the context of the region.

Areas of outstanding natural character must hold at least high or very high abiotic, biotic and experiential attributes. Map 11 illustrates the specific area described below. The areas were mapped at a scale of 1:10,000 and therefore represent the same resolution as the more detailed component assessment.

Outstanding natural character cover page: Waiorua Bay, Kāpiti Island. Boffa Miskell, 2021

Kereru on the northern shore of Kāpiti Island. Boffa Miskell, 2021

OUTSTANDING NATURAL CHARACTER ATTRIBUTE		
COASTAL TERRESTRIAL AREA AND RATING	Kāpiti Island, Very High	
COASTAL MARINE AREA AND RATING	Kāpiti Continental Shelf, High	
ATTIBUTES		
ABIOTIC	Very High	• The geomorphology of the Island remains intact • High levels of natural erosion to the west of the island • Four regionally significant geopreservation sites - Kāpiti Island phyllonite, Kāpiti Island uplifted sea caves, the Okupe Lagoon uplifted lagoon and Kāpiti Island beach ridges • Part of the Rauoterangi fault zone • Riverine-influenced water column with sediment-laden surface plumes after rainfall • Scoured and current-swept mid- channel, bathymetrically more complex western margin adjoining Passage Rocks, White Rocks, Tokomapuna Island and chains of submerged rocky reefs. • Shore connected and near-shore rocky reefs and boulder reefs • Nearshore rocky reefs and rocky shoreline habitats • Storm and wind influenced from western quarter • Steep sea cliffs shed material onto exposed narrow shoreline of steep boulder-gravel beaches and course substrates nearshore
BIOTIC	Very High	• Considered a nationally significant Ecosite with extensive areas of established and regenerating native forest • Okupe Lagoon is recognised as a Significant Natural Wetland • All rivers on the island have significant indigenous ecosystem values for macroinvertebrate community health • High biodiversity value: Five plant species with a national threat status, very high diversity of birds including a number of Threatened and At Risk species, eight lizard species including four At Risk species • New Zealand fur seal colony on the northern coast • Small long-tailed bats have been recorded in old-growth forest south of Kahikatea Stream • Kāpiti Island is predator free and has limited pest induced modification • Kāpiti Island Marine Reserve adjoins the west and east coast of the island • The only known rhodolith beds in the Wellington region • The only known collection of a black coral from the Wellington region • Dense beds of large brown algae/kelps occur on the western and southern reefs • Rhodolith beds, horse mussel beds and extensive anemone beds are found on off the eastern shore • Dense beds of large brown algae/kelps occur on these nearshore reefs. • The Boulder Bank harbours a unique sponge / bryozoan/ cobble community • Large anemone beds • Diverse and extensive beds of macroalgae • Deep bryozoan-characterised reef habitat
EXPERIENTIAL	Very High	• Frequent immersive opportunities for wild, remote and isolated experiences. • The Wilkinson and Trig Tracks offer panoramic views of the island, Cook Strait and the Rauoterangi Channel.

MAPPED EXTENT

The mapped extent of the Kāpiti Island area of Outstanding Natural Character includes the entirety of Kāpiti Island, excluding the settlement, and more modified area to the south of the Okupe Lagoon. The marine reserve to the north west of the island, Tahoramaura Island, Tokomapuna Island and the reefs surrounding the islands are also included to a depth of 10 metres below MHWS.

RATING	OUTSTANDING


0
1,000 m
1:50,000 @ A4
LEGEND
Outstanding Natural Character
Data Sources:
LINZ Data Service, & NIWA
Projection: NZGD 2000 New Zealand Transverse Mercator
Tokahaki Point
Okupe Lagoon
Waiorua Bay
Honeymoon Bay
Rangatira Bay
Rangatira Point
Kapiti Island
Trig Point
Kaiwharawhara Point
Maraetakaroro
Manawanau
West Point
Ngakuriahinepoupou
Taremango Point
Tahiriimongo Point
Wharekohu Point
Passage Rocks
Tokomapuna Island
(Aeroplane Island)
White Rocks
Motungarara Island
(Fishermans Island)
Tahoramaurea Island
(Browns Island)
Tarapunga Shoal
Rauoterangi
Raumati

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Appendices

Appendix 1: Project Methodology

Appendix 1 cover page:

View from the Okupe Valley Loop track looking towards the Mainland. Boffa Miskell, 2021

Appendix 1: Project Methodology

Study Approach

In this section, the key components of the study methodology are outlined. The NZCPS 2010 and Resource Management Act 1991 (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; the approach to natural character evaluation; digital mapping and the use of the New Zealand Land Cover database.

Defining the Coastal Environment

The RMA does not define 'coastal environment', however its extent needs to be considered to respond to Policy 1 of the NZCPS 2010. This recognises that the extent and characteristics of the coastal environment will vary from location to location. It also recognises that the coastal environment includes the following nine characteristics set out in Policy 1(2):

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; (Study Team emphasis)

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

The above list of characteristics has assisted in defining what is included within the coastal environment. DoC has also provided guidance material on implementing Policy 1, which reflects best practice including Environment Court and Board of Inquiry decisions to date (Department of Conservation, 2013). The inland extent of the coastal environment within the Kāpiti Coast was undertaken in the first phase of this current study.

Method for Identifying the Coastal Environment

The methodology used recognises that the coastal environment is a dynamic system where the influence of coastal elements and processes on the environment gradually decreases inland with distance. As recently noted in a recent environment court decision, it is important that the mapping exercise not become an end in itself; the purpose of identifying the coastal environment must drive any mapping methodology, not the other way around[7]. This is because such mapping is an inherently reductive exercise, setting an apparently clear boundary when in the real world it is impossible to get an abstract definition which is capable of simple and ready application to any given situation[8].

The mapping of the coastal environment was delineated at a scale of 1:50,000, acknowledging that the information provided for this study ranged in detail and mapping scale. Representing the inland extent of the coastal environment at this scale also acknowledges that such spatial delineation may require more detailed refinement at a finer scale for the purpose of determining the precise boundary of the coastal environment within a site.

In applying the methodology, the study team addressed all of the characteristics of the coastal environment listed in NZCPS Policy 1(2) (see above) but gave particular consideration to "where coastal processes, influences or qualities are significant" (emphasis added) as this provides the clearest and strongest direction for interpreting the coastal extent. The term 'significant' is not defined in the NZCPS but in the context of its Policy 1(2)(c), the study team have interpreted the term 'significant' to mean "sufficiently great or important to be worthy of attention; noteworthy", as outlined within the Oxford English Dictionary.

The seaward extent of the coastal environment under the jurisdiction of GWRC extends 12 nautical miles from MHWS (Mean High Water Springs) and is easy to define. Notwithstanding this, the study team recognised that the significance of coastal influences increasingly dissipate as one moves further from the coastal edge. In the context of the Kāpiti Coast, the Rauoterangi Channel separates the mainland from Kāpiti Island reaching a depth of 80 m below MHWS and characterised by the Rangatira Fault Zone. To the west of Kāpiti Island the Continental Shelf drops steeply to 100 m below MHWS and reaches Continental Slope. At the 12 nautical mile limit the Continental Slope reaches 160 m below MHWS.

Along the south-west of the North Island, the Kāpiti Coast's coastline extends for approximately 38 kilometres between Porirua City District (Greater Wellington Region) and the Horowhenua District (Manawatu-Wanganui Region). This area extends from Paekākāriki in the south to the regional boundary in the north near Ōtaki beach. With the exception of Kāpiti Island, much of this area of coastline follows a gradually sloping continental shelf flanked by extensive coastal dune systems. Kāpiti Island conversely is located some five kilometres west of the mainland and is surrounded by coastal reef systems and three islets in the Rauoterangi Channel.

7. Environmental Defence Society Incorporated v Thames-Coromandel District Council C001/2020, para. 55

8. Northland Regional Planning Authority v Whangarei County Council (1977) TCPAB A4828, quoted in Environmental Defence Society Incorporated v Thames-Coromandel District Council C001/2020, para. 55.

View from the Okupe Valley Loop track lookout towards the Kāpiti Continental Slope. Boffa Miskell, 2021

Mapping the coastal environment

Identifying the landward extent of the Kāpiti Coast's coastal environment has relied on relevant and accessible data available to inform judgements. Data includes specialist terrestrial and freshwater ecological advice from BML. This study acknowledges that future changes resulting from climate change are predicted to have significant consequences along coastal environments including impacts associated with sea level rise, however this has not influenced the delineation of the inland extent of the coastal environment for the purpose of this study.

The study team also used, as an essential source of information, its own professional knowledge and judgement in relation to the characteristics outlined within Policy 1 of the NZCPS and the DoC guidance from 2013. The work undertaken for the Kāpiti Coast District Coastal Environment Study (2012) and coastal natural character assessments completed for the remainder of the Wellington Region have also provided additional background information alongside marine benthic/ bathymetry and ecological / physical data recorded by NIWA. Based on this information, the delineation of the inland extent of the Kāpiti Coast's coastal environment has utilised several different methods in adhering to the requirement of current policy.

As stated above, the seaward extent of the coastal environment extends 12 nautical miles from MHWS (and the district council boundary). The landward extent requires greater consideration, as this extent defines the landward 'boundary' of the coastal environment and the relevance of the NZCPS for the purpose of assessing coastal natural character. Due to the complexity of the Kāpiti Coast coastal area, specific consideration will need to be applied to more complex areas around river mouths, inlets, coastal flats and dunes and the urban, more modified areas around Waikanae Beach, Paraparaumu Beach, Raumati Beach and Paekākāriki.

Conceptually, a number of different methods can be recognised in determining the inland extent of the coastal environment. To assist in determining this extent, basic principles have been described where coastal processes, influences or qualities may remain significant. These principles include:

Ridgeline Principle

A general rule of thumb[9] is that the inland extent extends to the first [proximate] significant ridgeline inland of the coast. Where a dominant ridge maybe a useful means to identify a coastal environment boundary, such a boundary should be relevant to the coastline and coastal environment. For areas where the 'first ridge' is located 'too far' from the coast, other methods need to be employed. There is no necessity to identify a dominant ridge in each case, particularly one that may be kilometres away from the coast. This view is endorsed by the Environment Court in the case Mainpower NZ Ltd v Hurunui District Council (C38 / 2011), which found:

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

Land typing Principle

This principle relates to land types across which influences of coastal processes, influences or qualities diminishes (i.e.: dunes and back dunes, coastal estuaries and coastal wetlands). Such land types occur where coastal processes have significantly shaped and formed the landscape. In such areas, the extent of the area can be obvious, (for instance it follows the back of dunelands, or an inland coastal escarpment) or where it is more ill-defined, vegetation patterns will assist in defining this.

Coastal Hazard Principle

The two factors which have informed the coastal hazard principle coastal erosion and coastal inundation. The data which informs this principle is coastal erosion and coastal hazard data from present day (i.e. 0.0m Sea Level Rise and the present coastal erosion extent). Where areas of obvious modification are apparent, a judgement was made over to what extent natural elements, patterns and process are still significant, which often result in a very slender coastal environment. Where this approach is utilised, mapping has been adapted to align with legible changes on the ground to encompass modelling of current coastal hazards.

Vegetation and Land Use Principle

Particularly for flatter areas, such as south of the Ōtaki River, the boundaries may be determined by changes in land use determining the extent to which coastal elements, patterns and processes remain significant. This also includes inter-related coastal marine and coastal terrestrial areas, where continuity of elements, patterns and processes remain legible and coherent as a contiguous element of the coast.

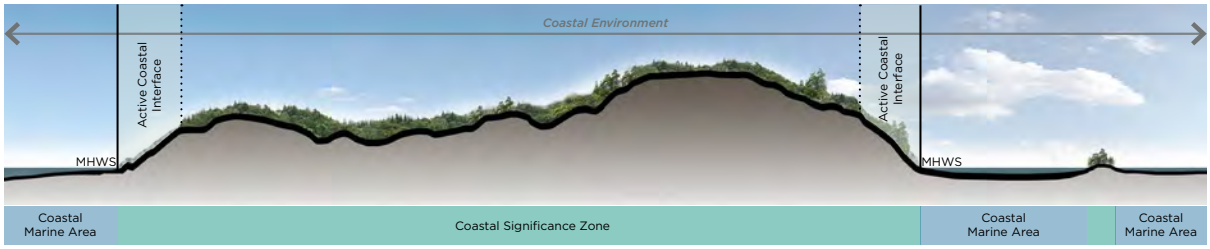
Cultural and Historic Heritage Principle

Such aspects include areas of cultural and historic heritage in the CMA or on the coast. These items may retain a specific focus relating to the coastal environment, and include areas of mahinga kai, whaling stations, lighthouses etc. where coastal processes, influences or qualities remain significant. Accordingly, such cultural and

9. [2008] NZEnvC 78 Long Bay-Okura Great Park Society Incorporated vs North Shore City Council (paragraph 134) and [2011] NZEnvC 384 Mainpower NZ Ltd v Hurunui District Council (paragraph 320).

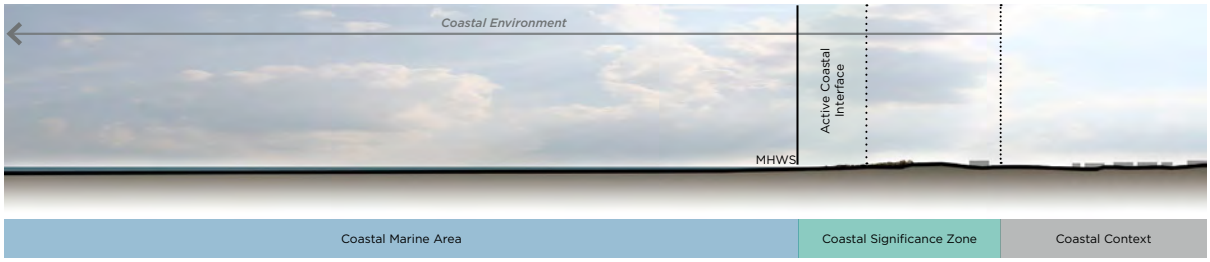
historic heritage have also been considered where such aspects remain on the coast.

The following sections demonstrate the different methods to delineate the Kāpiti Coast coastal environment. As much of the Kāpiti Coast's coastal environment consists of extensive dune systems land typing was the key principle in defining the inland extent of the coastal environment of the Kāpiti Coast. Within each Coastal Terrestrial Area, a discussion is outlined, which explains how the extent of the coastal environment was delineated, which, in some areas, may use a multiple of approaches. Context is extremely important in each case and professional judgement is ultimately applied as part of confirming the identified inland extent of the coastal environment with the study team for the purpose of assessing coastal natural character.

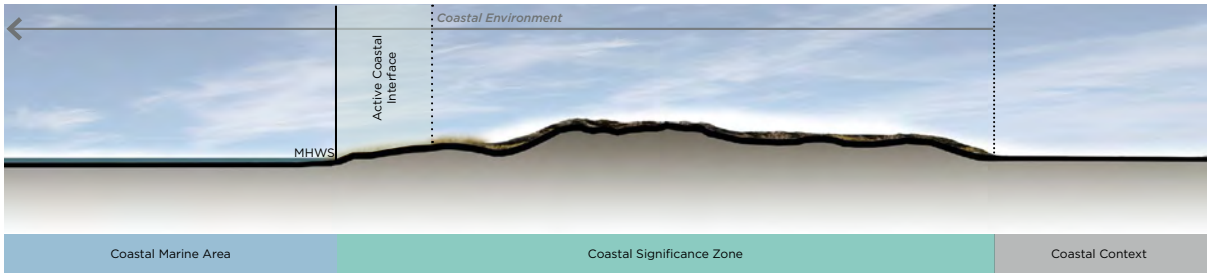


Kapiti Island

Otaki



Waikanae + Paraparaumu



Paekakariki

Zones of Significance

In combination with mapping the inland extent of the coastal environment, BML have developed the following Zones of Significance framework to apply to the coastline to determine the extent of the coastal environment, as interpreted under Policy 1 of the NZCPS. As illustrated in Table 1 below, the framework interprets the coastal environment to contain the following zones that, collectively, are called the Coastal Landscape:

TABLE 1: ZONES OF COASTAL SIGNIFICANCE

	Zone A	This zone includes the Coastal Marine Area (CMA). Within the statutory context the CMA means the foreshore, seabed and coastal water and the air above the water to twelve nautical miles (or the territorial sea boundary). Inland, the CMA extends to the mean high water spring (MHWS). The CMA includes the rock, beach, coastal lagoons and lakes below MHWS. The CMA extends approximately 1km upstream of a river or a point that is calculated by multiplying the width of the river mouth by five.
	Zone B	The Coastal Significance Zone includes the Active Coastal Interface (land above MHWS) and generally includes land up to the summit of the first coastal ridge/ crest or escarpment (with the width of this zone varying depending on the topographic environment). The Active Coastal Interface is generally a slender component of the Coastal Significance Zone where the sea is the dominant element and the primary or significant influence on landform, vegetation and perception. This zone is where coastal processes are significant and may include cliffs, settled (or modified) dune lands, farm land, settlements and coastal forests. For this project, this zone is also referred to as the Coastal Terrestrial Zone.
	Zone C	Coastal Context. This area is where coastal elements, patterns and processes have an influencing presence on the coastal landscape and would include developed dune ridges which no longer exhibit significant coastal processes plus coastal plains, and hill-slopes. This zone generally extends inland from Zone B to where coastal influences are sufficiently diminished. It is also recognised that some activities occurring within this zone can significantly affect the coastal environment (Zones A and B), either experientially or physically, to varying degrees. The inland extent of Zone C will not be identified, as it falls outside of the coastal environment.

Coastal Natural Character

Definition of Natural Character

The environments with the greatest natural character are those with comparatively low levels of human modification. Areas of 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. In light of the NZCPS 2010, the definition of natural character adopted in this study and confirmed at a workshop convened by DoC in August 2011, states:

> ***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[10] 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.[11]***

Policy 13 of the NZCPS recognises that natural character is not the same as natural features and landscapes or amenity values and identifies that natural character may include (but is not limited to):

a. ***natural elements, processes and patterns;***

b. ***biophysical, ecological, geological and geomorphological aspects;***

c. ***natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;***

d. ***the natural movement of water and sediment;***

e. ***the natural darkness of the night sky;***

f. ***places or areas that are wild or scenic;***

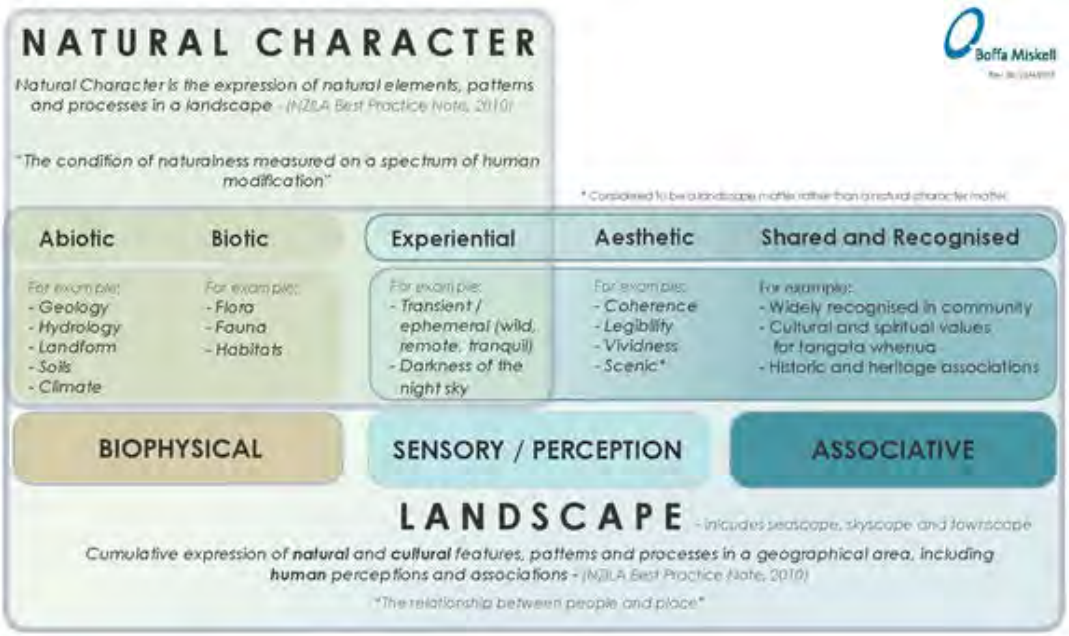
g. ***a range of natural character from pristine to modified;***

h. ***experiential attributes, including the sounds and smell of the sea; and their context or setting.***

Essentially, BML understand that natural character can be conceived of as a measure of the condition of biophysical landscape attributes. Such condition can vary as a result of levels of human modification and takes account of the way such biophysical attributes are experienced i.e. the 'feeling' of being in a wild unmodified environment. By comparison, landscape evaluation considers a broader suite of biophysical, sensory / perception and associative attributes including aesthetic and scenic qualities alongside other shared and recognised values. This relationship is graphically expressed in the following diagram.

10. 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.

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



Below View of Kāpiti Island taken from Paraparaumu Beach.
Boffa Miskell, 2021.

Evaluation of Natural Character

The assessment approach is based upon an agreed interpretation of key terminology, as well as the development of an evaluation matrix and calibration for identifying at least 'high' natural character (as required by Policy 13 (1)(a) and (c) of the NZCPS 2010).

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

- the methodology can be adapted to suit different types and scales of coastal landscapes and ecosystems;
- an understanding of natural character requires input from terrestrial, freshwater and marine ecologists and other natural scientists (e.g. geomorphologists), as well as the input of landscape architects and planners;
- that natural character can be assessed on a continuum 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
    - Recognition that the degree of natural character is context-dependent and can change over time.

The degree or level of natural character has been assessed on a seven-point scale:

VERY HIGH	HIGH	MODERATE - HIGH	MODERATE	LOW - MODERATE	LOW	VERY LOW

In accordance with the requirement outlined within Policy 13 of the NZCPS 2010, by mapping or otherwise identifying at least areas of high natural character. Following this, a separate exercise has considered whether any areas of high or very high natural character qualify as Outstanding Natural Character and where appropriate, these have also been mapped.

Based on similar natural character assessments undertaken throughout the country, an understanding of natural character has been initially identified within separate coastal terrestrial areas and coastal marine areas. The extent of each coastal terrestrial area and coastal marine area has been primarily determined based on differences in biophysical condition as appropriate for the study scale.

Based on separating marine and terrestrial areas, NIWA and BML team members have captured the necessary data which has helped inform the judgement of natural character ratings. This includes aspects for delineation of coastal terrestrial areas including landform composition, freshwater catchments, land management and land cover. For coastal marine areas, aspects include continuity of biotic patterns parallel to the shore, along the intertidal and subtidal zones, and influences of exotic species and water quality. Overall, a generally similar level of natural character homogeneity is sought and the evaluation matrices that were developed to ensure calibration between terrestrial and marine aspects have been confirmed through a collaborative workshop exercise.

When assessing natural character of the coastal environment, several key attributes need to be considered. The list of attributes that natural character may include (NZCPS 2010 Policy13 (2)) have been grouped into biotic, abiotic and experiential attributes to provide a systematic way to consider the different aspects of the natural elements, processes and patterns of the coastal environment and the degree of modification present.

The attributes are described for each coastal marine area and each coastal terrestrial area identified in Section C and were assessed for their degree of natural character by way of the evaluation matrix which has been calibrated to become specific to the Kāpiti coastal environment context (refer to Table 4 and Table 5). This has been used to inform and summarise the findings identified for each coastal terrestrial and coastal marine area.

The list of attributes has been developed to avoid double-counting and to ensure that the indicators for each attribute are mutually exclusive. They draw on the coastal environment diagrams on Table 2: Coastal Marine and Table 3: Coastal Terrestrial Attributes. The indicators of natural character for each attribute differ between the terrestrial and marine areas. 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 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. Notwithstanding this, the relationship between terrestrial and marine systems has also been considered. Each attribute is described specific to the area (rather than using standard descriptions) so that variations in the attributes between different areas are recorded and considered when assessing the degree of natural character. An overall rating of the degree of natural character is then made for each coastal terrestrial area and each coastal marine area.

In evaluating the degree of natural character, NIWA have described the abiotic and biotic characteristics for the coastal marine areas and BML have described the abiotic and biotic characteristics for the coastal terrestrial areas.

BML and NIWA described the experiential characteristics for both the coastal and terrestrial areas together. 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. However, no community engagement or consultation has been undertaken in this phase of the project. Experiential characteristics and values are therefore those determined by the study team.

It is important to recognise that for an area to rate ‘high’ or ‘very high’ for experiential aspects of natural character, their intactness of biotic or 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 lower in terms of the experiential attributes of natural character due to the lack of wildness and high level of modification, despite the extensive range of available recreation opportunities in the area. The shared and recognised aspects of available recreation infrastructure and activities are generally factored into landscape assessments as a positive contributor, but this may form a detractor in terms of an assessment of natural character.

Not all human intervention within an environment has the effect of reducing natural character. For example, modifications associated with restoration and management to keep pest and weed levels low, is intervention that can enhance the natural character of a place. Understandably, it has only been possible to capture marine or terrestrial data where that data exists. Accordingly, mapped areas illustrate the existing knowledge available amongst the study team only.

Tables 2 and 3 below detail the aspects of each attribute used to describe and assess the level of natural character of the terrestrial and marine areas.

TABLE 2: COASTAL MARINE ATTRIBUTES

COASTAL MARINE AREAS – ZONE A

ATTRIBUTES	DESCRIPTORS	SPECTRUM OF NATURALNESS*
MARINE ABIOTIC SYSTEMS	• Geomorphology or seascape - the shape, slope, relative composition and texture of the seafloor. • Water depth - the depth of the water column. This strongly influences the amount of light reaching the seafloor, the influence of waves on the seafloor, and the strength of currents. • Physical substrates on the seafloor - the texture and composition of sea floor sediments (gravel, sand, mud) and the presence of exposed rocky reefs strongly affect biotic characteristics. • Currents - the direction and magnitude of water flows caused by the influence of lunar tides, surface winds and waves, and in some places by river outflows. • Wind and waves - the Wellington coastal area varies greatly in exposure to winds and waves, with the hills surrounding Cook Strait (Raukawa) funnelling strong winds and the south coast affected most markedly by southerly storms. • Water quality - including temperature, salinity, suspended sediments, and levels of pollutant contamination (e.g., heavy metals, pesticides).	The degree (very high to very low) to which physical modifications (e.g. trawling and dredging, major port structures, port dredging and dumping, reclamation, jetties, sea defences, groynes, aquaculture and land-derived sedimentation) affect this abiotic attribute
MARINE BIOTIC SYSTEMS	The natural distribution, abundance diversity and continuity of species, communities, habitats and ecological processes intertidally and sub-tidally including: • Pelagic community - the microalgal, bacteria, zooplankton and larval fish community in the water column • Seafloor communities - the invertebrate fauna, and macro-algae living on or in the seafloor • Fish - reef, bottom associated, and pelagic fish • Marine mammals - fur seals, sea lions, dolphins and whales • Birds - shore birds (e.g. oyster catcher, herons) and seabirds (penguins, petrels, albatross)	The degree of natural character assessed (very high to very low) included the presence/ absence of species expected to occur in the modern period, changes in abundance or biomass, changes in the size or age distribution of populations, the numbers and impact of exotic species present, and the degree of ecosystem functionality remaining.
EXPERIENTIAL	• The degree that human modification of the area has occurred through the construction of structures, the numbers of people engaged in recreational or commercial activities, and/or the magnitude of human-made light, noise, and smell. • Sense of wildness and ecological intactness	The degree (very high to very low) to which biotic and abiotic factors and their intactness (or conversely their modification) are experienced. Experiential values may be reduced 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).

TABLE 3: COASTAL TERRESTRIAL ATTRIBUTES		
COASTAL TERRESTRIAL AREAS – ZONE B		
ATTRIBUTES	**DESCRIPTORS**	**SPECTRUM OF NATURALNESS***
ABIOTIC SYSTEMS	• Geology and geomorphological aspects including identification of different types of landforms (i.e. headlands, peninsulas, cliffs, dunes, wetlands); • Terrestrial coastal processes, including erosion, river mouth processes including sedimentation (within the terrestrial zone); • Freshwater processes. • Climatic influences (wind, rain, exposure);	The evident intactness of the abiotic systems. The degree (very high to very low) to which physical modifications such as built structures, road cuts, earthworks and reclamation works affect this abiotic attribute.
TERRESTRIAL BIOTIC SYSTEMS	• Land cover and associated land use, including the composition, distribution, and condition of land cover, and the presence of indigenous/exotic species; • Presence of indigenous fauna; • The margins of estuaries, wetlands and terrestrial areas including the intactness of their natural ecological processes, patterns and elements; • Extent of freshwater communities.	The degree (very high to very low) to which modifications affect this biotic attribute. Influences include the presence of exotic species on native communities, physical structures such as infrastructure, housing, roading, tracking, reclaimed land, stop banks, as well as commercial forestry, agricultural and viticulture land use that reduce the naturalness of the biota;. This attribute also includes modifications to freshwater systems, including channelizing watercourses, stop banks, culverts, dams etc. which affect freshwater biota.
EXPERIENTIAL	• Experience in seeing, feeling and perceiving the coast; • Aromas, visual and scenic, auditory, sense of wildness, remoteness, isolation, natural darkness of the night sky; • Ephemeral biotic activity (i.e. seasonality of flora, presence of birds); • Ephemeral human activity affecting the naturalness (such as recreation, commercial activities); • Note, this attribute does not include heritage elements.	The degree (very high to very low) to which physical and biotic modifications affect the naturalness experienced. Influences reducing naturalness include the presence of physical structures including ports, reclaimed land, infrastructure, roading, lighting, industrial noises and non-natural aromas; Presence of exotic species; Presence of humans, including recreational activities (driving, walking, camping, settlements);

** Each coastal terrestrial and 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.*

Evaluation Matrices

Evaluation matrices where developed for terrestrial and marine areas to provide clarity and consistency for the assessment of the level of natural character for each attribute. Refer to Tables 4 and 5

TABLE 4: COASTAL MARINE AREAS EVALUATION MATRIX

DEGREE OF NATURAL CHARACTER	VERY HIGH	HIGH	MODERATE - HIGH
ABIOTIC (Geomorphology; Water depth; Physical substrates on the seafloor; Currents; Wind and waves; Water quality.)	• Unmodified natural elements • Intact with rare modifications to physical substrates, currents, and water quality • Rare modification / structures • Unmodified natural patterns • Dynamic processes virtually intact with no or very little presence of human influence	• Natural elements remain largely free of modification • Very small levels of modification to physical substrates, currents, and water quality • Very small levels of modification / isolated structures • Largely unmodified natural patterns • Dynamic processes largely intact and show little evidence of human influence	• Natural elements remain clearly apparent • Small modification to physical substrates, currents, and water quality • Small scale modification / limited structures • Relatively unmodified natural patterns • Dynamic processes generally intact with some interference
BIOTIC (Natural distribution, abundance diversity, communities and habitats intertidally and subtidally; Pelagic community; Seafloor communities; Fish; Intertidal communities of crustaceans, bivalves and molluscs; Marine mammals; Seabirds, shore birds.)	• Exotic biota may occur but virtually no invasive species • All expected species present and their population structure virtually unmodified • Rare modifications to natural patterns • All ecosystem functions virtually intact • Natural processes show very little or no human influence	• Exotic biota may occur and invasive biota rare • Virtually all expected species present and population structure is largely unmodified • Small modifications to natural patterns • Almost all ecosystem functions intact • Natural processes express some limited human influence	• Exotic biota common with few invasive species • Virtually all expected species present with slight modification to population structure • Natural patterns are common with some modification apparent • Most ecosystem functions intact • Natural processes remain apparent with evidence of human modification
EXPERIENTIAL (Views, sounds and smells of the sea; Sense of wildness and ecological intactness; Natural darkness of the sky)	• Overwhelming natural experience • Wild and remote • No sense of human activity or modification • Strong experience of the sensory aspects of the coastal environment	• High natural experience • Predominantly wild and remote • Limited modification • Clear experience of the sensory aspects of the coastal environment	• Predominantly natural experience • Frequent sense of wildness and remoteness • Minor modification apparent • Opportunities to experience of the sensory aspects of the coastal environment likely

MODERATE	LOW - MODERATE	LOW	VERY LOW
• Some modification to natural elements • Physical substrates, currents, and water quality remain apparent • Modification is apparent / structures frequently occur • Some modification to natural patterns • Dynamic processes still apparent but frequently modified	• Natural elements remain present albeit modified • Physical substrates, currents, and water quality modification is common • Modification/ reclamation / structures common • Some natural patterns are present • Dynamic processes markedly modified	• Natural elements markedly modified • Physical substrates, currents, and water quality are highly modified • Large areas of modification / reclamation and/or structures • Some key natural patterns are no longer present • Dynamic processes highly modified	• Natural elements rarely occur • Physical substrates, currents, and water quality modification is extensive • Very extensive modification / large reclamation • Key natural patterns are no longer present • Dynamic processes extremely modified
• Exotic and invasive biota common • Some expected species absent with moderate modification to population structure • Modification to natural patterns is often apparent displaying some human influence • Some ecosystem functions varying outside natural range • Natural processes occur in the context of clear human induced modification	• Exotic and invasive biota common • Many expected species absent with marked modification to population structure • Some natural patterns remain present, albeit frequently modified • Most ecosystem functions are outside natural range • Natural processes are limited within a modified human setting	• Exotic and invasive biota very common • Most expected species absent with remnant population structure highly modified • Most natural patterns have been modified • Limited ecosystem functions within natural range • Natural processes are largely modified and less frequently occur	• Exotic and invasive biota dominate • Expected species and ecosystems virtually absent with only the most hardy or adaptable species occurring • Most natural patterns are no longer present • Little to no ecosystem functions exist within natural range • Natural processes are not immediately evident or present
• Somewhat natural experience • Opportunities to experience wildness and remoteness • Some modification apparent • Opportunities to experience sensory aspects of the coastal environment could well occur	• Human influence common • Limited sense of wildness or remoteness • Predominantly modified environment • Opportunity to experience the sensory aspects of the coastal environment possible but not expected	• Human influence strong • Rare sense of wildness and remoteness • Modified environment clearly apparent • Opportunity to experience the sensory aspects of the coastal environment unlikely	• No sense of naturalness or a natural experience • No sense of wildness or remoteness • Modified environment dominates • Little to no opportunity to experience the sensory aspects of the coastal environment

TABLE 5: COASTAL TERRESTRIAL AREAS EVALUATION MATRIX

DEGREE OF NATURAL CHARACTER	VERY HIGH	HIGH	MODERATE - HIGH
ABIOTIC (Climatic influences; Geomorphology and identification of different landforms; terrestrial coastal processes (e.g. erosion); freshwater processes.)	• Unmodified natural elements • Rare modification / structures • Unmodified natural patterns • Intact with rare modifications to landforms • Dynamic processes virtually intact with no or very little presence of human influence	• Natural elements remain largely free of modification • Very small levels of modification / isolated structures • Largely unmodified natural patterns • Very small levels of modification to landform • Dynamic processes largely intact and show little evidence of human influence	• Natural elements remain clearly apparent • Small scale modification / limited structures • Relatively unmodified natural patterns • Small modification to landform patterns • Dynamic processes generally intact with some interference
BIOTIC (Margins of estuaries, wetlands and terrestrial areas and the intactness of their ecological processes; Colonies of nesting birds; Extent of freshwater communities; land cover; presence of indigenous fauna; marine mammal haulouts; organic sediments/ soils.)	• Exotic biota may occur but virtually no invasive species • All expected species present and their population structure virtually unmodified • Largely unmodified and intact natural patterns • Rare modifications to natural patterns and indigenous vegetation • All ecosystem functions virtually intact • Natural processes show very little or no human influence	• Exotic biota may occur and invasive biota rare • Virtually all expected species present and population structure is largely unmodified • Small modifications to natural patterns • Largely intact natural patterns containing predominantly indigenous vegetation • Almost all ecosystem functions intact • Natural processes express some limited human influence	• Exotic biota common with few invasive species • Virtually all expected species present with slight modification to population structure • Natural patterns are common with some modification apparent • Indigenous patterns partially removed, with introduced vegetation in harmony with the landform • Most ecosystem functions intact • Natural processes remain apparent with evidence of human modification
EXPERIENTIAL (Views, sounds and smells of the sea; Sense of wildness and ecological intactness; Natural darkness of the sky)	• Overwhelming natural experience • Wild and remote • No sense of human activity or modification • Strong experience of the sensory aspects of the coastal environment	• High natural experience • Predominantly wild and remote • Limited modification • Clear experience of the sensory aspects of the coastal environment	• Predominantly natural experience • Frequent sense of wildness and remoteness • Minor modification apparent • Opportunities to experience of the sensory aspects of the coastal environment likely

MODERATE	LOW - MODERATE	LOW	VERY LOW
• Some modification to natural elements • Modification is apparent / structures frequently occur • Some modification to natural patterns • Natural landform remain apparent with several earthworks / built influences • Dynamic processes still apparent but frequently modified	• Natural elements remain present albeit modified • Landform modification is common / several structures • Some natural patterns are present • Frequent earthworks linear/ built influences • Some natural processes capable of recovery • Few natural processes remain apparent	• Largely modified natural elements • Large areas of modification / reclamation and/or structures • Largely modified natural patterns • Earthworks and built influences are common • Some key natural processes are no longer able to operate • Natural processes are largely modified	• Natural elements rarely occur • Very extensive modification / reclamation • Earthworks or reclamation dominant • Highly engineered forms • Few or no natural processes remain • Natural processes are not immediately evident or present
• Exotic and invasive biota common • Some expected species absent with moderate modification to population structure • Modification to natural patterns is often apparent • Indigenous vegetation may occur within exotic vegetation displaying some human influence • Some ecosystem functions varying outside natural range • Natural processes occur in the context of clear human induced modification	• Exotic and invasive biota common • Many expected species absent with marked modification to population structure • Some natural patterns remain present, albeit frequently modified • Exotic vegetation common with frequent linear or artificial patterns • Most ecosystem functions are outside natural range • Natural processes are limited within a modified human setting	• Exotic and invasive biota very common • Most expected species absent with remnant population structure highly modified • Largely modified or artificial patterns • Limited vegetation with several linear or artificial patterns and built elements/ structures • Limited ecosystem functions within natural range • Natural processes are largely modified and less frequently occur	• Exotic and invasive biota dominate • Expected species virtually absent • Only the most hardy or adaptable species occur • Original ecosystems rare or absent • Highly modified and artificial patterns dominate • Rectilinear or artificial built patterns dominate • Little to no ecosystem functions exist within natural range • Natural processes are not immediately evident or present
• Somewhat natural experience • Opportunities to experience wildness and remoteness • Some modification apparent • Opportunities to experience sensory aspects of the coastal environment could well occur	• Human influence common • Limited sense of wildness or remoteness • Predominantly modified environment • Opportunity to experience the sensory aspects of the coastal environment possible but not expected	• Human influence strong • Rare sense of wildness and remoteness • Modified environment clearly apparent • Opportunity to experience the sensory aspects of the coastal environment unlikely	• No sense of naturalness or a natural experience • No sense of wildness or remoteness • Modified environment dominates • Little to no opportunity to experience the sensory aspects of the coastal environment.

When determining the overall natural character evaluation at the area scale, greater weighting has been given to natural science attributes, which encompass abiotic and biotic matters, compared with experiential values. This recognises that natural character is primarily a condition rather than a value; it exists regardless of experiential attributes. While the NZCPS 2010 includes perceptual and experiential attributes in its definition of natural character, such matters are not identified as the primary or principle determinants of levels of natural character. Therefore, in this report they have been given a weighting of 20% in defining the overall judgement with each area. Conversely, abiotic and biotic natural character attributes have been given an equal weighting of 40%.

The priority ascribed to natural science attributes in the NZCPS 2010 recognises that natural character is primarily based on a condition, the understanding of which can be assisted with scientific methods. Experiential attributes are important contributing factors to a natural character assessment. However, they are more subjective and can be perceived differently by different people and over different timescales. Therefore, it is necessary to base assessments of natural character primarily on natural science indicators in the first instance which may be more enduring and ultimately influence our experiences. This method also assists with transparency.

At the component scale, either abiotic or biotic attributes have to score at least high for the component to be identified as having a high level of natural character. This also recognises the primacy of such natural science attributes which determine natural character condition. Notwithstanding this, the scoring for abiotic, biotic and experiential attributes have been recorded for each component to ensure transparency in this aspect of the assessment. When identifying natural character of terrestrial vegetation and habitats, we have taken account of assemblages of species that are representative of the natural successional stage the component/habitat is in. This aspect of the assessment acknowledges that natural character must be considered in the context of what exists today rather than a comparison with a past condition that can no longer occur.

Table 6 shows the matrix approach used to rank the level of natural character in relation to the natural character attributes for a particular location

TABLE 6: EVALUATION OF NATURAL CHARACTER ATTRIBUTES

	NATURAL CHARACTER ATTRIBUTES		
DEGREE OF NATURAL CHARACTER	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		Rating (e.g. High)	

Evaluating Outstanding Natural Character

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

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

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

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

including by:

c. assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and

d. ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions

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 Boffa Miskell 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 and subsequent to the main assessment which determines areas holding 'very low' to 'very high' levels of natural character. This decision to separate out this assessment from the main natural character study stems from Policy interpretation in the NZCPS 2010. Policy 13 (1)(a) requires avoidance of adverse effects of activities on natural character in the coastal environment with outstanding natural character. For all other areas in the coastal environment Policy 13 (1) (b) requires that significant adverse effects are avoided, remedied or mitigated. The high threshold is outlined within Policy 13 (1)(c), where areas with at least 'high' natural character be identified.

This separation of outstanding natural character from the baseline follows best practice outlined within Environment Court decisions on natural character, where everything in the coastal environment fits on the continuum from very low to very high (or pristine). The avoidance of effects as required under Policy 13(1)(a) for outstanding natural character requires a reassessment of the highest rated areas. This approach is also consistent with studies identifying outstanding natural landscapes.

It was also determined that outstanding natural character should combine both terrestrial and marine components so that important sequences of ecological naturalness (such as from the top of a ridge above sea level to the bottom of the adjacent sea and interconnected systems) are considered.

An assessment to establish whether all or parts of a coastal area contain outstanding natural character needs only be undertaken when all of the attributes, when appraised at an adequate scale (in this case the component level) and using adequate data, are assessed as being of 'high' or 'very high' levels of natural character. A further analysis of the areas determined as having 'high' or 'very high' are contained within Section D of this study.

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 Wellington Region. (Boffa Miskell)

GIS Data Sources

GIS sources used by the study team included the following information:

- Topo Maps (LINZ)
- Bathymetry (NIWA, VUW, DOC)
- Aerial Photography (2013 - 2014)
- Geopreservation Sites (Geological Society of New Zealand)
- New Zealand Land Cover Database (LCDB5)
- Recorded Natural Areas – (Key Native Ecosystems (GWRC), Ecosites (DOC, WCC), QEII Covenants and DOC Land Holdings)
- Ecological Districts (DOC)
- Operative District Plan Outstanding and High Natural Character, and Coastal Environment Extent
- Coastal Heritage Sites (GWRC)
- Cultural Sites (GWRC)
- Fishing effort data (MPI)
- Historical mapping (https://retrolens.co.nz)
- Coastal Erosion (Jacobs)
- Storm Surge (GWRC)

New Zealand Land Cover Database

To assist in understanding the land cover and biotic modification for each coastal terrestrial area, the New Zealand Land Cover Database (LCDB v5) has been used as a key source of information. In addition to the helicopter reconnaissance, there has also been some ground-truthing carried out to confirm vegetation types. However, no additional detailed ecological survey has been conducted as part of this natural character assessment. LCDB v5 is based on a digital map of New Zealand which has been derived from recent satellite imagery. The current version LCDB v5 contains 33 classes and has been designed to be compatible in scale and accuracy with Land Information New Zealand's 1:50,000 topographic database. Accordingly, the use of LCDB v5 has been limited to a broad scale assessment tool and has not been relied upon to confirm any more detailed assessment scale.

Right: Indigenous forest found on Kāpiti Island. Boffa Miskell, 2021

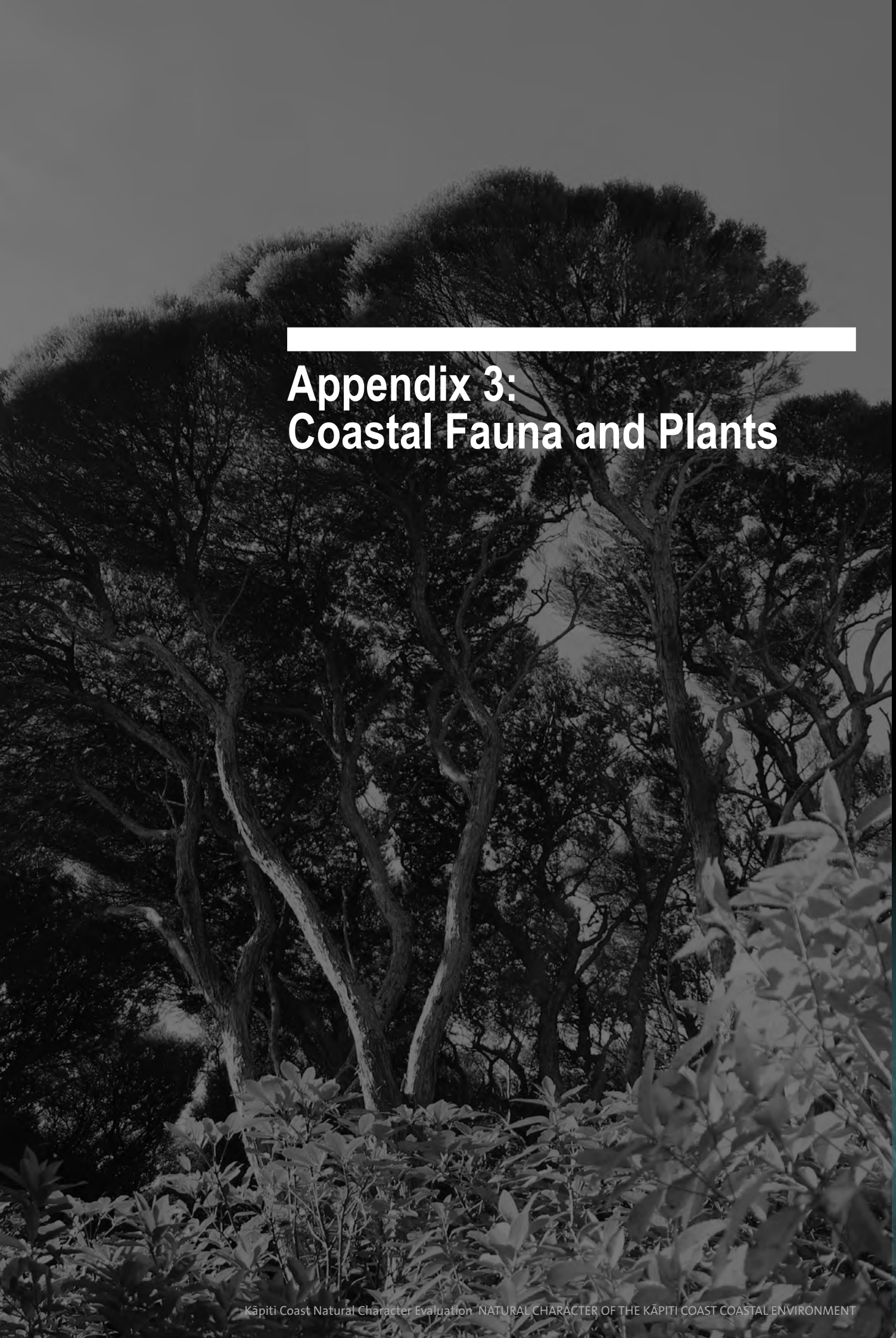
Appendix 2: Glossary

Appendix 2 cover page:
Cabbage tree at Ngapotiki.
Boffa Miskell, 2020.

Appendix 2: Glossary

NAME	DESCRIPTION
Active Coastal Interface	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.
Alluvium / Alluvial	Sediments such as sand, silt or gravel that have been deposited by streams, rivers and other running waters
Benthic	The surface of the seabed
Coastal environment	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: • The coastal marine area; • Islands within the coastal marine area; • 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) • Areas at risk from coastal hazards; • Coastal vegetation and the habitat of indigenous coastal species including migratory birds; • Elements and features that contribute to the natural character, landscape, visual qualities or amenity values; • Items of cultural and historic heritage in the coastal marine area or on the coast; • Inter-related coastal marine and terrestrial systems, including the intertidal zone; and • Physical resources and built facilities, including infrastructure, that have modified the coastal environment
Dunes	Dunes: An accumulation of sand built by wind or water. Fore dune: The more active part of dunes located closest to the sea Back dune: the backshore areas of a beach
Ephemeral	Water ways or waterbodies that are not permanent. Their surface expression changes depending on rainfall events or groundwater levels
Estuarine	Pertaining to or formed or living in an estuary, especially said of deposits and the sedimentary or biological environment of an estuary
Greywacke	Dark grey, firmly indurated and lightly metamorphosed sandstone with a compact fine-grained matrix. This rock type is ubiquitous through much of central New Zealand.
Herbfields	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.

NAME	DESCRIPTION
Intertidal	The area of the shore which is covered and uncovered by the rise and fall of the tide
Indurated	To make harden (i.e. soils that had been indurated by extremes of climate.
Lagoon	A shallow body of water separated from a larger body of water by a barrier.
Macroalgae	Seaweeds.
Offshore Reef	A ridge of rock with the top just below or just above the water surface which is located at some distance from the shore.
Rhodoliths	Unattached, branching, benthic calcified red algae that superficially resemble coral.
Shrublands	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.
Subtidal	The area below the intertidal zone which remains permanently covered in water.
Turbidity	Discolouration of water caused typically by suspended sediment load.
Ulva	Genus of green seaweeds, some of which are common in areas with elevated nutrients



Appendix 3: Coastal Fauna and Plants

COMMON NAME	*SCIENTIFIC NAME*	NEW ZEALAND CONSERVATION STATUS
Akiraho	*Olearia paniculata*	Not Threatened
Albatross species	*Thalassarche spp.*	-
Arctic skua	*Stercorarius parasiticus*	Non-resident Native – Migrant
Bachelor's button	*Cotula coronopifolia*	Not Threatened
Banded dotterel	*Charadrius bicinctus bicinctus*	Threatened – Nationally Vulnerable
Barberry	*Berberis glaucocarpa*	Introduced
Bar-tailed godwit	*Limosa lapponica baueri*	At Risk - Declining
Black-backed gull	*Larus dominicanus*	Not Threatened
Blackberry	*Rubus fruticosus*	Introduced
Boneseed	*Chrysanthemoides monilifera*	Introduced
Buck's horn plantain	*Plantago coronopus*	Introduced
Cabbage tree	*Cordyline australis*	Not Threatened
Caspian tern	*Hydroprogne caspia*	Threatened – Nationally Vulnerable
Central short-tailed bat	*Mystacina tuberculata rhyacobi*	At Risk – Declining
Fairy prion	*Pachyptila turtur*	At Risk – Relict
Flax	*Phormium tenax*	Not Threatened
Fluttering shearwater	*Puffinus gavia*	At Risk – Relict
Gorse	*Ulex europaeus*	Introduced
Hinau	*Elaeocarpus dentatus*	Not Threatened
Ice plant	*Carpobrotus edulis*	Introduced
Inanga	*Galaxias maculatus*	At Risk – Declining
Kahikatea	*Dacrycarpus dacrydioides*	Not Threatened
Kākāpo	*Strigops habroptilus*	Threatened – Nationally Critical
Karo	*Pittosporum crassifolium*	Not Threatened
Knobby clubrush	*Ficinia nodosa*	Not Threatened
Kohekohe	*Dysoxylum spectabile*	Not Threatened
Little penguin	*Eudyptula minor*	At Risk – Declining
Longfin eel	*Anguilla dieffenbachii*	At Risk – Declining
Long-tailed bat	*Chalinolobus tuberculatus*	Threatened – Nationally Critical
Macrocarpa	*Cupressus macrocarpa*	Introduced
Marram grass	*Ammophila arenaria*	Introduced
Mingimingi	*Coprosma propinqua*	Not Threatened
Montbretia	*Crocosmia x crocosmiiflora*	Introduced
New Zealand pipit	*Anthus novaeseelandiae novaeseelandiae*	At Risk – Declining
Ngaio	*Myoporum laetum*	Not Threatened
Nīkau	*Rhopalostylis sapida*	Not Threatened
Northern diving petrel	*Pelecanoides urinatrix urinatrix*	At Risk - Relict
Northern rata	*Metrosideros robusta*	Threatened – Nationally Vulnerable
Oioi	*Apodasmia similis*	Not Threatened
Pampas grass	*Cortaderia selloana*	Introduced

COMMON NAME	*SCIENTIFIC NAME*	NEW ZEALAND CONSERVATION STATUS
Pied stilt	*Himanotopus h. leucocephalus*	Not Threatened
Pine	*Pinus sp.*	Introduced
Pingao	*Ficinia spiralis*	At Risk – Declining
Pohuehue	*Muehlenbeckia australis*	Not Threatened
Pohutukawa	*Metrosideros excelsa*	Threatened – Nationally Vulnerable
Pukatea	*Laurelia novae-zelandiae*	Not Threatened
Red-billed gull	*Larus novaehollandiae scopulinus*	At Risk – Declining
Reed sweetgrass	*Glycerica maxima*	Introduced
Remuremu	*Selliera radicans*	Not Threatened
Rewarewa	*Knightia excelsa*	Not Threatened
Saltmarsh ribbonwood	*Plagianthus divaricatus*	Not Threatened
Sand coprosma	*Coprosma acerosa*	At Risk – Declining
Sand sedge	*Carex pumila*	Not Threatened
Sea rush	*Juncus krausii*	Not Threatened
Shag species	*Phalacrocorax spp.*	Not Threatened or At Risk
Shore spurge	*Euphorbia glauca*	At risk - Declining
Sooty shearwater	*Puffinus griseus*	At Risk – Declining
Spinifex	*Spinifex sericeus*	Not Threatened
Tall fescue	*Festuca arundinacea*	Introduced
Tauhinu	*Ozothamnus leptophyllus*	Not Threatened
Tawa	*Beilschmiedia tawa*	Not Threatened
Three-square	*Schoenoplectus pungens*	Not Threatened
Titoki	*Alectryon excelsus*	Not Threatened
Tree lupin	*Lupinus arboreus*	Introduced
Tuatara	*Sphenodon punctatus*	At Risk - Relict
Variable oystercatcher	*Haematopus unicolor*	At Risk – Recovering
White-capped albatross	*Thalassarche steadi*	At Risk – Declining
White-fronted tern	*Sterna striata*	At Risk - Declining
Wrybill	*Anarhynchus frontalis*	Threatened – Nationally Vulnerable