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SOUTHLAND/ MURIHIKU REGIONAL COASTAL ENVIRONMENT STUDY

COASTAL NATURAL CHARACTER ASSESSMENT

PREPARED FOR ENVIRONMENT SOUTHLAND,
INVERCARGILL CITY COUNCIL,
SOUTHLAND DISTRICT COUNCIL AND
TE AO MARAMA INC

DECEMBER 2019

Boffa Miskell





Prepared for Environment Southland, Invercargill City Council, Southland District Council and Te Ao Marama Inc

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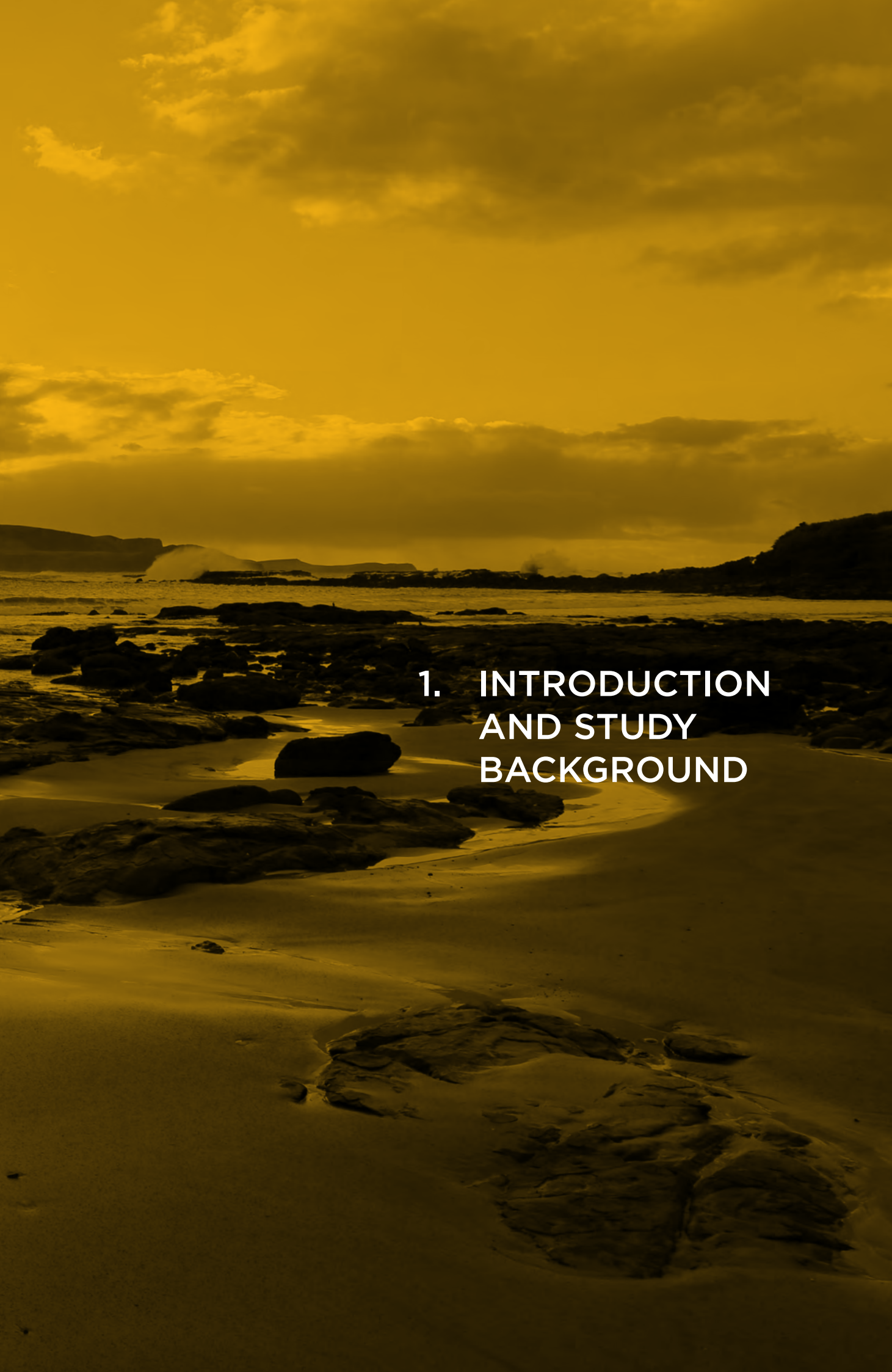
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**1. INTRODUCTION
AND STUDY
BACKGROUND**



Figure 1: Map of the Southland Region.

1.1 PURPOSE AND BACKGROUND

Boffa Miskell (BML) was engaged by Environment Southland (ES), Southland District Council (SDC) and Invercargill City Council (ICC) to define and map the terrestrial and marine component of Southland’s Regional Coastal Environment, utilising the elements described within Policy 1 of the New Zealand Coastal Policy Statement (NZCPS). The NZCPS also requires local authorities under Policy 13 to map or otherwise identify (at a minimum) the areas of high natural character within the coastal environment. Policy 13 also refers to areas of outstanding natural character, necessitating additional evaluation.

Policy 15 of the NZCPS refers to landscapes and the requirement to protect natural features and natural landscapes of the coastal environment. This Coastal Environment Study therefore encompasses both natural character and landscape considerations, as they relate to Policies 1, 13 and 15 of the NZCPS.

This report contains the results of the study, which the respective regional and district councils will use in their reviews and policy development of their resource management documents.

1.2 STUDY SCOPE

Using a methodology applied in other recent natural character assessments of the coastal environment, the BML study team refined the approach of the assessment to ensure consistency in the way landscape, ecological and marine expertise is harnessed for this study, 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; and
- Identifies areas of outstanding natural character in the coastal environment.

1.3 STUDY PROCESS

The coastal study has been undertaken as an independent technical assessment by BML and has been subject to input by a range of specialist experts, including marine and terrestrial ecologists at the Department of Conservation (DOC), ES, SDC, ICC and terrestrial ecologists at Wildland Consultants Ltd.

The identification of the coastal environment and natural character methodology used for this study has been adapted from several recently completed natural character studies, including Waimakariri District Coastal Study (2018); Selwyn District Coastal Study (2018); Timaru District Coastal Study (2017); Otago/ Christchurch City Landscape Study (2015); Hurunui District Coastal Study (2015); Natural Character of the Marlborough Coast (2014); South Taranaki Landscape Assessment (2014); Nelson Coastal Study (2015) and Natural Character Study of the Waikato Region (2015).

The study team refined the inland extent of the coastal environment and through this mapping exercise identified 11 Coastal Terrestrial Areas. Regarding the marine environment, where the extent of the coastal environment extends to 12 nautical miles, six Coastal Marine Areas were identified. These tasks of identifying the extent of the study area and small character areas involved a combination of desktop research using GIS datasets and fieldwork, which included an aerial reconnaissance by fixed wing plane. Once the inland extent of the coastal environment was determined, and the identified coastal area extents were mapped, discussions were held with principal ecologist Kelvin Lloyd at Wildland Consultants and Nick Ward, Freshwater and Marine Science Leader at Environment Southland.

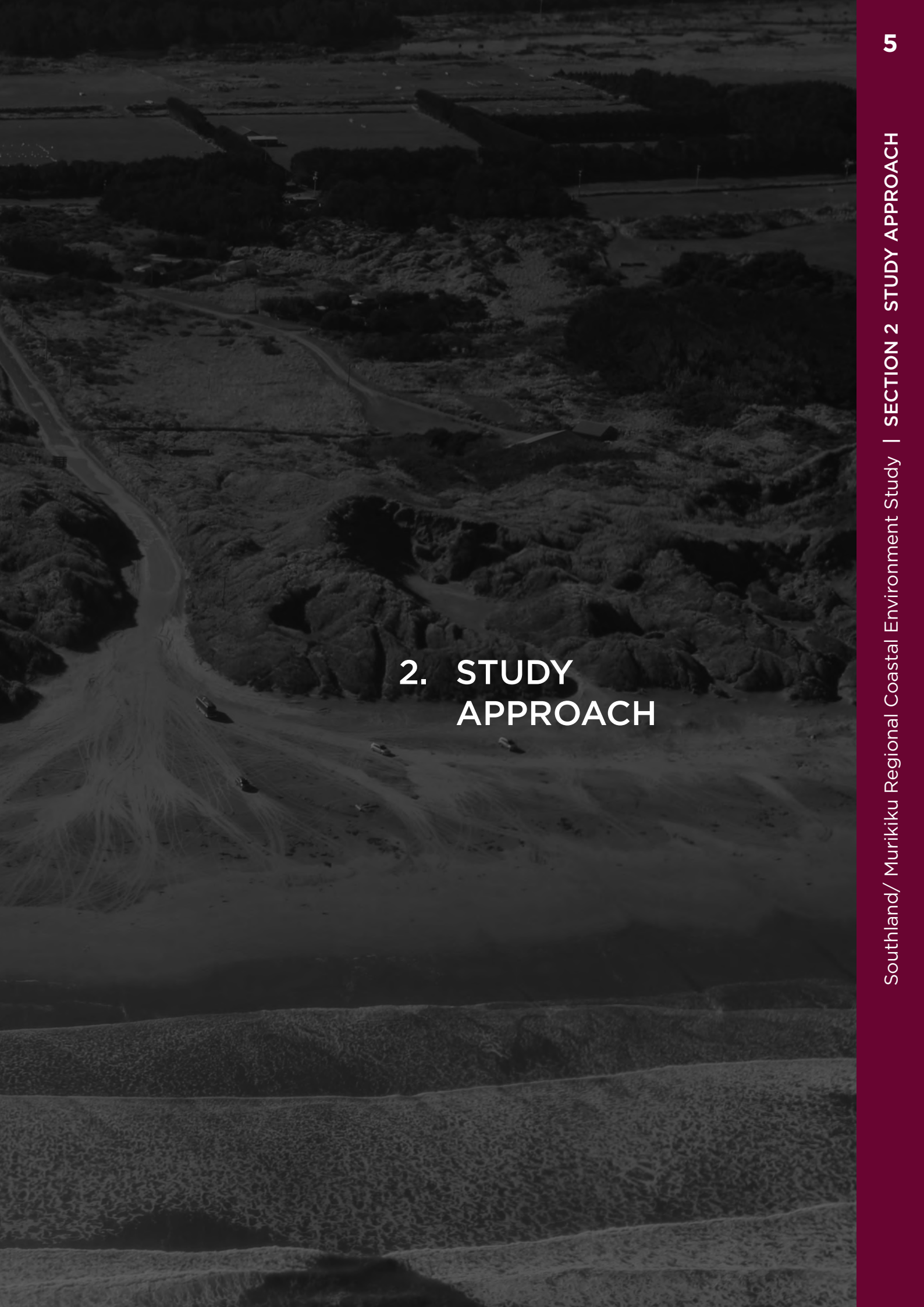
It was important to ensure that both the terrestrial and marine areas ‘are ecologically sound’ as well to ensure that they captured characteristics that were representative of the specific area. This work confirmed that the extent of the 17 broad Coastal Terrestrial and Marine Areas as mapped are accurate and appropriate. Following this, identification of a more refined mapping occurred (i.e. the Level 4 scale¹). These areas were identified and delineated on a series of maps and their condition and values tabulated. Following this, identification of areas containing Outstanding Natural Character (ONC) were considered.

No stakeholder input has been sought during the preparation of this study, but it is understood that this study will provide a basis for consultation through the review process.

1. The scaling for the Coastal Natural Character Study is explained in Section 2.2.4 of this report



2. STUDY APPROACH



2.1 COASTAL ENVIRONMENT

2.1.1 DEFINING THE COASTAL ENVIRONMENT

The Resource Management Act 1991 (RMA) does not define 'coastal environment', nor does the New Zealand Coastal Policy Statement (NZCPS). However, the extent of the coastal environment needs to be considered in order to respond to Policy 1 of the NZCPS. This policy recognises that the extent and characteristics of the coastal environment will vary from location to location and needs to be specifically assessed for each area.

Policy 1 of the NZCPS also recognises that the coastal environment may include the following nine characteristics:

- a. The coastal marine area;
- b. Islands within the coastal marine area;
- c. Areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, coastal wetlands, and the margins of these;
- d. Areas at risk from coastal hazards;
- e. Coastal vegetation and the habitat of indigenous coastal species including migratory birds;
- f. Elements and features that contribute to the natural character, landscape, visual qualities or amenity values;
- g. Items of cultural and historic heritage in the coastal marine area or on the coast;
- h. Inter-related coastal marine and terrestrial systems, including the intertidal zone; and
- i. Physical resources and built facilities, including infrastructure, that have modified the coastal environment.

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 1², which is widely utilised when undertaking these assessments.

Through the development of a methodology to determine the extent of the coastal environment, BML were guided by all of the identified characteristics above, although particular consideration was given to item (c) of Policy 1(2) of the NZCPS 'where coastal processes, influences or qualities are significant'. This, along with the relationship to the accompanying marine natural character study, provided helpful guidance. All remaining characteristics of the coastal environment were also addressed in the methodology.

The term 'significant' is not defined in the NZCPS. Within the context of the RMA the word is used to address Section 6(c) matters³. In the context of Policy 1(2)(c) of the NZCPS, the study team have interpreted the term 'significant' to mean 'sufficiently great or important to be worthy of attention; noteworthy', as outlined within the Oxford English Dictionary.

The seaward extent of the coastal environment extends 12 nautical miles from mean high water springs (MHWS). The landward extent requires greater consideration, as this extent defines the landward 'boundary' of the coastal environment and the relevance of the NZCPS. Due to the complexity of the Southland coastal area, specific consideration will need to be applied to more complex areas, such as the southern Catlins, the lagoons and wetlands around Invercargill and the broad sweeping beach areas, including Oreti. Specific consideration has also been given to Fiordland, where the extent of the coastal environment has essentially followed the main divide, due in part to the highly indented fiords. Therefore, a large proportion of Fiordland is contained within the coastal environment.

The terrestrial component of Stewart Island has been excluded from this Study, as this was undertaken separately in 2017 with details contained within 'Stewart Island / Rakiura: Landscape and Coastal Natural Character Study,' Boffa Miskell 2019. The marine component of Stewart Island that was included in the 2017 report has been reconsidered to encompass the broader marine area now required for the region. Some amendments have been made to the Eastern Marine and Western Marine Coastal Marine Areas in the 2017 study to better reflect the regional context and in particular to note areas of dredging and trawling. Paterson Inlet Coastal Marine Area and Port Pegasus Coastal Marine Area remain the same in terms of their boundaries.

2. [http://www.doc.govt.
New Zealand/Documents/
conservation/marine-and-coastal/
coastalmanagement/guidance/
policy-1.pdf](http://www.doc.govt.nz/conservation/marine-and-coastal/coastalmanagement/guidance/policy-1.pdf)

3. It is not defined in the RMA but there is a lot of case law around what it means.

A general rule of thumb⁴ is that the inland extent of the coastal environment extends to the first [proximate] significant ridgeline inland of the coast, although for flat areas, such as around the wetlands, lagoons and plains around Invercargill, the boundaries are determined more by landscape character and where coastal elements, patterns and processes are still sufficiently significant to be dominant. Where areas of obvious modification are apparent in land, a judgement was made over to what extent natural elements, patterns and process are still significant. Where practicable, landscape features and paddock boundaries have been used for flat areas. A decision to include the Main Divide as the extent for Fiordland was agreed upon due to the highly indented fiords extending significantly inland and the extent of intact natural sequences extending from ridge to seafloor.

Fundamental to this assessment of the inland extent of the coastal environment is the relevant and accessible data available to inform judgements. The use of professional knowledge of the study team in relation to the elements outlined within Policy 1 of the NZCPS was also an essential source of information.

Determination of the inland extent of the coastal environment for this Study was undertaken at a scale of 1:50,000.

4. Derived from a number of sources, including Environment Court Decisions including Mainpower NEW ZEALAND Limited v Hurunui District Council (December 2011) and the May 2011 decision by the Board of Inquiry into the Hauāuru Mā Raki Wind Farm.



Porpoise Bay rocky shores. Boffa Miskell, 2018.

Study Approach cover page: Oreti Beach. Boffa Miskell, 2018.

2.1.2 ZONES OF SIGNIFICANCE

BML have developed the following model which has been applied to Southland’s Regional Coastal Environment.

The coastal environment has been divided into two areas to aid description (Zone A and Zone B). These two areas, divided by the MHWS mark, are labelled Coastal Terrestrial Areas (CTAs) and Coastal Marine Areas (CMAs). Landward of the coastal environment is a zone labelled the Coastal Context zone. A description of each zone is summarised in Table 1 below:

The Coastal Environment Zones (Zones A and B) and the Coastal Context Zone (Zone C) can collectively be referred to as The Coastal Landscape.

TABLE 1: ZONES OF COASTAL SIGNIFICANCE

TABLE 1: ZONES OF COASTAL SIGNIFICANCE		
COASTAL LANDSCAPE	COASTAL ENVIRONMENT	Zone A This zone includes the Coastal Marine Area (CMA). Within the statutory context the CMA means the foreshore, seabed and coastal water and the air above the water to twelve nautical miles (or the territorial sea boundary). Inland, the CMA extends to the mean high-water spring (MHWS). The CMA includes the rock, beach, coastal lagoons and lakes below MHWS. The CMA extends approximately 1 km 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. The Coastal Significance Zone is where coastal processes are significant and may include estuaries, and dune lands. Coastal features are also prominent, such as farm land, settlements and coastal forests. For this Study, this zone is also referred to as the Coastal Terrestrial Zone.
	COASTAL CONTEXT	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 is not identified, as it falls outside of the Coastal Environment.

The diagram (below) Diagram 1, illustrates the extent of the Coastal Environment and the three coastal environment zones within a very typical coastal environment in Southland. The diagram illustrates that the coastal environment is determined by a variety of factors and changes from one coastal area to another.

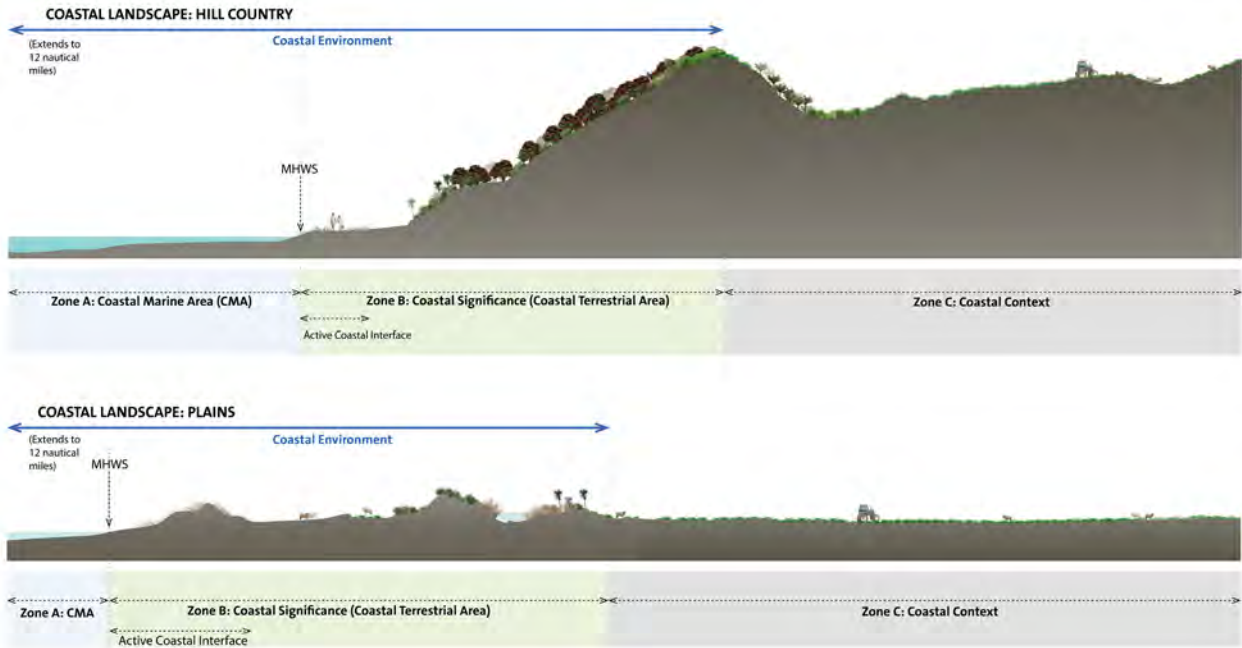


Diagram 1: Illustration of the extent of the Coastal Environment and the three zones with two very typical coastal environments in Southland.

2.2 COASTAL NATURAL CHARACTER

2.2.1 DEFINITION OF NATURAL CHARACTER

Natural character is not defined in the RMA or in the NZCPS. BML considers that the environments with the greatest natural character are those with comparatively low levels of human modification. Areas with high natural character are composed of natural elements appearing in natural patterns formed by natural processes.

Within ‘Natural Character and the NZCPS’ [2012, Department of Conservation, p19] the following definition was endorsed:

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:

- the extent to which the natural elements, patterns and processes⁵ occur and;
- 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 community⁶.

Policy 13 (2) 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):

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

The definition adopted for this study is the DOC endorsed definition mentioned earlier. Essentially, BML understand that natural character is a component of the human construct of ‘landscape’. Whereas landscape encompasses biophysical, aesthetic and associative components, natural character is primarily concerned with the degree of naturalness associated with the natural elements, patterns and process within the landscape (or coastal environment in this study) and the level or degree of modification to those components.

5. For the purposes of interpreting the NZCPS 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.

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

7. Including High Country Rosehip Orchards Limited and MackeNew Zealandie Lifestyle Limited and Ors v MackeNew Zealandie District Council, Interim Decision No. [2011] NEW ZEALANDEnvC387 and Port Gore, Decision No [2012] NEW ZEALANDEnvC72 paragraphs 66-67.

8. Long Bay-Okura Great Park Society Incorporated v North Shore City Council (2008)

2.2.2 NATURALNESS

Accordingly, the thresholds of naturalness differ and a refined definition of ‘naturalness’ was agreed as being:

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

- ecological naturalness (indigenous nature); and
- landscape naturalness (perceptions of nature)⁹.”

The naturalness concept was discussed within the Mackenzie District Plan Change 13 Appeal Decision¹⁰, where the court restated the principle that perceptions of naturalness under the RMA are a “cultural construct” and “vary with the beholder”. Whilst natural science factors are important in underpinning the term, they should not be given undue weight at the expense of experiential and associative (i.e. recreational) factors.

A rating of very high to very low was also provisionally adopted by the court for rating naturalness as shown in Diagram 2 below.

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



Diagram 2: Naturalness rating scale.

This construct was also reiterated within the Port Gore mussel farm decision¹¹. Here the Judge considered that naturalness “is an anthropomorphic concept”. The Court noted that “a scale of naturalness of habitats is not the same as a scale of naturalness of landscapes or natural character of the coastal environment”.

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

2.2.3 NZCPS AND PERTINENT COURT DECISIONS

Since the inception of the NZCPS in December 2010, there have been numerous court decisions that have attempted to provide further clarity over Policy 13 (Natural Character).

Of the many, the most pertinent is a Supreme Court decision (NZSC38¹²) in April 2014 on two appeals in relation to salmon farms in the Marlborough Sounds which focussed attention on the underlying policies (in this case the NZCPS), particularly in relation to directive policies that require the avoidance of effects. The essence of the decision clearly provides strong direction to avoid adverse effects on Outstanding Natural Character and Outstanding Natural Landscapes in the Coastal Environment. The decision states that where policy direction states ‘avoid’, essentially this is what should occur. The implications of this decision have yet to be fully determined and further guidance on this will develop over time.

2.2.4 STUDY SCALE

Natural Character assessments use different scales of reference that steadily decrease from the broad regional scale to the detailed local scale. Natural character is context and scale related. i.e. the coastal area can be perceived as having different levels of natural character at different scales, depending on the level of detail investigated.

9. This description was endorsed within Clearwater Mussels V Marlborough District Council, Decision [2018] NEW ZEALANDEnvC88, paragraph 125 and 126

10. High Country Rosehip Orchards Limited and MackeNew Zealandie Lifestyle Limited and Ors v MackeNew Zealandie District Council. Decision No. [2011] NEW ZEALANDEnvC 387

11. Decision No (2012) NEW ZEALANDEnvC 72. 26th April 2012 (paragraphs 66 – 67)

12. Environmental Defence Society Inc v The New Zealand King Salmon Co Ltd [2014

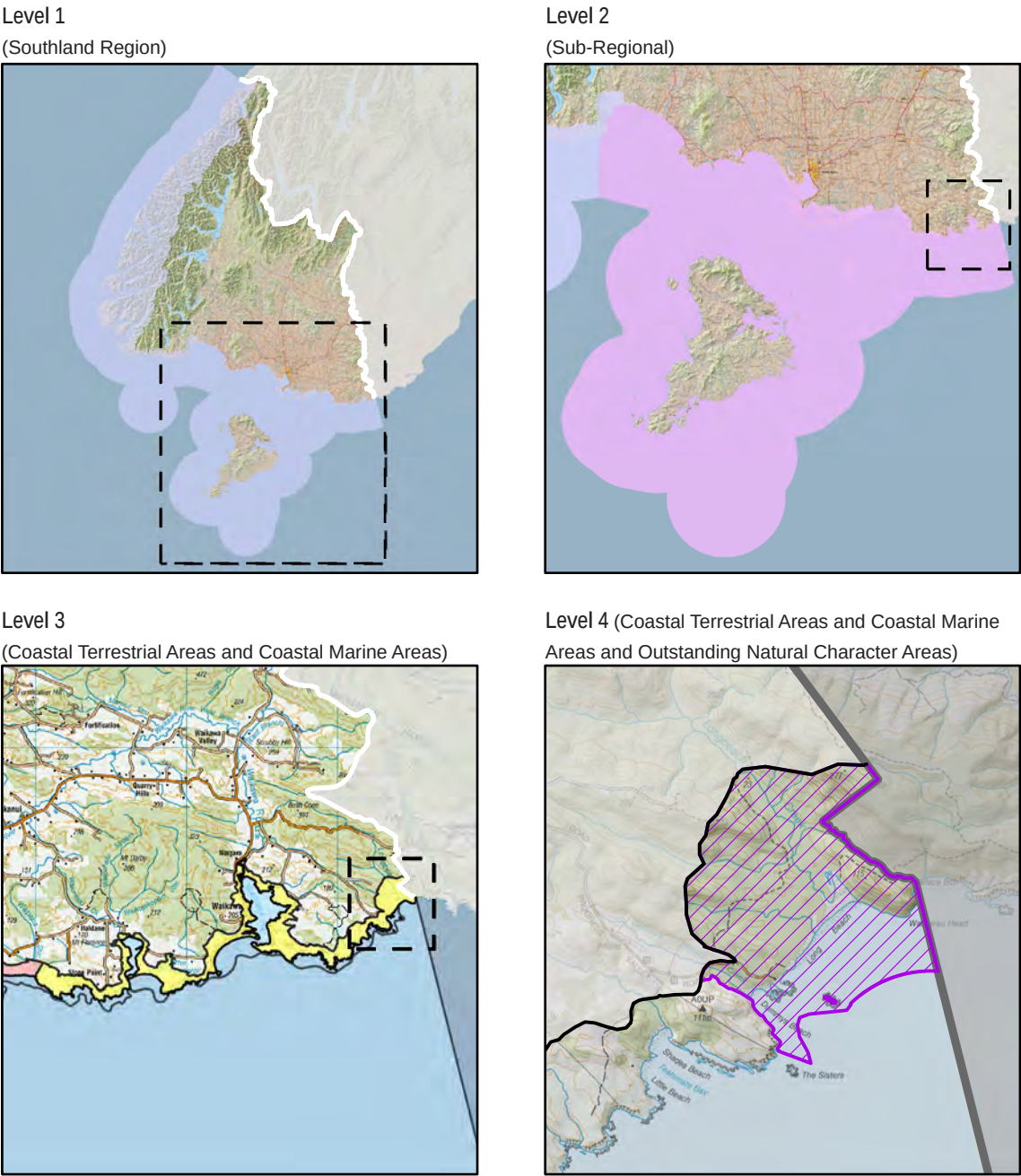


Diagram 3: Scaling diagram of levels of natural character.

As the simplified diagram in Diagram 3 above illustrates, that natural character scales for Southland can be considered at both a broad and more detailed scale. Due to the large scale of the coastal environment for Southland, four scales or areas have been considered for this assessment. At the broadest scale is the entire region of Southland (i.e. Level 1). At this scale, climate, sea currents, geomorphological and land uses can have broad natural character inferences. At the next broad level, (Level 2), the region can be divided into two broad areas, Fiordland and the remaining coastline. This division recognises that the elements, patterns and processes that occur in Fiordland and the western part of the region are quite different to those elsewhere. This is predominantly influenced by landform and biotic modification versus little modification.

At a more detailed scale, Levels 3-4 are considered. The Level 3 scale includes the 11 Coastal Terrestrial Areas (CTAs) and six Coastal Marine Areas (CMAs). At the most refined scale is Level 4 (mapped at 1:2,500). Only at this more detailed stage is Outstanding Natural Character (ONC) considered. Level 4 scale is illustrated as bullet points in the tables and more refined mapping within the Level 3 CTAs and CMAs.

The hierarchical approach, depicted by Diagram 3, has been useful in further identifying specific features or stretches of coastline with higher levels of natural character compared to the remaining parts of the Coastal Environment.

2.2.5 EVALUATION OF NATURAL CHARACTER

The assessment approach is based upon best practice use 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).

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 freshwater and terrestrial ecologists and other natural scientists, 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.

In accordance with the requirement outlined within Policy 13 of the NZCPS, mapping and identification of at least areas of high natural character has been undertaken. 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 have been primarily determined based on differences in biophysical condition as appropriate for the study scale which also takes account of previous assessments of natural character, including those in adjacent areas, such as Otago.

Based on separating marine and terrestrial areas, study members have captured the necessary terrestrial and marine data which has helped inform the assessment of terrestrial and marine natural character ratings. Aspects for delineation of Coastal Marine Areas include continuity of biotic patterns parallel to the shore (and further inland where appropriate), the extent of intertidal and subtidal zones, and influences of exotic species and water quality. Specific data from the Ministry of Primary Industries relating to trawling and other fishing related data has also assisted to understand modifications in the marine environment. Further information relating to this is contained within Appendix 3 of this Study. For Coastal Terrestrial Areas, aspects include landform composition, freshwater catchments, dunes, backdunes, river mouths, estuaries and coastal wetlands and lakes and landcover. Overall, a generally similar level of natural character homogeneity is sought.

When assessing the natural character of the coastal environment, several key attributes need to be considered. The list of attributes that natural character may include (NZCPS Policy 13 (2)) have been grouped broadly into the categories of biotic (living: ecology), abiotic (non-living: geology, climate) and experiential (human based perceptions) attributes to provide a systematic way to consider the different aspects of the natural patterns, processes and elements of the coastal environment and the degree of modification present.

The attributes are described for each Coastal Marine and Coastal Terrestrial Area identified in Tables 2 and 3 and were assessed for their degree of natural character by way of the evaluation matrix Tables 4 and 5.

The list of attributes has been developed to avoid double-counting and to ensure that the indicators for each attribute are mutually exclusive. They expand on the coastal environment diagrams in Tables 2 and 3. Perceptual and experiential attributes have a small degree of overlap between marine and terrestrial, however, the descriptive approach allows for those overlaps to be clearly articulated.

The division of attributes between the Coastal Terrestrial Areas and Coastal Marine 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 taken into account. The interplay between Coastal Terrestrial Areas and Coastal Marine Areas is strong and they can each individually influence the degree of natural character of one another. For example, development on land at Riverton can affect the natural character of the adjoining Jacobs River coastal area, particularly where the presence of wharves extend from the terrestrial area into the marine area. Experiential aspects are often interwoven between the two areas.

For this Study, each attribute is described specific to the particular area (rather than using standard descriptions) so that variations in the attributes between different areas are recorded and taken into account when assessing the degree of natural character. An overall value judgement as to the degree of natural character is then made for each Coastal Terrestrial Area and each Coastal Marine Area. The scale and breadth of the data that has assisted to make decisions on an area's degree of natural character (most noticeably within the marine environment) can vary and any outputs will reflect to varying degrees the data used.

In evaluating the degree of natural character, BML landscape architects James Bentley and Hannah Wilson, with relevant input from external consultants from Wildland Consultants Ltd, Environment Southland, Ministry of Primary Industries and the Department of Conservation, have described the experiential characteristics.

Although community engagement is an important component of the assessment of experiential characteristics, no engagement or consultation has been undertaken in this phase of the project. Experiential characteristics and values used to inform the evaluations in this report 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, its 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 naturalness 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 they are considered 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, DOC have engaged on an extensive and successful *Spartina* sp. eradication programme in the New River Estuary, which is an example intervention that enhances natural character of a place.

It has only been possible to capture terrestrial and marine data where that data exists and is easily accessible. Accordingly, the mapped areas illustrate existing knowledge at this point in the study process.

Te Wae Wae Bay coast. Boffa
Miskell, 2018.



Table 2: Coastal Marine Areas

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 (e.g., Waiau River or Oreti River); - Wind and waves - the Southland coastal area varies greatly in exposure to winds and waves; and - 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 macroalgae living on or in the seafloor; - Fish - reef, bottom associated, and pelagic fish; - Inter-tidal communities of crustaceans, bivalves and molluscs; - Marine mammals - fur seals, sea lions, dolphins and whales; and - Birds - shore birds (e.g. oystercatcher, herons) and seabirds (terns, cormorants, penguins, petrels, and albatross species such as the nationally critical Antipodean albatross (<i>Diomedea antipodensis</i>), and the naturally uncommon Southern royal albatross (<i>Diomedea epomophora</i>).	The degree of natural character assessed (very high to very low) including 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.
MARINE 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; and - 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 and tourism vessels and servicing boats). Recognise that different people experience naturalness differently. For example, for some people natural drifts of kelp decomposing on a beach may reduce their experiential value and demand that it is removed so they can ‘enjoy’ the beach. Others have an opposing view.

**Attributes of each Coastal Marine Area have been measured on their 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. Refer also to Figure 2, Section 3.*

Table 3: Coastal Terrestrial Areas – Zone B

ATTRIBUTES	DESCRIPTORS	SPECTRUM OF NATURALNESS*
TERRESTRIAL ABIOTIC SYSTEMS	- Climatic influences (wind, rain, exposure); - Geomorphology and identification of different types of landforms (i.e. peninsulas, cliffs, dunes, wetlands); - Terrestrial coastal processes, including erosion, river mouth processes including sedimentation (within the terrestrial zone); and - Freshwater processes.	The evident intactness of the abiotic systems. The degree (very high to very low) to which physical modifications such as built structures, road cuts, earthworks and reclamation works affect this abiotic attribute.
TERRESTRIAL BIOTIC SYSTEMS	- The margins of estuaries, wetlands and terrestrial areas in Zone B including the intactness of their natural ecological processes, patterns and elements; - Colonies of nesting birds (terns, cormorants, penguins, gulls, petrels); - Extent of freshwater communities; - Land cover and associated land use, including the composition, distribution, and condition of land cover, and the presence of indigenous/exotic species; - Presence of indigenous fauna; - Marine mammal haulouts; and - Organic sediments / soils.	- 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 channelising watercourses, stop banks, culverts, dams etc. which affect freshwater biota.
TERRESTRIAL EXPERIENTIAL	- The experience in seeing, feeling and perceiving the Coastal Significance and Active Coastal Interface; - Aromas, visual and scenic, auditory, sense of wildness, remoteness, isolation, natural darkness of the night sky; - Ornithology and bird/nature watching; - Ephemeral biotic activity (i.e. seasonality of flora, presence of birds); and - Ephemeral human activity affecting the naturalness (such as recreation, commercial activities.	- 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; and - Presence of humans, including recreational activities (driving, walking, camping, settlements).

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

Table 4: Coastal Marine Areas – Area A Evaluation Matrix							
DEGREE OF NATURAL CHARACTER	VERY HIGH	HIGH	MODERATE - HIGH	MODERATE	MODERATE - LOW	LOW	VERY LOW
ABIOTIC (Wind, waves and currents; rocky reefs; seafloor sediments; water quality.)	- Rare modification / structures - Dynamic processes virtually intact - Sediment makeup and quality virtually unmodified - Water quality virtually unmodified	- Very low levels of modification / structures - Dynamic processes largely intact - Sediment makeup and quality very slightly modified - Water quality very slightly modified	- Small scale modification/ limited structures - Dynamic processes generally intact with some interference - Sediment makeup and quality slightly modified - Water quality slightly modified	- Moderate scale modification/ several structures - Dynamic processes still apparent - Sediment makeup and quality moderately modified - Water quality moderately modified	- Modification /structures common - Dynamic processes markedly modified - Sediment makeup and quality markedly modified - Water quality markedly modified	- Large areas of modification/ structures and or reclamation - Dynamic processes highly modified - Sediment makeup and quality highly modified - Water quality highly modified	- Very extensive modification / large reclamation - Dynamic processes extremely modified - Sediment makeup and quality extremely modified - Water quality extremely modified
BIOTIC (Pelagic community; seafloor communities; fish; marine mammals; seabirds, shore birds.)	- Exotic biota very rare - All expected species present and their population structure virtually unmodified - Contains species and habitats - Of high conservation value - All ecosystem functions virtually intact - Little to no presence of dredging, bottom trawling, set netting or other commerical fishing activities	- Exotic biota rare - All expected species present and population structure is largely unmodified - Very likely to contain species and habitats of high conservation value - Almost all ecosystem functions intact - Little presence of dredging, bottom trawling, set netting or other commerical fishing activities	- A few exotic biota occur - All expected species present with slight modification to population structure - Some species and habitats of high conservation value - Most ecosystem functions intact - Little to moderate levels of dredging, bottom trawling, set netting or other commerical fishing activities	- Exotic biota regularly present - Some expected species absent with moderate modification to population structure - A few species and habitats of high conservation value - Some ecosystem functions varying outside natural range - Moderate levels of dredging, bottom trawling, set netting or other commerical fishing activities	- Exotic biota common - Many expected species absent with marked modification to population structure - Species and habitats of high conservation value rare - Most ecosystem functions varying well outside natural range - Moderate to high levels of dredging, bottom trawling, set netting or other commerical fishing activities	- Exotic biota very common - Most expected species absent with remnant population structure highly modified - Species and habitats of high conservation value absent - Few original ecosystem functions remain - High levels of dredging, bottom trawling, set netting or other commerical fishing activities	- Exotic biota dominate - Expected species virtually absent - Only the most hardy or adaptable species occur - Original ecosystem functions rare or absent - High to very high levels of dredging, bottom trawling, set netting or other commerical fishing activities
EXPERIENTIAL (Views, sounds and smells of the sea; Sense of wildness and ecological intactness)	- Overwhelming sense of wild and intact ecosystem - Rare human influence	- Predominantly wild and intact ecosystem - Limited human interference	- Frequent sense of wild and intact ecosystem - Some human interference	- Opportunities to experience wildness and remoteness - Obvious human influence	- Limited sense of wild or intact ecosystem - Strong human influence	- Rare sense of wildness or intact ecosystem - Built environment clearly apparent	- No sense of wildness or intact ecosystem - Built environment dominates

Table 5: Coastal Terrestrial Areas – Area B Evaluation Matrix							
DEGREE OF NATURAL CHARACTER	VERY HIGH	HIGH	MODERATE - HIGH	MODERATE	MODERATE - LOW	LOW	VERY LOW
ABIOTIC (Geology / geomorphology, hydrology, climatic influences.)	- Rare modification / structures - Dynamic processes virtually intact	- Very small levels of modification / isolated structures - Dynamic processes largely intact - Freshwater quality very slightly modified	- Small scale modification/ limited structures - Dynamic processes generally intact with some interference - Freshwater quality slightly modified	- Moderate scale modification/ several structures - Dynamic processes still apparent - Freshwater quality moderately modified	- Frequent modification / several structures - Some natural processes capable of recovery - Freshwater quality markedly modified	- Large areas of modification/ structures and or reclamation - Some key natural processes are no longer able to operate - Freshwater quality highly modified	- Very extensive modification / large reclamation - Few or no natural elements, patterns, processes remain - Freshwater quality extremely modified
BIOTIC Land cover (indigenous /exotic species) Indigenous biota estuaries, freshwater communities	- Exotic biota may occur but virtually no invasive species - Virtually all expected species present and their population structure virtually unmodified - Contains species and habitats of high conservation value - All ecosystem functions virtually intact	- Exotic biota may occur and invasive biota rare - Virtually all expected species present and population structure is largely unmodified - Very likely to contain species and habitats of high conservation value - Almost all ecosystem functions intact	- Exotic biota common with few invasive species - Virtually all expected - Species present with slight modification to population structure - Some species and habitats of high conservation value - Most ecosystem functions intact	- Exotic and invasive biota regularly present - Some expected species - Absent with moderate modification to population structure - A few species and habitats of high conservation value - Some ecosystem functions varying	- Exotic and invasive biota common - Many expected species absent with marked modification to population structure - Species and habitats of high conservation value rare - Most ecosystem functions varying well outside natural range	- Exotic and invasive biota very common - Most expected species absent with remnant population structure highly modified - Species and habitats of high conservation value absent - Few original ecosystem functions remain	- Exotic and invasive biota dominate - Expected species virtually absent - Only the most hardy or adaptable species occur - Original ecosystem functions rare or absent
EXPERIENTIAL (Views, sounds and smells of the sea; Sense of wildness and ecological intactness)	- Overwhelming sense of wildness and remoteness - Rare human influence	- Predominantly wild and remote - Limited human interference	- Frequent sense of wildness and remoteness - Some human interference	- Opportunities to experience Wildness and remoteness - Obvious human influence	- Limited sense of wildness or remoteness - Strong human influence	- Rare sense of wildness or intact ecosystems - Built environment clearly apparent	- No sense of wildness, remoteness or intact ecosystem - Built environment dominates

Whilst the Coastal Marine Area (Level 3) extends out to the territorial sea boundary (12 nautical mile limit), information on seabed ecology is generally greatest close to the shore and decreases appreciably with distance. The strong connection between land and sea is also a pivotal feature in terms of defining the natural character of the marine area. As such, three mapping techniques were employed for the marine environment. The first mapping technique used either a contour or known features, for example, Coastal Marine Area A: Near Shore captures the coastal marine area of the coastal waters closest to the land, and includes all river mouths, coastal lagoons, inlets and shallow coastal reefs. The extent is based on the 10m bathymetry contour. The second technique used included defining large inlets, which included only Patterson Inlet and Port Pegasus in Stewart Island. The final mapping technique included dividing the broader coastal marine waters as they relate to Fiordland, Stewart Island and the southern mainland coast. From this, three Coastal Marine Area's were determined, Fiordland, Stewart Island and Foveaux.

When determining the overall natural character evaluation at the area scale (Level 3), the methodology that has been developed uses a greater weighting given to natural science attributes, which encompass abiotic and biotic values, compared with experiential values. This recognises that natural character is a condition rather than a quality or value; it exists regardless of experiential attributes. While the NZCPS includes experiential attributes in its definition of natural character, they have not identified such matters as the primary or principles determinants of natural character. Therefore, in this report they have been given a weighting of 20% in defining the overall judgement with each area. Conversely, the abiotic and biotic attributes have each been given an equal weighting of 40%.

The priority ascribed to natural science attributes in the NZCPS recognises that natural character is primarily based on a condition that can be described with natural 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 appropriate to base assessments of natural character primarily on natural science methods which may be more enduring and also more transparent.

At the Level 3 scale, abiotic, biotic and experiential attributes have been evaluated. Either the abiotic or biotic attributes have to score at least 'high' for the Level 3 (or Level 4) area to be identified as having a 'high' level of natural character. Similarly, if either the abiotic or biotic attributes are scored as 'very high', the component will be scored 'very high'. This also recognises the primacy of such natural science attributes which determine natural character condition. Notwithstanding this, the rating for abiotic, biotic and experiential attributes have been recorded for each component to ensure transparency in this assessment.

Table 6 shows an example of 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			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓	✓	✓
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING	Rating (e.g. Very High)		

2.3 OUTSTANDING NATURAL CHARACTER

Areas of Outstanding Natural Character have been identified through a detailed assessment process and mapped on Figure 40 of this study. Under RMA s6(a) it is necessary to determine the existing attributes and extent of naturalness. This approach is also required under the NZCPS. However, Policy 13 of the NZCPS 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 states:

- “(a) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use and development;
- (b) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and
- (c) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;...”

An area with outstanding natural character may be an area within the coastal environment that is considered to have 'high' or 'very high' levels of natural character, although it is important to note that the 'high' or 'very high' ratings do not in themselves equate to 'outstanding', as clarified by the following 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 the main assessment of natural character, 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. 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. [Emphasis added.] These are two quite different assessments.

This separation of outstanding natural character from the baseline follows current 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 therefore of effects under Policy 13(1)(a) for outstanding requires a reassessment of the highest rated areas. This approach is consistent with other BML coastal studies identifying outstanding natural landscapes.

The assessment of whether an area qualifies as having outstanding natural character combines both terrestrial and marine components. This means that where sequences of ecological naturalness are considered important these are clearly captured (such as from the top of a ridge on the land to the bottom of the sea adjacent). Outstanding natural character, by its very term, determines the highest rated areas and should include systems that interconnect with each other and therefore should not be considered in isolation.

Under the BML methodology used in this study, 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 Southland Region’. (Boffa Miskell)

For the Southland Region, an assessment to establish whether all or parts of its Coastal Terrestrial Areas and Coastal Marine Areas contain outstanding natural character needs only to be undertaken when all of the attributes, appraised at an adequate scale (in this case the more detailed – or Level 4 scale) and using adequate data, are assessed as being of 'high' or 'very high' levels of natural character. 'High' is included because this is mentioned in Policy 13 of the NZCPS. The methodology used for this Study incorporates a seven-point scale, ranging from very high at the top to very low at the bottom. To include High in this assessment also acknowledges that part of that 'high' may also have areas of higher natural character. The results of this assessment are contained within Section 5 of this Study.



2.4 DIGITAL MAPPING

The scale of the natural character study is critical to the validity of the end results. As outlined earlier, natural character assessment is scale related and determined by the study brief and varying extents by the mapping scale of the information used to determine the outcomes of the project. For this project, the scale is the region, although as described earlier, mapping is at a district level.

GIS has been used to systematically map the extent of the Coastal Environment and to map Coastal Marine and Terrestrial areas. The mapping scale undertaken for this project is 1:50,000. It is acknowledged that the majority of the data used for this study is at scales greater than 1:50,000. The mapping has been undertaken on high resolution aerial images, although presented in this report on 1:50,000 topographical maps. Where more intricate sections of the coastline exist, these have been mapped at a finer scale. At these finer scales, GIS allows the viewer to zoom in and assess the exact location of the coastal environment. However, extent of the coastal environment and coastal area boundaries in this study were mapped within the context of the Southland region as a whole and with reference to surrounding broad geographical features, not paddock by paddock. This broader context should be borne in mind.

The division between the Coastal Marine Area and the Coastal Terrestrial Area is the mean high-water spring mark (MHWS). BML received data from Environment Southland on this, however in some areas, the data was relatively coarse. Therefore, a combination of GIS data was used to determine this boundary which included:

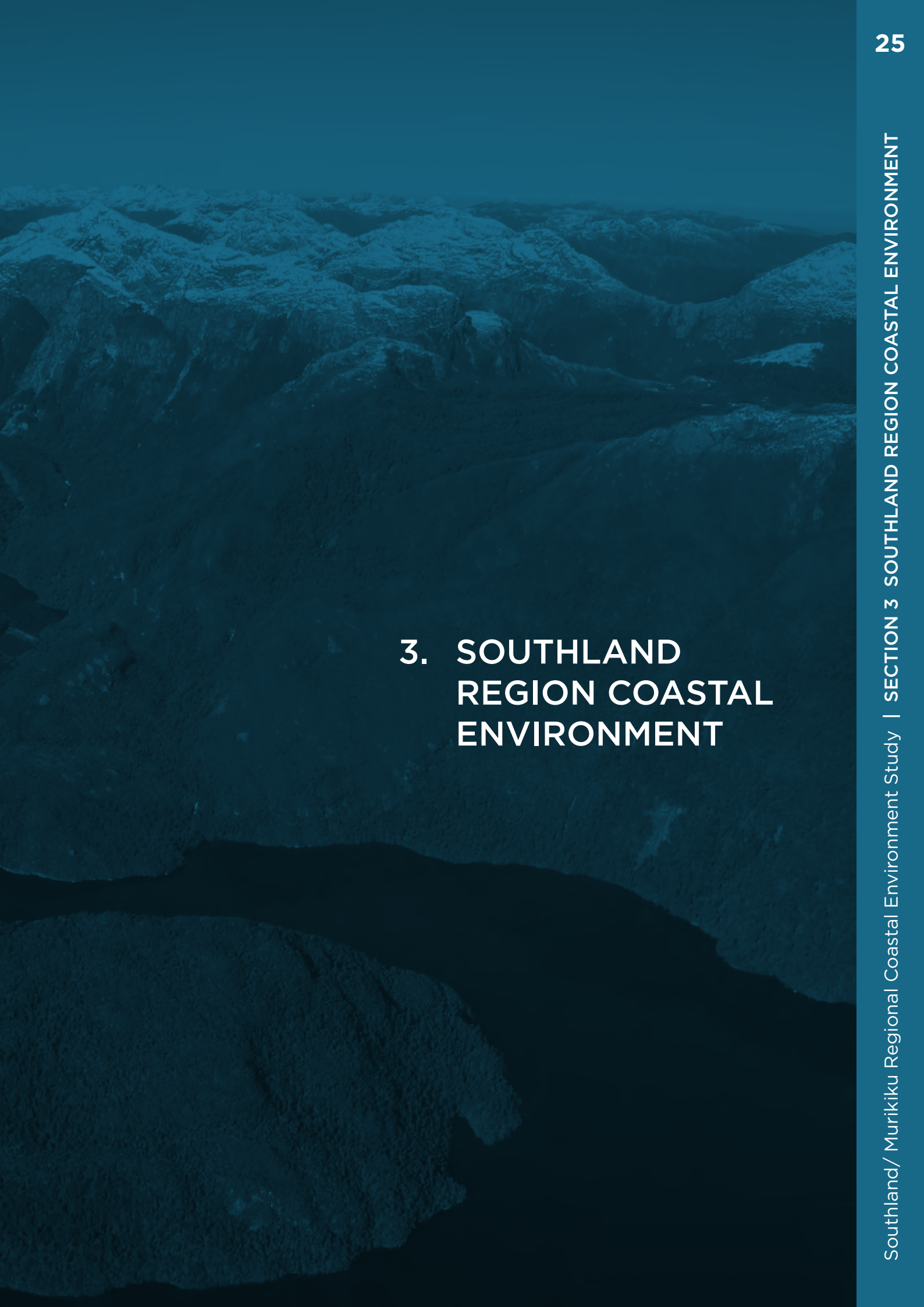
- Mainland Southland and Stewart Island’s coastline adopted and sourced from Topo50 LINZ data service, Feb 2018;
- CMA_BoundaryPlan (Southland Regional Council) polygons incorporated into the layer above LINZ coastline layer (SDC);
- The layers above when combined represent the MHWS;
- SNZ_2016 Regional Council GIS data was used as the 12-nautical mile extent, sourced from Statistics New Zealand data service, 2016;
- The Port Pegasus and Paterson Inlet CMA was used from the 2017 BML Stewart Island study;
- 10m Bathymetry line digitised (at a scale 1:15,000) from New Zealand Marine Charts 68 69 used along with other BML defined boundaries used to create the coastal unit; and
- Island extents were sourced from Topo50 LINZ data service Feb 2018.

For the remainder of the information, the study team utilised the following GIS sources:

- National GIS data provided by BML (and mapped at a variety of scales);
- Topo 50 & 250 Maps (LINZ);
- Digital contour information 20m interval (LINZ);
- Aerial image sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 3.0 New Zealand license;
- New Zealand Land Cover Database v4 (derived from the 2012-2013 LUCAS satellite imagery) and used to determine the % of land cover for each Coastal Terrestrial Area;
- Department of Conservation, conservation units (DOC);
- QE II covenants;
- River Environment Classification (NIWA);
- Land Resource Inventory (Landcare Research);
- Dredging/ trawling/ commercial fishing (MPI, NIWA and LINZ);
- Protected Marine Areas (Department of Conservation); and
- Coastal Marine Habitats and Marine Protected Areas in the New Zealand Territorial Sea: A broad scale gap analysis (Department of Conservation) and used to determine the % of marine habitats for each Coastal Marine Area. Note: *For ease of use with this Study, the 58 different habitat types have been consolidated by the Study Team into nine broader habitats that share common traits.*



Te Waewae beach looking towards Flordland. Boffa Miskell, 2018.



3. SOUTHLAND
REGION COASTAL
ENVIRONMENT



Cover page: Southern Fiordland
Boffa Miskell, 2018.
Above: Mokomoko Inlet. Boffa
Miskell, 2018.

3.1 INTRODUCTION TO THE SOUTHLAND REGION COASTAL ENVIRONMENT

The coastal environment of the Southland Region is amongst the most diverse in the New Zealand. Extending from the Catlins in the east to the rugged and wild mountains and coastal fiords in the west, and from the heavily modified areas around Invercargill to the open, largely untouched waters of the Southern Ocean south of Stewart Island, the coastal environment of Southland contains some of this country's most dynamic and ecologically rich and unmodified areas, that are often considered as a benchmark for the best of the best in the country.

Southland's coastal environment extends from Fiordland in the west (Awarua Point) round the south coast to the Catlins in the east (Waiparau Head) and includes the coast of Stewart Island/Rakiura and other nearby islands. Southland's coastal waters lie in the Tasman Sea, Foveaux Strait and the Pacific Ocean. Exposed to the prevailing westerly winds and the Southern Ocean, the Southland coastal environment retains a complex geology, where continuous seismic and erosional forces have sculpted and formed the landscape that we have today. From the sweeping, golden sandy bays of Oreti and Toetoe Bays to the rocky outcrops around the Catlins to extensive wetlands, modified agricultural land and urban centres, the coastal terrestrial environment of Southland is diverse.

The coastal environment of Southland contains a variety of naturally uncommon ecosystems including active sand dunes, coastal cliffs, coastal turfs, shingle beaches, estuaries, and lagoons. These ecosystems, although classified as being naturally uncommon, can be found in numerous locations along Southland's coastline.

The mountains and fiords of Fiordland occupy the western part of the region and represent the largest and most intact environment in the country. Due to the regularity of the indented landform of Fiordland, the extent of the coastal environment extends to the Main Divide, where the overwhelming continuity of unmodified vegetation patterns extends from ridgetop to seafloor. The scale of this is unmatched anywhere else in the country. Its Biotic patterns are amongst the richest in the country and the lack of modification here epitomises the sense of wildness, isolation and remoteness. The geological nature of these fiords ensure that there is substantially more coastline relative to land-area, which results in Southland achieving a 3,400km coastline, the longest of any region in the country.

More sheltered areas are found within the lagoons, estuaries and wetlands within the central and eastern part of the coastline and include New River Estuary, Bluff Harbour, Awarua Bay, Waituna Lagoon, as well as the extensive Awarua Plains that extend inland nearly 10km.

There are also numerous islands off the Southland mainland, of which Stewart Island is the largest. These islands are often the most unmodified in the country, with Ulva Island being a predator-free open sanctuary while Whenua Hou (Codfish Island) is a predator-free island with the highest protection in New Zealand Waters (Department of Conservation, 2011).

Paterson Inlet, which contains Ulva Island/Te Wharawhara Marine Reserve, has ecological and scientific importance. The ecological communities found within the inlet are nationally outstanding, with tube worm mounds, bryozoan reefs, a species of swimming bivalve and five species of brachiopods (Department of Conservation, 2012). The inlet has areas of important indigenous vegetation, and extensive beds of red algae and the highest diversity of algal species in New Zealand (Department of Conservation, 2012). The intertidal area is a significant habitat for wading birds, in particular the nationally critical Southern New Zealand dotterel (*Charadrius obscurus*) (Department of Conservation, 2012).

The coast and marine ecosystems provide important habitat for a number of threatened species such as the nationally endangered hoiho/yellow-eyed penguin (*Megadyptes antipodes*), tōrea pango/variable oystercatcher (*Haematopus unicolor*), the nationally vulnerable pohowera/banded dotterel (*Charadrius bicinctus*), the nationally vulnerable kawau/Stewart Island shag (*Leucocarbo chalconotus*), the nationally endangered matuku moana/reef heron (*Egretta sacra*), the nationally vulnerable tūturiwhatu / New Zealand dotterel (*Charadrius obscurus*), naturally uncommon kōtuku-ngutupapa/royal spoonbill (*Platalea regia*), nationally critical whakahao /New Zealand sea lion (*Phocarctos hookeri*) and nationally endangered tūpoupou/Hector's dolphins (*Cephalorhynchus hectori*). Sperm and right whales are also found moving through these waters (Department of Conservation Southland Conservancy, 2000) . New Zealand has the highest number of sea-birds in the world with 92 species, of which many are found in these southern regions and offshore islands of Southland.

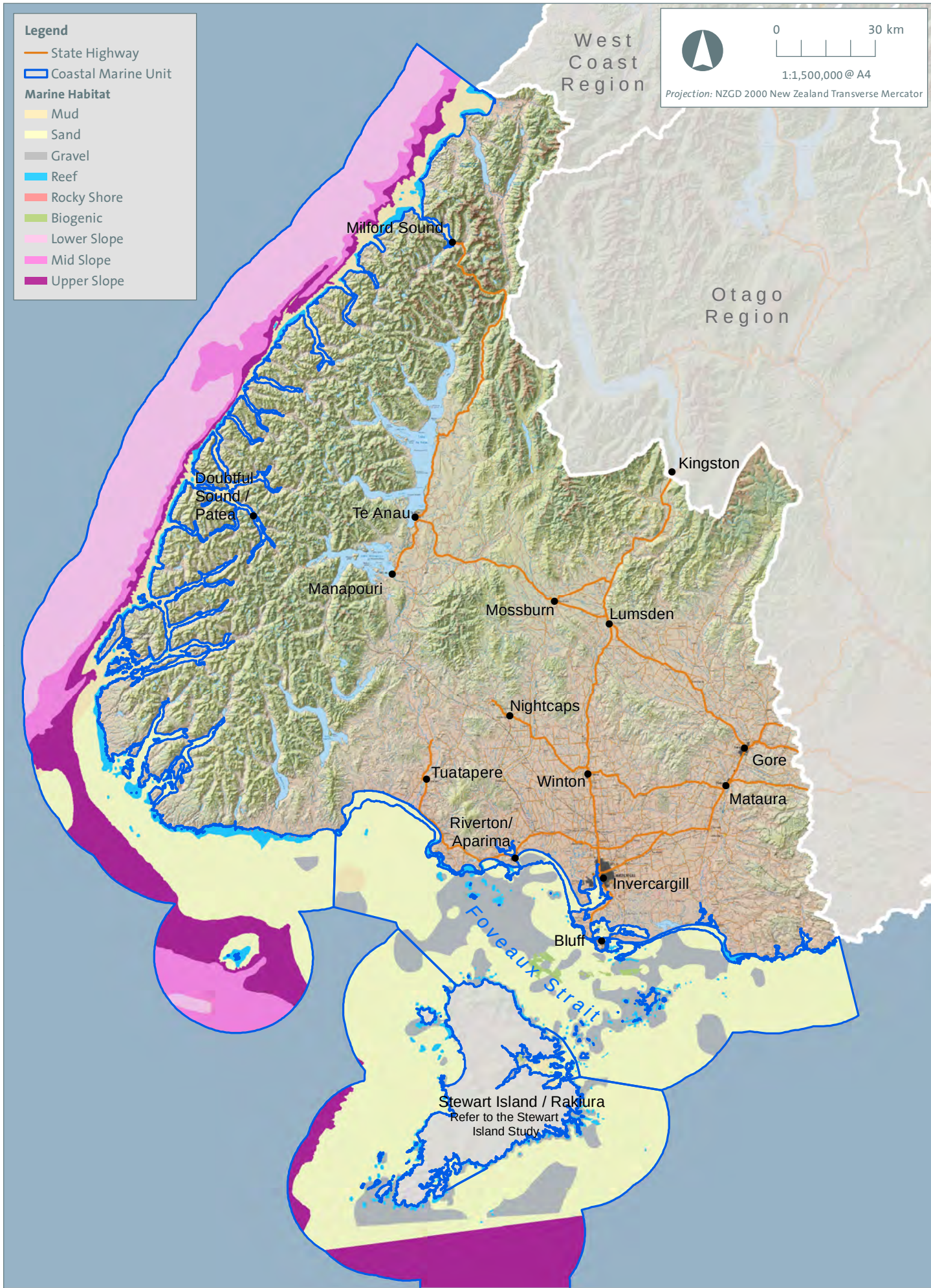


Figure 2: Marine Habitat Map.

Southland also boasts a relatively rare and large population of toheroa (*Paphies ventricosa*), a native shellfish. Populations of this size do not occur on other New Zealand beaches and they are considered a valuable treasure for the region. Because of this, the toheroa are considered a valuable species nationally, and although there is no official food gathering season, the fishery is managed under a permit system issued by Tangata Tiaki.

The diversity of the abiotic and biotic conditions in the Southland Region create extensive and varied experiential aspects. Walkways (especially the national Te Araroa Trail) provide access to the coast, with numerous roads also providing opportunities for visitors and locals to experience the coast. Opportunities also exist for surfing, diving, swimming, sailing, fishing, biking and kayaking, and the Southland Coast itself is a great location to view the aurora.

3.2 COASTAL MARINE ENVIRONMENT OF THE SOUTHLAND REGION

The coastal marine environment of Southland encompasses dynamic and extremely variable stretches of water. With broader connections to the Southern Ocean and Tasman Sea, the Southland Coastal Marine Area retains large parts that are heavily exposed to strong winds and currents that have helped shaped much of the adjacent terrestrial areas. The numerous fiords, inlets of Stewart Island and enclosed estuarine areas provide a more protected area for flora and fauna and present very different experiences for visitors and locals.

3.2.1 ABIOTIC

Southland's Coastal Marine Area is extremely diverse and is related to its variable morphology and underlying formative processes. Mixed sands and gravels predominate the broad and open beaches while rocky headlands (from ancient volcanoes) curtail the highly mobile mixing of sediment through long-shore drift.

The central waters of Foveaux Strait are frequently turbulent, due to the channelling provided by Stewart Island and the mainland by the prevailing winds. Whilst the sea floor is reasonably shallow within the Strait, although it drops off considerably west of Stewart Island into the Solander Trough.

By contrast, the predominantly sheltered coastal waters of Paterson Inlet and Port Pegasus on Stewart Island are typically above 25m depth with Paterson Inlet being highly affected by the large number of freshwater streams draining into the sea, creating a large estuarine environment of sand and mud substrates.

The fiords can be characterised by three distinct habitats: the sheltered, inner fiords with vertical rock walls, broken rocky reefs and soft bottoms; the semi-sheltered to sheltered fiord entrances, and the shallow, sandy exposed outer coast.

3.2.2 BIOTIC

A diverse and spectacular array of benthic habitats is found within parts of the Southland marine environment, the result of strong currents and nutrient rich waters flowing through areas such as Foveaux Strait.

Numerous large estuaries occupy much of the near-shore, where mud and silt dominate the benthic environment, continuously fed by river deposits. Within these more sheltered areas, currents and waves are reasonably low.

Estuaries are an important biotic system of the Southland Region and provide critical habitat for species that are ecologically, commercially, recreationally and culturally valued. They are bodies of water where freshwater from rivers and streams mix with the tidal saltwater from the sea. There is a high diversity of vegetation with sub-tidal reefs, inter-tidal mud flats and at-risk populations of seagrass (*Zostera muelleri subsp. Novazelandica*) beds to landward vegetation such as herb fields, saltmarsh, rush land and sedge land. These habitats support a diverse range of life including birds, shellfish, fish and invertebrates which depend on estuaries to live, feed, nest and reproduce. Estuaries provide stopovers for migratory bird species and many fish in New Zealand pass through them on their way up rivers. Some organisms make estuaries their permanent home while others use them to complete only part of their life cycle.

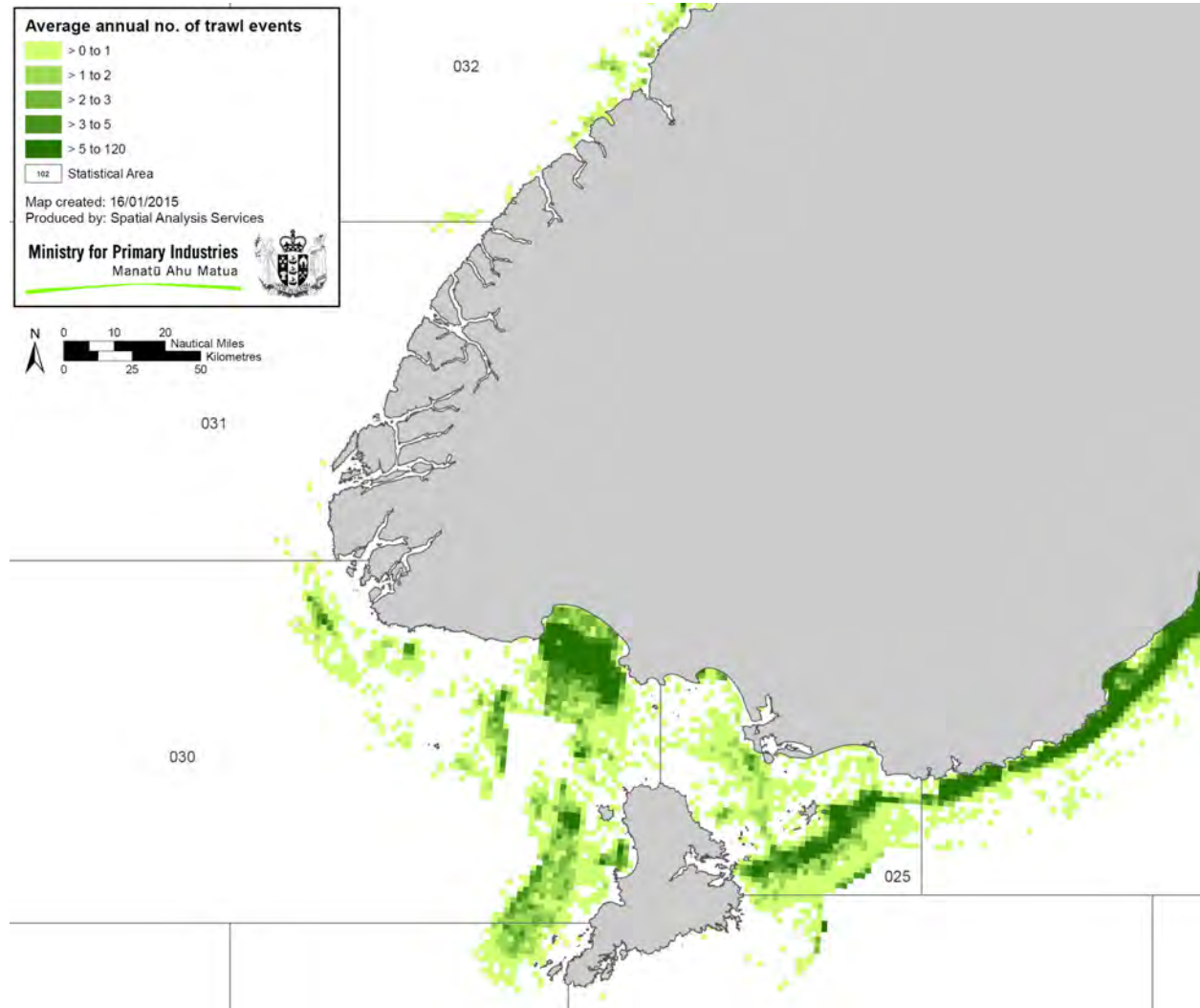


Diagram 4: Annual number of trawl events in the Southland Region [Source: MPI]

Estuaries filter contaminants from the land and protect the nearby coastal environment. The plants and animals in estuaries absorb excess nutrients from water and soil and use it for growth, effectively immobilizing pollutants. Tidal marshes, with their dense vegetation and narrow, winding channels, effectively trap sediment and remove it from floodwaters. Fringing marshes, riverine swamps, and other estuarine wetlands, like their upland counterparts, also slow floodwaters and stabilize the shore to prevent erosion. They are important for climate change adaptation and, as large sinks for carbon, they also punch above their weight for climate change mitigation.

Whilst much of the southern coastline is modified, large areas of unmodified terrestrial vegetation flank the inland catchments of Stewart Island and Fiordland, which is significant for its land/ sea ecotones from a national perspective. As a result, a diverse range of species can be found within the waters of Stewart Island, and more specifically, within the fiords, due to the forty-metre band of light penetrating through the freshwater layer and into the seawater below it.

A marine reserve within Te Awaatu Channel (The Gut) is the smallest in New Zealand and protects a fragile reef community within Doubtful Sound. A further marine reserve off Ulva Island/ Te Wharawhara provides a safe haven and nursery not only for fish and shellfish, but also for animals such as seals, penguins and other seabirds that breed on land but feed at sea. In addition to these marine reserves, there are mataitai sites in areas such as Waikawa, Oreti Beach and Paterson Inlet due to their importance to local tangata whenua in terms of fisheries. Waikawa is protected for its cockle population, Oreti Beach for its toheroa population and Paterson Inlet for its algal populations.

Marine mammals that can be found within the Southland coastal waters include populations of the nationally endangered bottlenose (*Tursiops truncatus*), common (*Delphinus delphis*), tūpoupou /Hectors's Dolphin (*Cephalorhynchus hectori*) and dusky dolphins (*Lagenorhynchus obscurus*) in addition to popoikore/leopard seals (*Hydrurga leptonyx*) which visit Southland seasonally, the nationally critical Ihupuku/Southern elephant seal (*Mirounga leonine*), the nationally critical whakahao/New Zealand sea lion (*Phocarcos hookeri*), colonies of kekeno/New Zealand fur seals (*Arctocephalus forsteri*), the nationally critical orca/killer whale (*Orcinus orca*), nationally vulnerable tohorā/southern right whales (*Eubalaena australis*), paikea/humpback whale (*Megaptera novaeangliae*) and parāoa/sperm whale (*Physeter macrocephalus*).

The nationally endangered mangō-taniwha/great white shark (*Carcharodon carcharias*), the nationally vulnerable tawaki/Fiordland crested penguin (*Eudyptes pachyrhynchus*), the nationally vulnerable basking shark (*Cetorhinus maximus*), and at-risk and declining kororā/blue penguin (*Eudyptula minor*) can also be found within these waters.

On the sea floor of Foveaux Strait lies an iconic oyster fishery. Oysters are considered a taonga species which also have recreational and commercial value to the people of Bluff and Invercargill. Trawling and dredging has occurred in large parts of the Southland marine environment for approximately 150 years, principally within Te Waewae Bay and west of Ruapuke Island between Stewart Island and the mainland. Works began to the east of Foveaux Strait near Ruapuke Island and moved west towards Stewart Island in later years. This has greatly impacted the structure of the sea floor with fishers dredging biogenic reefs and damaging the epifauna and exposing associated sediments (Cranfield, Manighetti, Michael, & Hill, 2003). This is illustrated in the annual (2015) number of trawl events map by the Ministry for Primary Industries (see Digram 4). As well as being impacted by dredging, oyster species are greatly affected by the parasite *Bonamia exitiosa*, which inhabits the oyster tissue causing fatalities in some cases (Michael et al., 2019).

EXPERIENTIAL

Experiential characteristics of natural character are the combined human response to the levels of abiotic and biotic condition that exists within the coastal environment. Policy 13 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 smells of the sea. There are strong overlaps between the terrestrial experiential values and those experienced within the marine environment.

The experiential characteristics of the marine component of Southland's coastal environment vary, from the remote and isolated parts of the fiords to the more modified and active parts of New River Estuary and Foveaux Strait. An overwhelming sense of naturalness and remoteness can be experienced in parts of Fiordland or the waters off Stewart Island, whereas quite different experiences can be obtained from within Foveaux Strait or many of the estuaries, where more modification is apparent. Estuaries are important recreational areas. People visit them year-round to boat, swim, fish, and watch birds and other wildlife.

Peoples' enjoyment is also affected by transient and sensory factors. In intertidal areas, pebble and sandy beaches, for instance, the ebb and flow of the water create different moods. The aroma of the sea and sound of the lapping or crashing waves is often associated with moods and feelings. Seasonal changes also affect experiential values, such as where fish and pods of dolphins or whales can be sighted, or types of visiting birds and seasonal blooms. The highest areas of natural character are the least modified.

3.3 COASTAL TERRESTRIAL ENVIRONMENT OF THE SOUTHLAND REGION

3.3.1 ABIOTIC

The abiotic systems of Southland's coastline are very telling of its location on the Southern Ocean and Tasman Sea. Climatic influences such as excessive wind, rain and exposure have all contributed in shaping the various landforms that can be found along this coastline.

Landforms along Southland's coast vary greatly from the enclosed, steep-walled fiords found along the Fiordland coast to the open, sweeping beaches such as Te Waewae or Oreti. Estuaries and harbours with sand spits are tucked into the mainland and separated by rocky headlands, cliffs and small beaches. Large dune systems can be found along Oreti Beach, near Mokonoko Inlet and at the Three Sisters.

An internationally important wetland complex including Toetoes, Awarua Bay, Bluff Harbour, Waituna and New River Estuaries is located between Invercargill and Fortrose. Several large river mouths feed into the estuaries or bays along the south coast, namely the Waiau, Oreti and Mataura Rivers.

Jacobs River, New River and Toetoes Estuaries tend to have a greater level of sedimentation than others along this stretch of coast.

Rainfall on average in Fiordland is between 4,000-7,000mm annually, whereas along the southern coast, rainfall on average is between 1,000-1,500 per year. Both areas experience slightly more rainfall in the

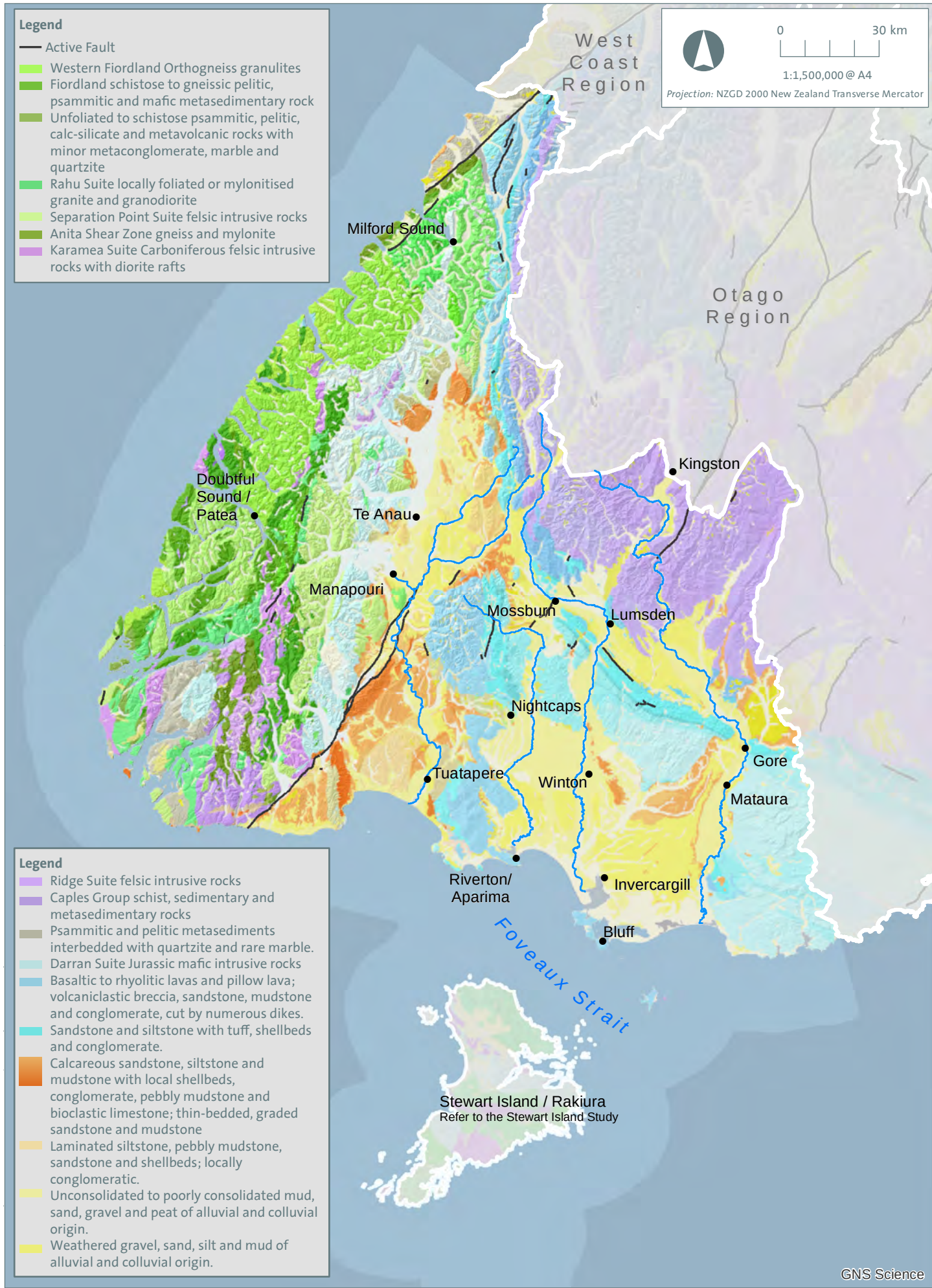


Figure 3: Geology Map.

summer than in the winter. Although Fiordland has a greater annual rainfall, it is on average warmer than the southern coastline of Southland.

Southern Fiordland receives the smallest annual sunshine hours of each of the coastal terrestrial areas, followed by Western Fiordland. Waikawa, Waipapa, Awarua, and Bluff all receive the most sunshine hours due to the flat topography along the southern coast.

3.3.2 BIOTIC

A diverse range of biotic systems are found from the extensive Fiordland forests to the lush rainforests of the Catlins coast. Along the south coast, a series of wetlands, estuaries, lagoons and harbours can be found, all with varying levels of intact margins. Many of these terrestrial systems can be found in the internationally important Awarua Wetland complex which supports a wide range of habitats for native flora and fauna and includes subalpine cushion field vegetation, which is uncommon at sea level. Southland's large tidal estuaries and coastal lagoons form the one of the most important birdlife habitats in the region. The Awarua Wetland Complex, also plays an important role as a fish nursery for a range of threatened species.

The Awarua Wetland Complex contains the Waituna Lagoon and associated peatlands which host vast populations of wading and waterfowl species. Near the New River Estuary, up to seventy-four wading and waterfowl species can be found. It also has the highest usage by trans-equatorial waders including several at risk and threatened species (DOC, 2000). These species consist of the nationally vulnerable pekepeka/ New Zealand dotterel (*Charadrius obscurus*), kūaka/eastern bar-tailed godwit (*Limosa lapponica*), tōrea/ South Island pied oystercatcher (*Haematopus finschi*), turnstone and the nationally vulnerable lesser knot / huahou (*Calidris canutus*). Various penguin breeding sites are found along the Southland coast. The nationally vulnerable tawaki/Fiordland crested penguin (*Eudyptes pachyrhynchus*) is found on the south western coast of Southland and Stewart Island, the yellow-eyed penguin in the Catlins, and the blue penguin in the Catlins and near Bluff

The exceptionally dense and intact indigenous forests of Fiordland dominate the west coast. The ecological processes, patterns and elements clearly demonstrate a natural and pristine environment within Fiordland. The southern coast ranges from highly modified farmland to large remnant forests found along the coast with long, sweeping sandy beaches backed by exotic marram grass and dunelands.

3.3.3 EXPERIENTIAL

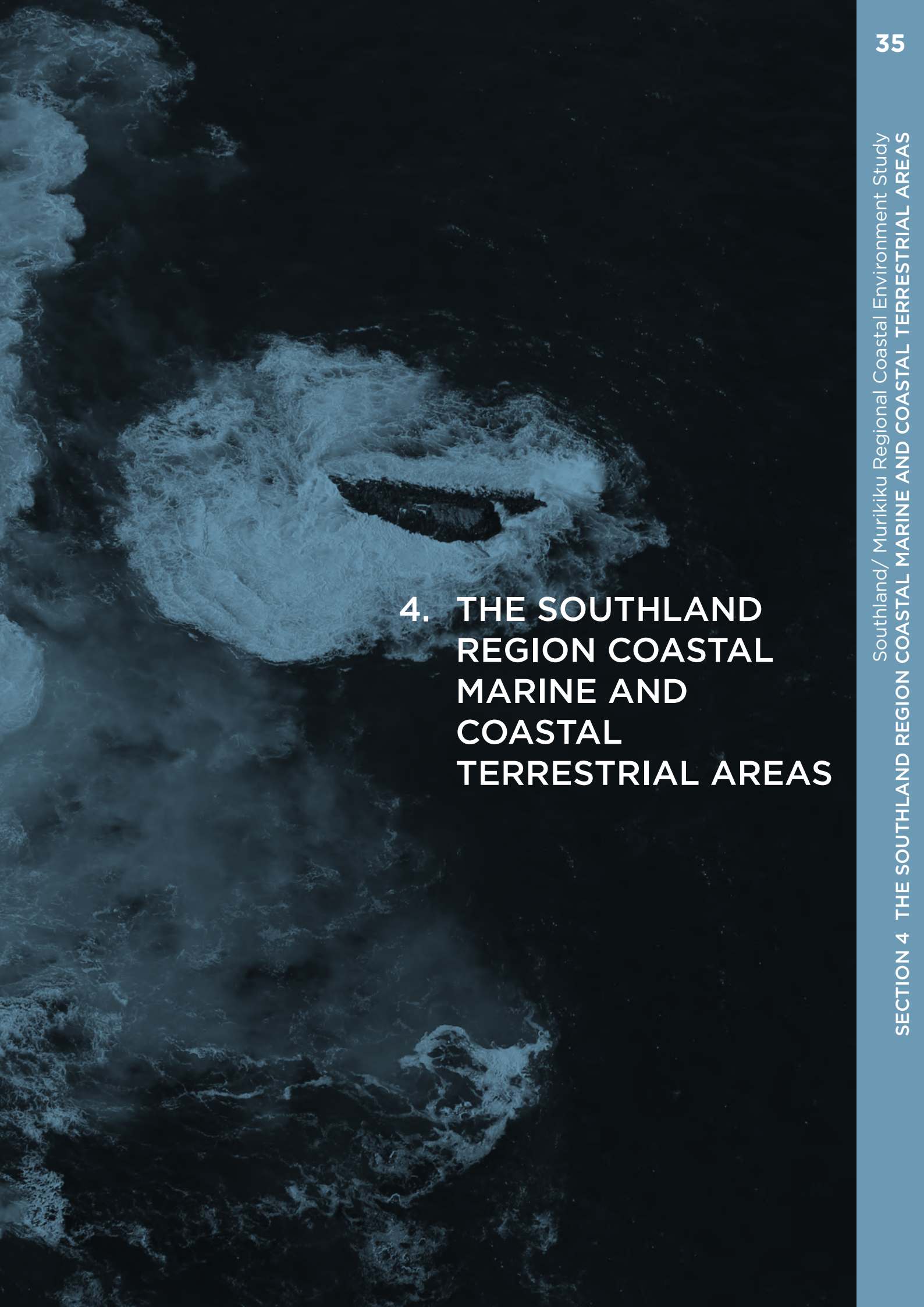
The experiential aspects along Southland's coast are amongst the best throughout New Zealand. The feeling of isolation, remoteness and wildness are overwhelming when experiencing the impressive Fiordland coast. Beaches and rocky headlands along the southern coast provide a great local asset to experience the truly rugged coastline that is lashed by the high seas of Foveaux Strait.

The presence of dolphins, kekeno/New Zealand fur seals (*Arctocephalus forsteri*), the nationally critical whakahao/New Zealand sea lion (*Phocarcots hookeri*) and penguins along the coast and in the water truly amplifies the experience and naturalness this coast has to offer. Birdwatching is easily accessible, especially at key areas of the Awarua Wetland Complex to Invercargill and other townships located on the estuaries or harbours.

Recreational opportunities range from tramping in the steep mountains to gathering food along the beaches and rocky headlands. Boat cruises, kayaking or scuba diving in Fiordland provides an up-close experience to wildlife. Blue cod (*Parapercis colias*), and kōura papatea/rock lobster (*Jasus edwardsii*), Pāua/rock lobster (*Haliotis iris*) and the famous Bluff oyster's fisheries form large commercial operations along this coast as well.



4. THE SOUTHLAND
REGION COASTAL
MARINE AND
COASTAL
TERRESTRIAL AREAS



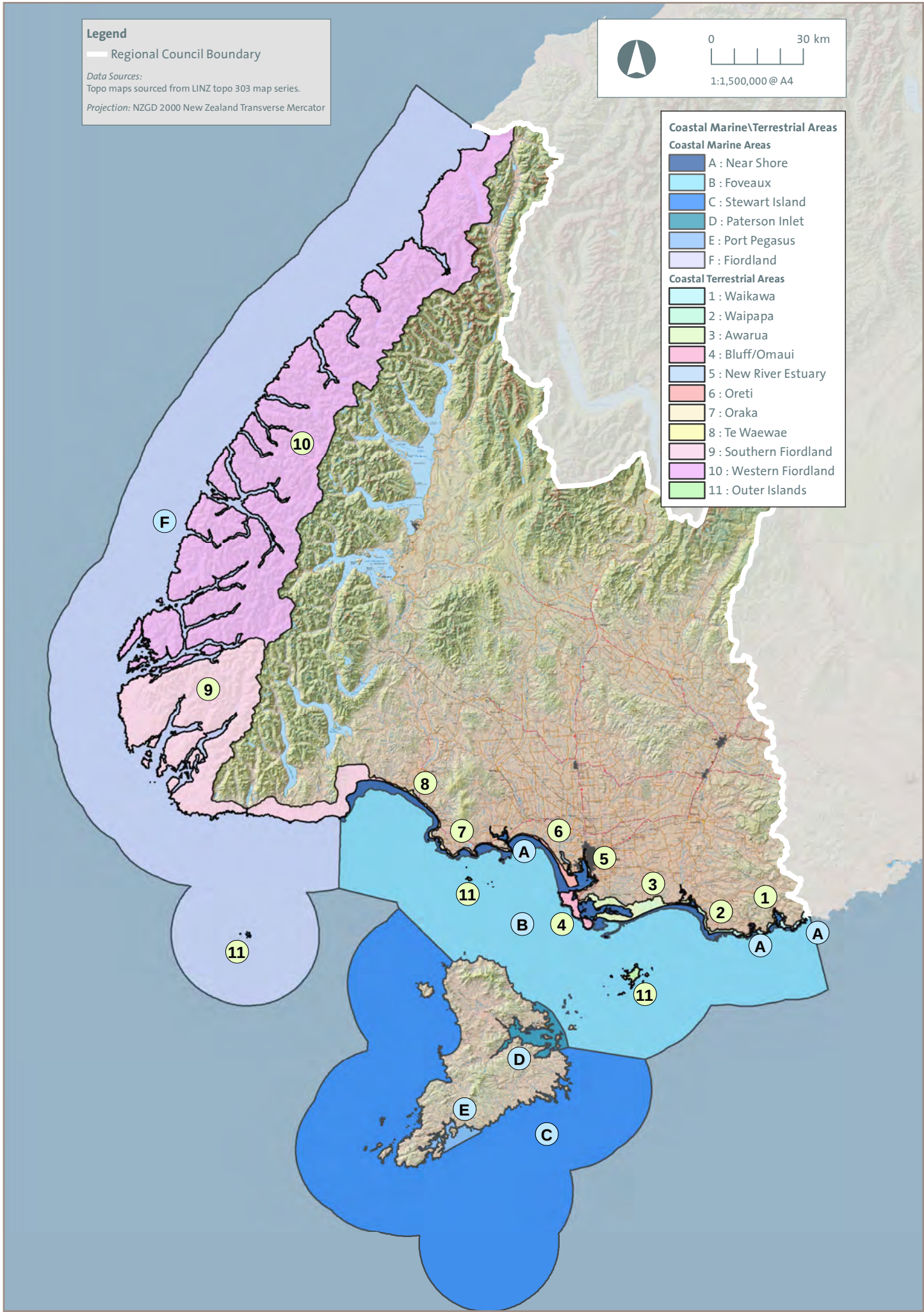


Figure 4: Southland Coastal Marine and Terrestrial Areas.

The Southland coastal environment has been divided into 17 Coastal Marine and Coastal Terrestrial Areas. Six Coastal Marine Area (A-F) and 11 Coastal Terrestrial Areas (1-11) have been identified, described and mapped. (Refer to Figure 4):

COASTAL MARINE AREAS (CMA)	COASTAL TERRESTRIAL AREAS (CTA)
Coastal Marine Area A: Near Shore	Coastal Terrestrial Area 1: Waikawa
Coastal Marine Area B: Foveaux	Coastal Terrestrial Area 2: Waipapa
Coastal Marine Area C: Stewart Island	Coastal Terrestrial Area 3: Awarua
Coastal Marine D: Paterson Inlet	Coastal Terrestrial Area 4: Bluff
Coastal Marine E: Port Pegasus	Coastal Terrestrial Area 5: New River Estuary
Coastal Marine Area F: Fiordland	Coastal Terrestrial Area 6: Oreti
	Coastal Terrestrial Area 7: Oraka
	Coastal Terrestrial Area 8: Te Waewae
	Coastal Terrestrial Area 9: Southern Fiordland
	Coastal Terrestrial Area 10: Western Fiordland
	Coastal Terrestrial Area 11: Outer Islands

The following pages outline in more detail the relevant abiotic, biotic and experiential characteristics and values of each Coastal Marine and Coastal Terrestrial Area at the Level 3 scale. Within each of these CMA's and CTA's are smaller areas of high and very high natural character. Where applicable, these smaller areas have been tabulated at the end of each CMA and CTA's descriptions. This more refined identification represents the 'Level 4' scale.

Previous overleaf: Rocky outcrop on Stewart Island. Boffa Miskell, 2018.



View overlooking sand bar within Awarua Bay. Boffa Miskell, 2018.

4.1 COASTAL MARINE AREA A: NEAR SHORE

The Near Shore Coastal Marine Area spans the southern coastline of Southland from Sand Hill Point to Waiparau Head. The general landscape formation has a shallow depth of 0-30 metres, predominantly sandy habitat and is highly exposed (Department of Conservation & Ministry of Fisheries, 2011).

The long sweeping, sandy bays and beaches such as Te Waewae, Kawakaputa, Colac, Oreti, Toetoes, Haldane and Porpoise are separated by rocky headlands and regionally important estuaries, lagoons and harbours which form part of the Awarua Wetland Complex. These include: Jacobs River Estuary, New River Estuary, Bluff Harbour, Awarua Bay, Toetoes Estuary, Haldane Estuary and Waikawa Harbour.

There is a Marine Mammal Sanctuary within Te Waewae Bay and along the Catlins Coast from Toetoes Bay to The Brothers Point. Refer to Figure 5 for the extent of the Near Shore Coastal Marine Area.

ABIOTIC

An analysis of this CMA's habitat type comprises of 59% sand; 19% reef; 14% mud; 5% gravel; 2% biogenic and 1% rocky shores. The approximate size of this CMA is 42,000 hectares.

The Near Shore Coastal Marine Area between Te Waewae Bay to Waiparau Head is characterised by a rocky shoreline with large tidal estuaries and sweeping, sandy beaches. The Coastal Marine Area has a diverse range of hydro-systems including tidal lagoons, shallow drowned valleys, waituna type lagoons and hapua type lagoons.

The intertidal habitats are mostly made up of rocky shorelines consisting of hard bedrock and loose material ranging in size from small pebbles and boulders to large, immovable rocky slabs. This rocky intertidal layer often merges into soft sediments of sand and mud. The estuaries and harbours along this stretch of coast are predominately soft-bottom habitats with extensive tidal flats exposed for long periods of time during low tide. The majority of this Coastal Marine Area is very exposed to the Southern Ocean and wave action or strong currents can prevent sediments from settling which results in the rocky bedrock continuing into deeper water.

A nationally significant, petrified fossil forest located at Curio Bay sits on an intertidal shore platform. The 160-million-year-old fossil forest exposes logs and stumps from eroding sandstone.

The water depth is predominantly shallow (10metres or less) within this marine area especially near the shore. Most the of deep-water waves arrive from the south west resulting in high energy waves along the

exposed west and south coastline. The north and north-east facing coasts tend to be more protected. The waves slow down once they feel the bottom of the seafloor upon approaching land. The waves bend to match the contours of the seabed and transfer water energy along the coast forming a longshore current. A powerful, longshore coastal drift is evident along the Southland coastline and generally operates west to east. However, near the Waiau River mouth the longshore drift is east to west. This results in more erosion being seen on the east of the Waiau River mouth than on the west. As a result, dynamic processes are largely intact.

Water quality of the Near Shore Coastal Marine Area varies, it is generally of higher quality away from rivers and streams. Historical land reclamation within New River Estuary has resulted in more sedimentation and effected the flushing of the estuary. In addition to New River Estuary, Jacobs River Estuary and Toetoes Bay drain well-developed agricultural catchments and include several industrial discharges. This has resulted in a lesser water quality compared to the remaining Near Shore areas.

Some offshore trawling, dredging and potting activity is apparent, notably within Te Waewae Bay, Oreti Beach and south of Brothers Point.

BIOTIC

The Near Shore Coastal Marine Area which consists of intertidal flats of estuaries and harbours are often highly productive with much of the animal life is beneath the surface. Kelp forests are often found along the wave-exposed rocky coasts. The rocky reefs around Waipapa Point have populations of rimurapa/bull kelp (*Durvillaea antarctica*). Due to the location of this Coastal Marine Area abutting the land, and with much of the land being grazed and/ or modified, some biotic components have been influenced by this modification, through sedimentation, water run-off, increased level of structures and vessel movements.

The estuaries and harbours see less wave action resulting in a more stable seafloor bottom. At risk seagrass (*Zostera muelleri subsp. Novazelandica*) and saltmarsh plants can easily establish in addition to crabs and snails being able to move around on the sediment surface.

There are mataitai areas in Waikawa Harbour which is protected for its cockle population and Oreti Beach for its toheroa (*Paphies ventricosa*) population. Oreti Beach has nationally significant toheroa beds found in the intertidal zone, which are the largest in New Zealand.

The soft sediments also support dense populations of macroscopic invertebrates, notably polychaete worms, molluscs and crustaceans, many of them active burrowers that vigorously rework the sediment (Darby, J; Fordyce, R; Mark, A; Probert, K; Townsend, C., 2003). The sediment flats present a wealth of potential food which in turn creates important feeding grounds for fish and wading birds.

The estuaries and harbours provide extensive rearing and spawning habitats for marine and freshwater fish species which include native fish such as the at risk taiwharu/giant kōkopu (*Galaxias argenteus*), the nationally vulnerable kanakana/lamprey (*Geotria australis*) and the tuna kuwharuwharu/longfin eel (*Anguilla dieffenbachii*) (Environment Southland, 2013). These waters also act as a nursery for flatfish species, specifically pātiki/flounder (*Rhombosolea spp.*). Inanga/whitebait (*Galaxias maculatus*) species commonly breed in these waters, spawning in the flooded bankside vegetation. Cockles can also be found in abundance in these waters.

There are two Marine Mammal Sanctuaries within this Coastal Marine Area, one is within Te Waewae Bay and the other spans the stretch of coastline from Toetoes Bay to The Brothers Point. Marine mammals that frequent this coast include tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*), the nationally critical whakahao/New Zealand sea lion (*Phocartos hookeri* and kekeno/New Zealand fur seals (*Arctocephalus forsteri*). Nationally vulnerable tohorā/southern right whales, (*Eubalaena australis*) may also be seen along their migratory path which crosses through Te Waewae Bay.

Significant birdlife exists within the estuaries, lagoons and harbours including migratory species from the northern hemisphere. The Awarua Wetland Complex ranks in the top five most important wading bird habitats in New Zealand. This wetland complex is internationally recognised and is an integral part of world wildlife habitat. The wading and waterfowl species include pārekareka/spotted shags (*Stictocarro punctatus*), gulls, the at risk tītī/sooty shearwater (*Puffinus griseus*), tōrea pango/variable oyster catchers (*Haematopus unicolor*), the nationally vulnerable pohowera/ banded dotterel (*Charadrius bicinctus*), tītī/mottled petrel (*Pterodroma inexpectata*), the nationally vulnerable Caspian tern (*Hydroprogne caspia*), the nationally endangered Matuku-hūrepo/Australasian bittern (*Botaurus poiciloptilus*), sandpipers, tattlers, greenshanks, turnstone and the kuaka/ eastern bar-tailed godwit (*Limosa lapponica*). As well as the wetland there is also a significant penguin breeding habitat in Curio Bay near Waikawa.

EXPERIENTIAL

The experiential aspects of this Coastal Marine Area vary from the exposed rocky platforms to the enclosed tidal estuaries. Weather extremes can drastically change the experiential values from pleasant to rough and wild when the waves and wind intensify.

This Coastal Marine Area is and has been historically heavily influenced by people, due in part to the close proximity to settlement areas such as Invercargill, Riverton and Bluff. Most of the estuaries are surrounded by roads or a town/city which has resulted in modifications in the form of jetties, bridges and most notably the port at Bluff Harbour. The highest areas of natural character are the least modified and this is where greater levels of more wild and remote experiences can be found.

Recreational opportunities in swimming, bird watching, gamebird hunting, snorkelling, gathering pāua (*Haliotis iris*) or crayfish and fishing. The entire stretch of coast is a mahinga kai area where food is gathered, especially Inanga within lagoons and river mouths. Yachting is particularly popular within Bluff Harbour and Awarua Bay. Windsurfers can be seen Awaura and Te Waewae Bays.

Seasons also affect experiential values in this Coastal Marine Area, where abundant birdlife and pods of dolphins or whales can be sighted. Porpoise Bay and Te Waewae Bay are well known for local pods of tūpoupou Hector's dolphin (*Cephalorhynchus hectori*).

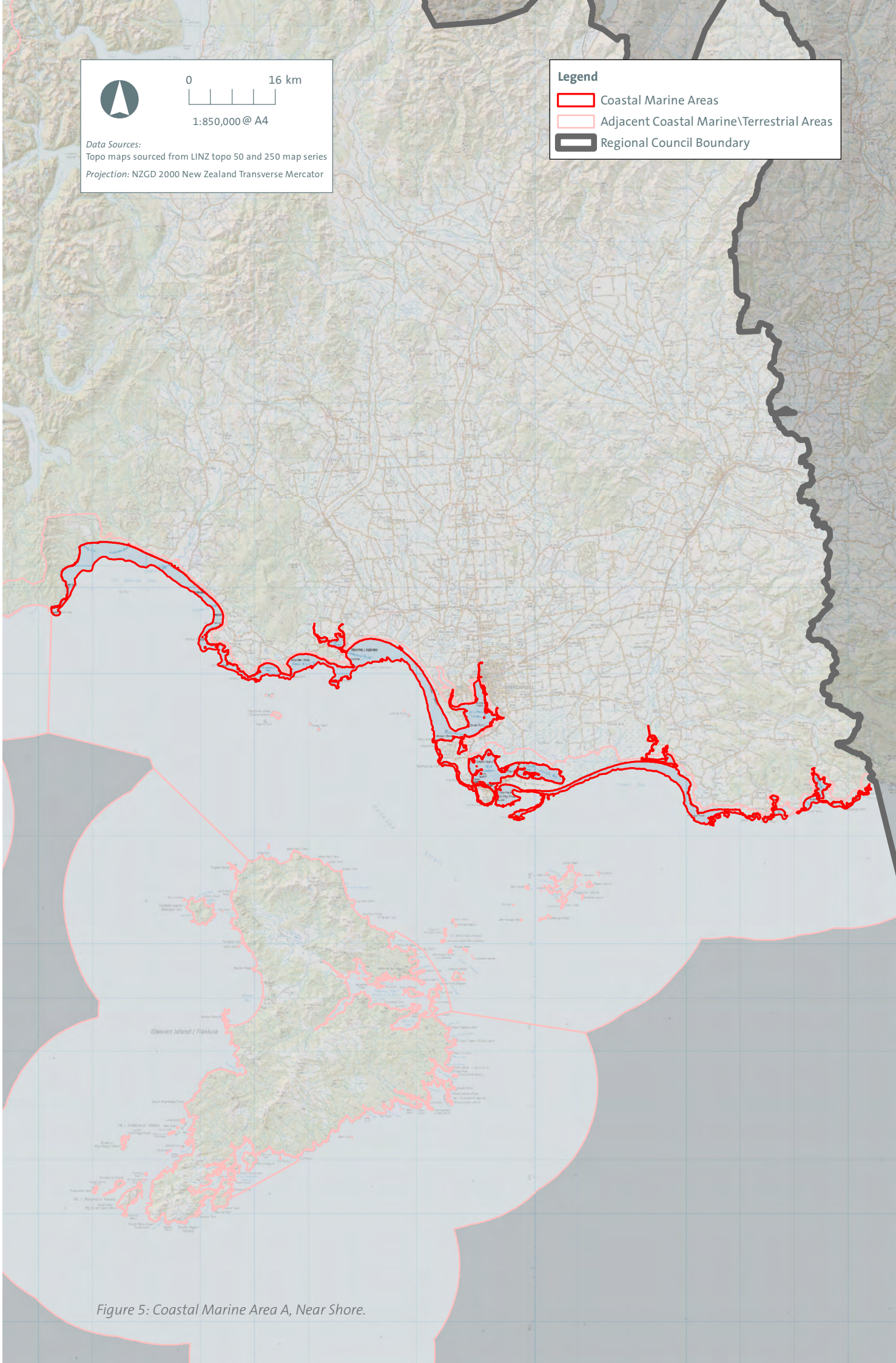


Figure 5: Coastal Marine Area A, Near Shore.

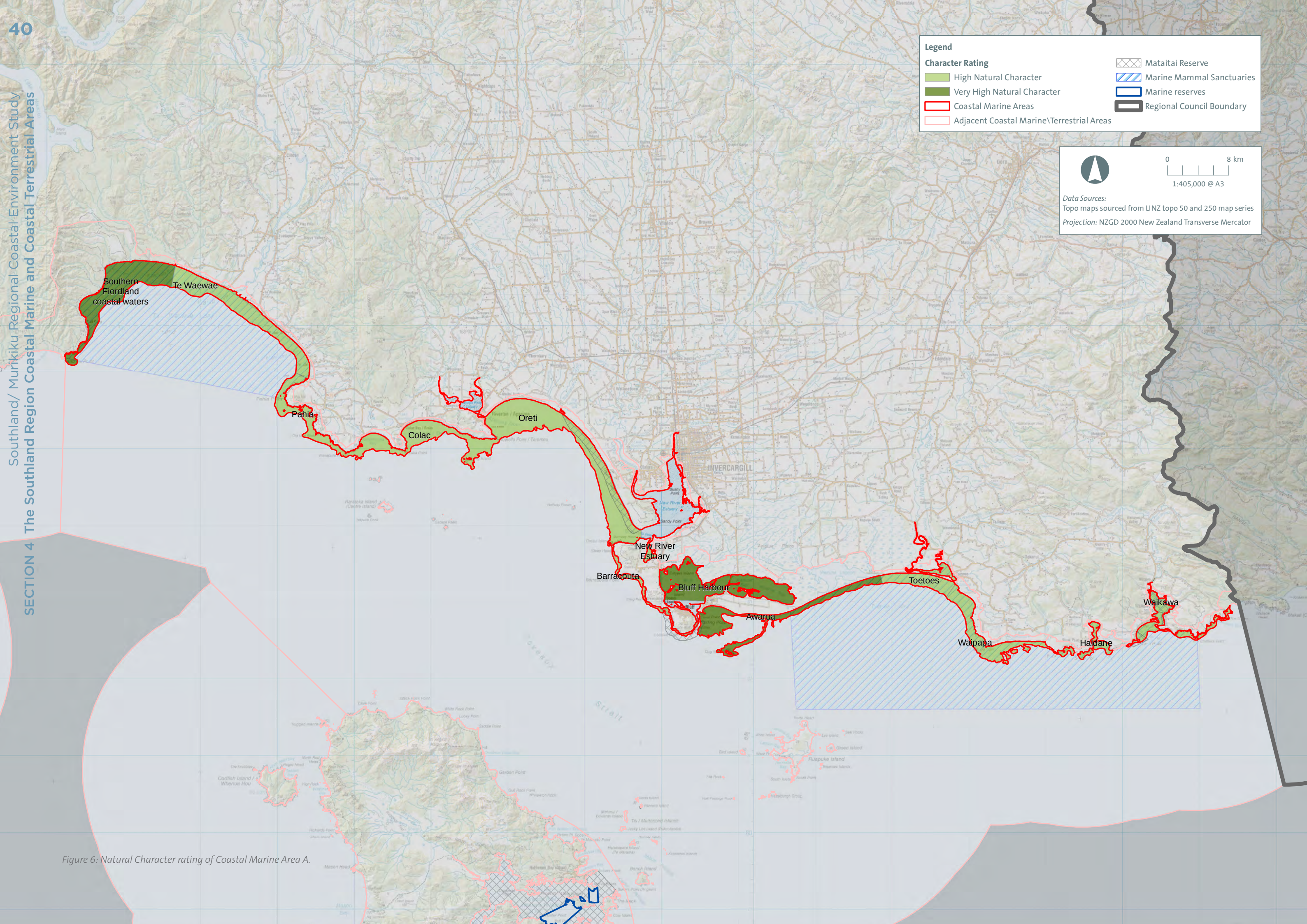


Figure 6: Natural Character rating of Coastal Marine Area A.



Above: Northern view of the Catlins coastline. Boffa Miskell, 2018.
Left: New Zealand Long Fin Eel. Boffa Miskell, 2013

Level 3 Rating: Coastal Marine Area A Near Shore

DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH	✓	✓	✓
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		HIGH	

Coastal Marine Area A: Near Shore

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 6

REFER TO COASTAL TERRESTRIAL AREAS 1-9 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WAIKAWA	H	H	VH	H	- Waikawa Estuary is a regionally important landform. Marine Mammal Sanctuary. - Curio Bay is the best example of a fossilised Jurassic forest in New Zealand. - Porpoise Bay often has significant populations of tūpoupou (Hector's dolphin, <i>Cephalorhynchus hectori</i>) present. - Extensive kelp forests are found on the wave exposed rocky platforms. - Waters are broadly intact. - Provides sheltered environment for fish. - Important habitat for wading birds in Waikawa Harbour.	- Small modification includes a jetty. - Some offshore trawling occurs
HALDANE	H	VH	H	H	- Haldane Estuary is a regionally important landform. - Extensive kelp forests are found on the wave exposed rocky platforms. - Important habitat for wading birds in Haldane Estuary. - Waters are broadly intact. - Marine Mammal Sanctuary.	Some offshore trawling and dredging occurs
WAIAPAPA	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values. - Marine Mammal Sanctuary.	Some offshore trawling and dredging occurs
TOETOES	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values. - Marine Mammal Sanctuary.	- Low water quality due to draining farmland and industrial discharge points. - Some offshore trawling and dredging occurs
AWARUA	VH	VH	VH	H	- Highly productive and intact waters. - Continuity of vegetation sequences between marine and terrestrial area. - Important habitat for wading birds. - Marine Mammal Sanctuary. - High experiential values with yachting popular.	Surrounding terrestrial area is broadly intact.

Continued from previous page

Coastal Marine Area A: Near Shore

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 6

REFER TO COASTAL TERRESTRIAL AREAS 1-9 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
BLUFF HARBOUR	VH	VH	VH	H	- Highly productive and intact waters. - Continuity of vegetation sequences between marine and terrestrial area. - Important habitat for wading birds. - High experiential values with yachting popular.	Surrounding terrestrial area is broadly intact.
BARRACOUTA	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values.	Some offshore trawling and dredging occurs.
ORETI	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values.	Some offshore trawling and dredging occurs.
COLAC	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values.	Some offshore trawling and dredging occurs.
PAHIA	H	H	VH	H	- Unmodified near shore marine environment. - High experiential values.	Some offshore trawling and dredging occurs.
TE WAEWAE	H	H	VH	H	- Marine Mammal Sanctuary. - Te Waewae Bay often has significant populations of tūpoupou (Hector's dolphin, <i>Cephalorhynchus hectori</i>) present. - Largest bay on the Southland coast. - Abundant fish species and marine mammals. - Nationally critical. - High experiential values.	- Extensive offshore trawling and dredging occurs within Te Waewae Bay. - Waiau River water flows have been modified.
SOUTHERN FIORDLAND COASTAL WATERS	VH	VH	VH	VH	- Highly productive and intact waters. - Continuity of vegetation sequences between marine and terrestrial area. - Marine Mammal Sanctuary. - Te Waewae Bay often has significant populations of Hector's dolphin present. - Very high experiential values.	Very limited modification along the coastline. Offshore trawling, potting and dredging occurs within Te Waewae Bay. Coastal trawling occurs near Sand Hill Point and Port Craig



View overlooking Foveaux Strait with Ruapuke Island in the foreground. Boffa Miskell, 2018.

4.2 COASTAL MARINE AREA B: FOVEAUX

The Foveaux Coastal Marine Area occupies Foveaux Strait and the open waters further eastwards to the regional boundary. This area includes the turbulent stretch of water located between the mainland and Stewart Island. This coastal marine area’s general landscape formation is approximately 30-200 metres in depth, predominantly gravel habitat, and high current exposure (Department of Conservation & Ministry of Fisheries, 2011).

It is at its narrowest point 27km in width and includes the coastal waters around Ruapuke Island, the northern small offshore islands off Stewart Island, Dog Island and Raratoka Island (Centre Island). Despite Foveaux Strait being reasonably shallow, there is a persistent tidal drift that passes from west to east. Boats cross this water body regularly between Bluff and Stewart Island, and biotically, this is the home to the Bluff-oysters. Refer to Figure 7 for the extent of the Foveaux Coastal Marine Area.

ABIOTIC

An analysis of this CMA’s habitat type comprises of 70% sand, 26% gravel, 2% reef, 1% mud and 1% biogenic. The approximate size of this CMA is 550,600 hectares.

The western entrance to Foveaux Strait is the most exposed coastal area in New Zealand. Large oceanic swells are dissipated into this high-energy environment, similar to swells pounding an exposed beach. Depth varies from west to east: the effect of wave energy is greatest in the northwest, but tidal currents are stronger in the east. These factors determine the composition of the seabed sediments and shape the habitats within the Strait .

The seabed is coarse gravel overlaid with fine gravel and sand that is formed into waves, banks, dunes, and scour channels by swells and currents. The seabed of this Coastal Marine Area is generally flat and reasonably shallow between 10 and 88 metres deep. Water flow into the western entrance is relatively unimpeded, and the tidal current accelerates through the eastern strait. The flow of water within the Strait is likely to be complex and probably form eddies in the central strait. Severe south-westerly storms with large oceanic swells and high wind-driven currents move vast amounts of sediment capable of changing the landscape of the seafloor. Sediment transport is greatest in the north-western entrance to the Strait, the northern strait, and eastern strait where the shallow depth accentuates these effects. These areas are characterised by highly mobile coarse sediments with little fine sand and usually no animals and plants living

on the seabed. Generally, the central and south-eastern strait becomes progressively more sheltered from swell and tide by Stewart Island. Seabed sediments in these areas become increasingly less mobile and the surface sediments are finer (Ministry of Fisheries, 2009).

Foveaux Strait is primarily influenced by warm subtropical water of the Southland Current that is highly productive and supports high production of phytoplankton. The strong tides through Foveaux Strait ensure this water mass is well mixed, both vertically and horizontally. The annual primary production in Foveaux Strait can vary from year to year depending on a number of factors including the influence of the Southland Current (Ministry of Fisheries, 2009).

BIOTIC

This Coastal Marine Area encompasses the strong currents and nutrient rich waters of Foveaux Strait. Due to extensive dredging, bottom trawling, and set net activity across Foveaux Strait over the past 150 years the seabed has become greatly modified. Effects from these activities include modification of sediment characteristics through sediment removal and turnover, and damage to large, habitat forming fauna (Baird, Hewitt, Wood, New Zealand, & Ministry for Primary Industries, 2015). Whilst this stretch of coastal water has been subject to modification there remains a diverse assemblage of habitats. Prior to dredging, this Coastal Marine Area would have supported biogenic reefs with a rich associated fauna of oysters, fragile lace corals, sponges and other invertebrates (Department of Conservation, 2012).

These rocky and biogenic reefs are recognised as important nursery areas for fish species and foraging grounds for seabirds. Much of the rocky outer shore and near-shore reef environments have been commercially fished, notably for pāua (*Haliotis iris*), crayfish and rawaru/blue cod (*Parapercis colias*).The softer outer shore (comprising sand and mud) including shelf environments to the north of this Coastal Marine Area, has been affected by oyster dredging. This has impacted on the composition of the seabed biota, particularly in regard to the diversity and presence of the biogenic reef communities, which once occurred prolifically within Foveaux Strait.

The Foveaux Strait ecosystem comprises of four main seabed types and three distinct groups of benthic fauna. Seabed types include mobile gravels, hard rocky reef habitat, mobile sand over stable sand wave structures, and stable seabed sediments comprising of a mixture of sands and gravels. Benthic fauna can be classified in to animals living in the seabed sediments (infauna), especially the mobile gravels, the most visible being tuatua (*Paphies subtriangulata*), large and small dog cockles, and geoducs; sessile animals (that do not move) such as bivalves (oysters and mussels), sponges, sea squirts, and bryozoans; and mobile animals on the seabed such as starfish, crabs, urchins, gastropods (circular saws and volutes), and octopuses (Ministry of Fisheries, 2009).

Notably, the submarine conditions favour the natural growth of edible oysters, which are the basis of a thriving industry centred at Bluff. The Bluff oysters are harvested by wooden fishing vessels of small to moderate size using dredges. These oysters are renowned for their high quality and size throughout New Zealand. The seafloor within Te Waewae Bay and Oreti Beach are commonly trawled offshore for flatfish (*Pleuronectiformes spp.*), rig (*Mustelus lenticulatus*) and elephant fish (*Callorhinchus spp.*). Rock lobster (*Panulirus spp.*) is found on the rocky seafloor offshore from Bluff Peninsula.

Nationally endangered tūpoupou/Hector’s dolphin (*Cephalorhynchus hectori*) and nationally critical kera wēra/orca (*Orcinus orca*) are relatively common around the south-eastern coast, notably between Fortose and Brothers Point. This is also a significant area for nationally vulnerable tohorā/southern right whales (*Eubalaena australis*) sightings. This species is likely to use these waters as breeding grounds especially as they return to the mainland following steady population increases in the Sub-Antarctic waters.

Along the coast of the South Island there are approximately four-hundred to six-hundred breeding pairs of the endemic and nationally endangered hoiho/yellow-eyed penguin (*Megadyptes antipodes*).In Southland, these colonies are at North Head, Slope Point, Flaxy Head (Curio Bay) and Te Rere Reserve at The Brothers Point, which is the largest breeding colony of hoiho in the southern Catlins. In 2012 two-hundred and fourteen nests were found in the Catlins, compared to the second largest breeding colony in Otago which had one-hundred and eighty-four nests (Ellenberg & Mattern, 2012).

Kekeno/New Zealand fur seals (*Arctocephalus forsteri*) haul out on rocky shores and the nationally critical whakahao/New Zealand sea lion (*Phocarcos hookeri*) favour sandy or pebbly beaches within this Coastal Marine Area including The Brothers Point, White Head and Porpoise Bay itself, although the number using them is small. A number of sealions have been resident at Waipapa Point since 1995.

EXPERIENTIAL

The relative exposure of this Coastal Terrestrial Area creates strong wild and remote experiences. Many people experience this Coastal Marine Area through travelling its waters by boat from the mainland to Stewart Island, for a variety of reasons, including hunting of young mutton birds. The international port at Bluff receives cargo of timber, aluminium ore and oil. The changing weather in this part of the country can lead to a variety of experiences.

The nationally endangered tūpoupou/Hector’s dolphin (*Cephalorhynchus hectori*) and nationally critical kera wēra/orca (*Orcinus orca*) are relatively common around the south-eastern coast with casual interactions occurring amongst swimmers and surfers, notably at Te Waewae Bay, Oreti Beach and Porpoise Bay. The population of nationally endangered tūpoupou/Hector’s dolphin (*Cephalorhynchus hectori*) in Porpoise Bay is also nationally significant, as it is one of the few places in New Zealand where these dolphins are easily viewed by the public.

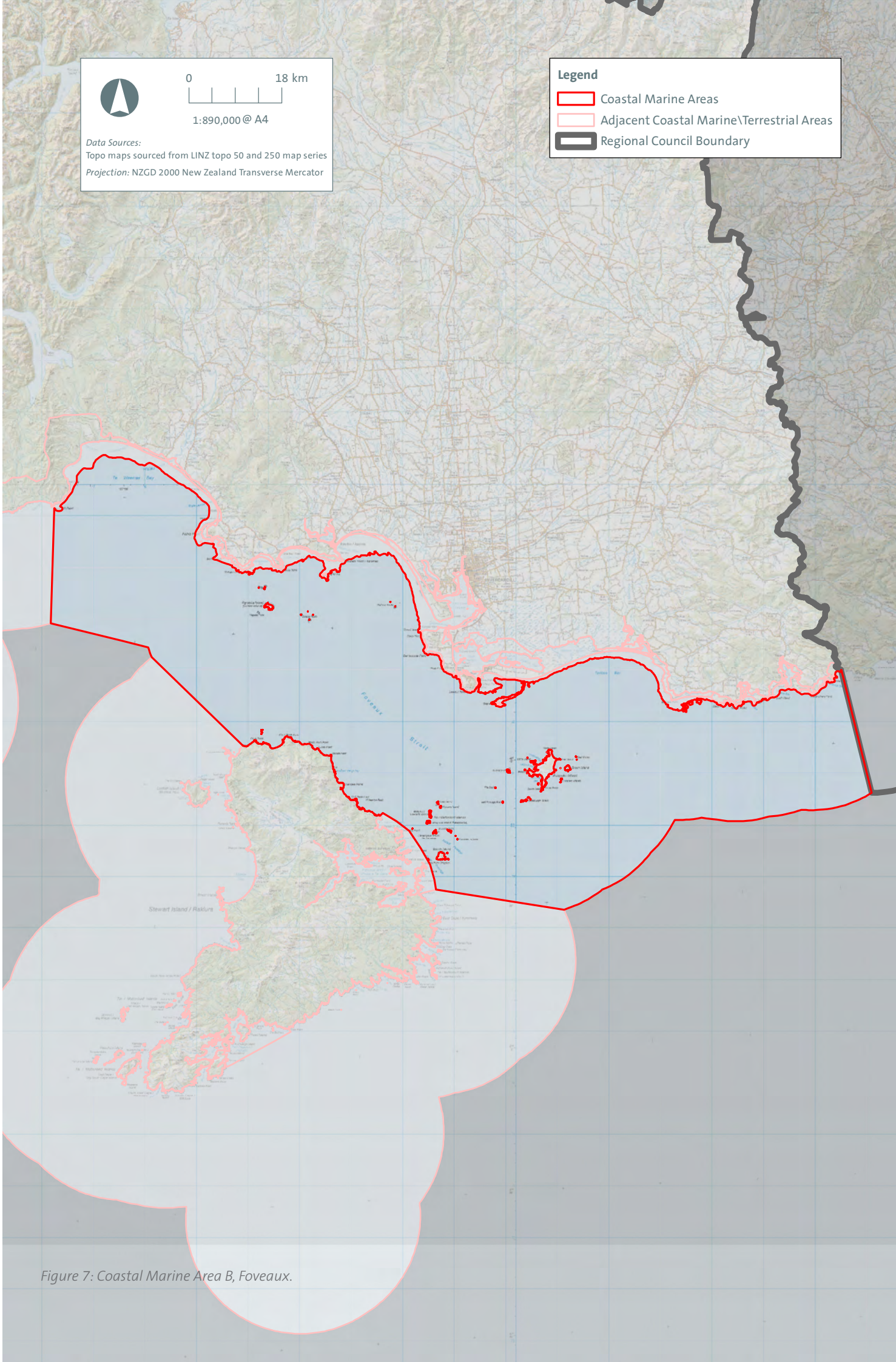
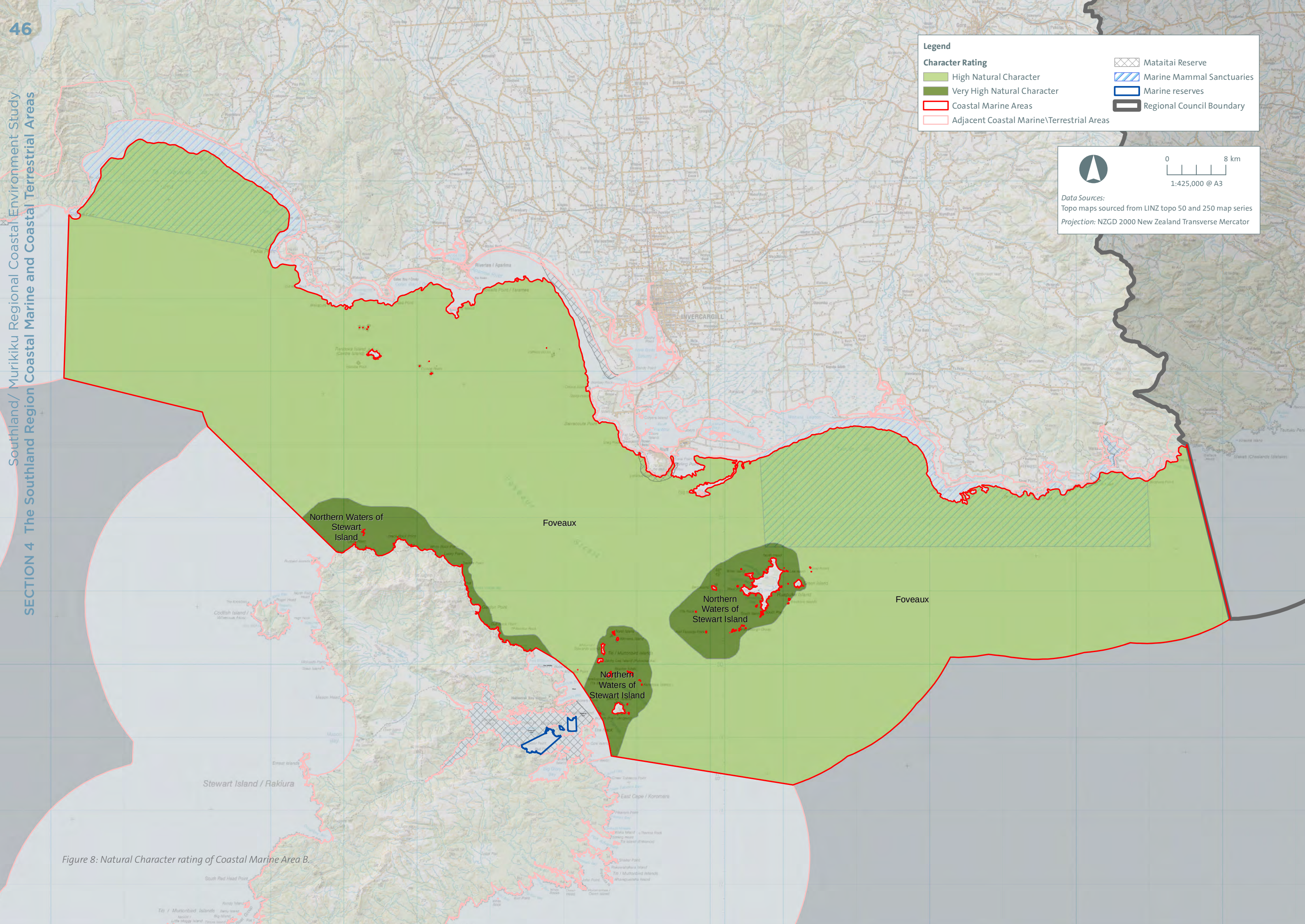


Figure 7: Coastal Marine Area B, Foveaux.



Coastal Marine Area B: Foveaux

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 8

REFER TO COASTAL TERRESTRIAL AREAS 11 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
FOVEAUX	H	H	H	VH	- Several islands provide rocky reefs and exhibit high levels of naturalness. - Strong currents and nutrient rich waters are broadly intact. - Rock lobster is found on the rocky seafloor offshore from Bluff Peninsula. - High abundance of fish present. - High experiential values, notably around opportunities to viewing marine mammals. - Small breeding colonies of the nationally endangered yellow-eyed penguin, notably at North Head, Slope Point, Flaxy Head (Curio Bay) and Te Rere Reserve at The Brothers Point. - Several at risk and threatred bird species such as the nationally endangered reef heron and the nationally critical New Zealand dotterel (<i>Charadrius obscurus</i>) are present in this Coastal Marine Area. - Nationally endangered tūpoupou/Hector's dolphin (<i>Cephalorhynchus hectori</i>) and nationally critical kera wēra/ orca (<i>Orcinus orca</i>) are relatively common around the south-eastern coast, notably between Fortrose and Brothers Point. - Nationally vulnerable tohorā/southern right whales (<i>Eubalaena australis</i>) present. - Strong wild and remote experiences.	- Trawling and dredging for commercial fishing occurs in areas of this Coastal Marine Area. Bottom trawling predominantly occurs to the south-east of Ruapuke Island and in Tewaewae Bay, with dredging efforts being concentrated to areas immediately north-west of Oban and near Bluff Harbour. - Main shipping area traverses this Coastal Marine Area.
NORTHERN WATERS OF STEWART ISLAND	VH	VH	H	VH	- Several islands provide rocky reefs. - Strong currents and nutrient rich waters are broadly intact. - Rock lobster is found on the rocky seafloor offshore from Bluff Peninsula. - High abundance of fish present. - High experiential values, notably around opportunities to viewing marine mammals. - Several at risk and threatened bird species such as the nationally endangered reef heron and the nationally vulnerable New Zealand dotterel (<i>Charadrius obscurus</i>) are present in this Coastal Marine Area. - Nationally vulnerable tohorā/southern right whales (<i>Eubalaena australis</i>) present. - Strong wild and remote experiences.	- Bottom trawling, dredging and set netting is present in this area particularly from Ackers Point to Saddle Point and near the Titi/ Muttonbird Islands. - The bays between Saddle Point and Gull Rock Point are anchorage points for ships waiting to enter Bluff Harbour.

Cosy Nook and Pahia Hill overlooking Foveaux Strait.
Boffa Miskell, 2018.





View overlooking the Stewart Island Coastal Marine Area. Boffa Miskell, 2018.

4.3 COASTAL MARINE AREA C: STEWART ISLAND

The exposed and open waters surrounding Stewart Island extend from Foveaux Strait through to the Southern Ocean. This Coastal Marine Area includes the open and southern coast east and west of Stewart Island, including the numerous small more sheltered bays. The general landscape formation of this area is 30 – 200 metres in depth, predominantly sandy habitat, and has both high currents and high levels of exposure (Department of Conservation & Ministry of Fisheries, 2011).

The more indented bays of Paterson Inlet and Port Pegasus support their own coastal marine area. This coastal marine area contains habitats, topographical features and a large number of important biological communities and populations that are absent or rare in the coastal waters south of Banks Peninsula. The strong currents and rich nutrient waters provide for a diverse and spectacular array of benthic habitats. Iwi own and manage many of the islands in this area for the customary harvest of tītī/muttonbirds. Refer to Figure 9 for the extent of the Stewart Island Coastal Marine Area.

ABIOTIC

An analysis of this CMA's habitat type comprises of 56% sand, 31% upper slope, 10% gravel and 3% reef. The approximate size of this CMA is 676,000 hectares.

This open, exposed Coastal Marine Area retains an unmodified abiotic environment. Topographically, the benthic environment is reasonably consistent, being part of the broad Campbell Plateau where Stewart Island is part of and averaging 80-150m deep. Further west (and beyond the 12-nautical mile limit), the seafloor drops to elevations lower than 600m. Small localised pockets of submerged rocks at depths of between 0.5m and 20m are located some 22km south-east of Port Pegasus, around North Trap and South Trap. Some trawling has historically occurred off the west coast of Stewart Island.

The composition of the ocean waters in this Coastal Marine Area are a combination of subtropical waters and Sub-Antarctic waters. The water currents of the Southern Ocean around Stewart Island are some of the strongest in the world, which form part of the broader Southern Ocean system moving in a west to east direction around Antarctica. The currents in this area are driven almost exclusively by the wind.

BIOTIC

There are a wide variety of protected marine mammal, fish and bird species that utilise these exposed waters. Notable species include the nationally critical whakahao/New Zealand sea lion (*Phocartos hookeri*), kekeno/New Zealand fur seals (*Arctocephalus forsteri*), nationally vulnerable tohorā/southern right whales (*Eubalaena australis*), the nationally endangered mangō-taniwha/great white shark (*Carcharodon carcharias*), the at risk tītī/sooty shearwater (*Puffinus griseus*), tītī/south georgian diving petrel (*Pelecanoides georgicus* 'Codfish Island'), and tītī/cook's petrel (*Pterodroma cookii*). Tītī/muttonbirds are also prevalent along much of this coastline, notably found amongst the numerous smaller offshore islands. Stewart Island is also one of the few places in New Zealand where kiwi can be found.

There are no marine mammal sanctuaries within this Coastal Marine Area. There are, however, many islands, such as Bench Island and Whero Rock, which have significant rookeries and breeding grounds for seals. A number of migratory whale species also visit the coasts and occasionally the inlets of Stewart Island/Rakiura. Aihe/common dolphin (*Delphinus delphis*) and the nationally endangered terehu/bottlenose dolphin (*Tursiops truncatus*) are regular visitors to the coast.

Fish and shellfish that are found within the waters surrounding Stewart Island include pāua (*Haliotis iris*), rāwaru /blue cod (*Parapercis colias*), barracuda (*Sphyræna spp.*), seven types of gill sharks and the nationally endangered mangō-taniwha/great white shark (*Carcharodon carcharias*).

While much of the sea floor remains unmodified in this Coastal Marine Area, the waters to the west of Stewart Island have been dredged and bottom trawled. Much of this activity has occurred to the north-west of this Coastal Marine Area with some set-net activity occurring closer to the shore.

EXPERIENTIAL

The open and exposed waters of this Coastal Marine Area are amongst the most remote in New Zealand. Seafaring vessels travelling within this area are either travelling to the more sheltered waters of Port Pegasus or towards the Sub-Antarctic Islands.

Due to the varied and often extreme currents and persistent wind, encountering this Coastal Marine Area will be highly dependent on the conditions. Extreme swells and currents can make a journey extremely rough and overwhelmingly wild. Few people experience the true wilderness of this Coastal Marine Area.

Closer to the coastline, however, the experiential characteristics vary around Stewart Island and include commonalities such as remoteness, isolation, beauty and high degrees of naturalness. Rocky coves, small sandy beaches and small islands, including the dramatic tītī/muttonbird Islands near South West Cape/Puhiwaero present a wildness experience unlike any other area in New Zealand. Crashing waves, driving wind and high swells dictate these highly transient conditions. Other sensory factors, including aromas of the sea and the sound of the lapping or crashing waves is often associated with moods and feelings. Seasons also affect experiential values in this Coastal Marine Area, where fish and pods of dolphins or whales can be sighted, or types of visiting birds and seasonal blooms. The highest areas of natural character are the least modified, and since the vast majority of Stewart Island offers this, it can be said that this Coastal Marine Area is within the national and international psyche as one of the most remote and virtually untouched parts of New Zealand.

Level 3 Rating: Coastal Marine Area C Stewart Island			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓		✓
HIGH		✓	
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

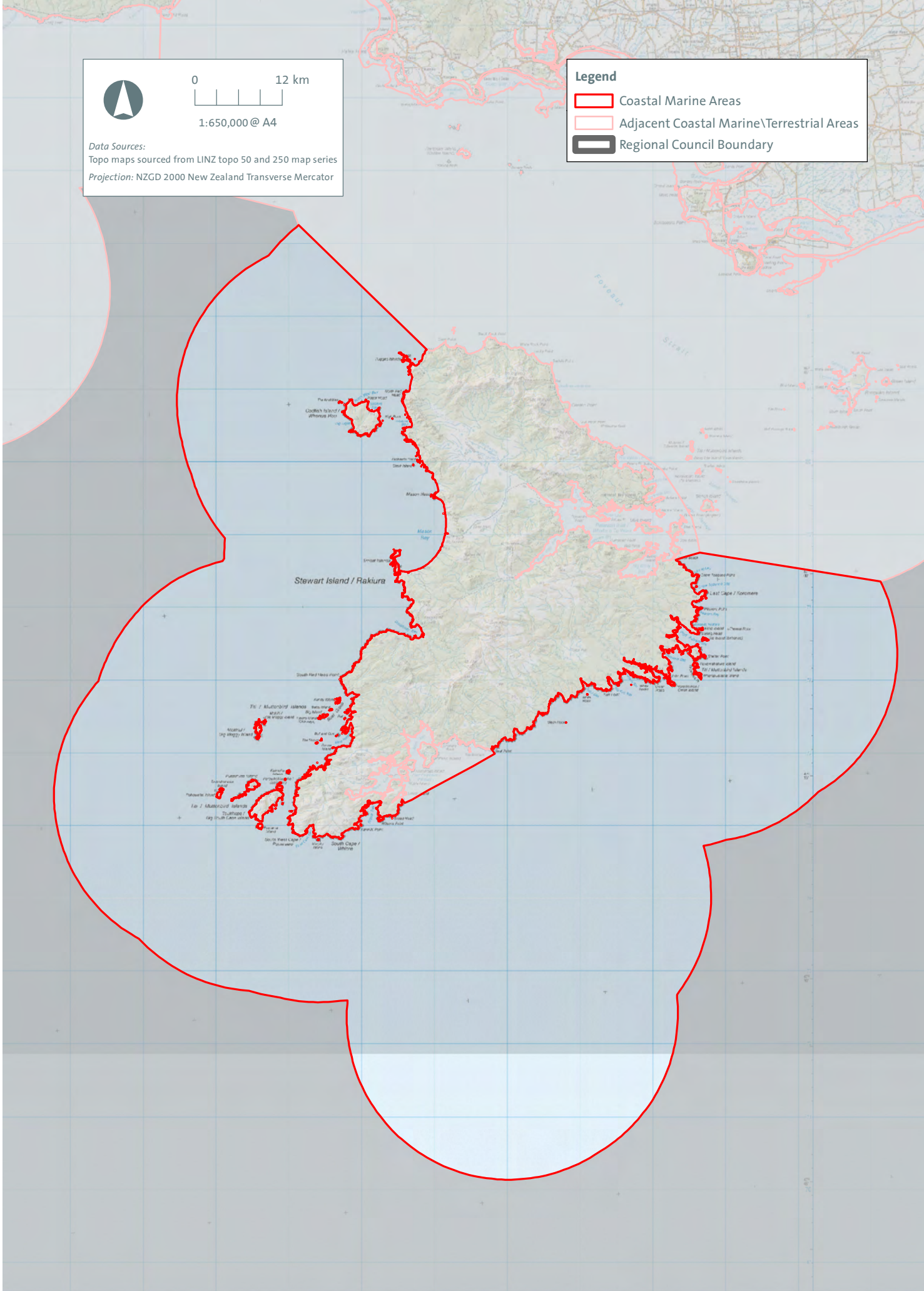


Figure 9: Coastal Marine Area C, Stewart Island.

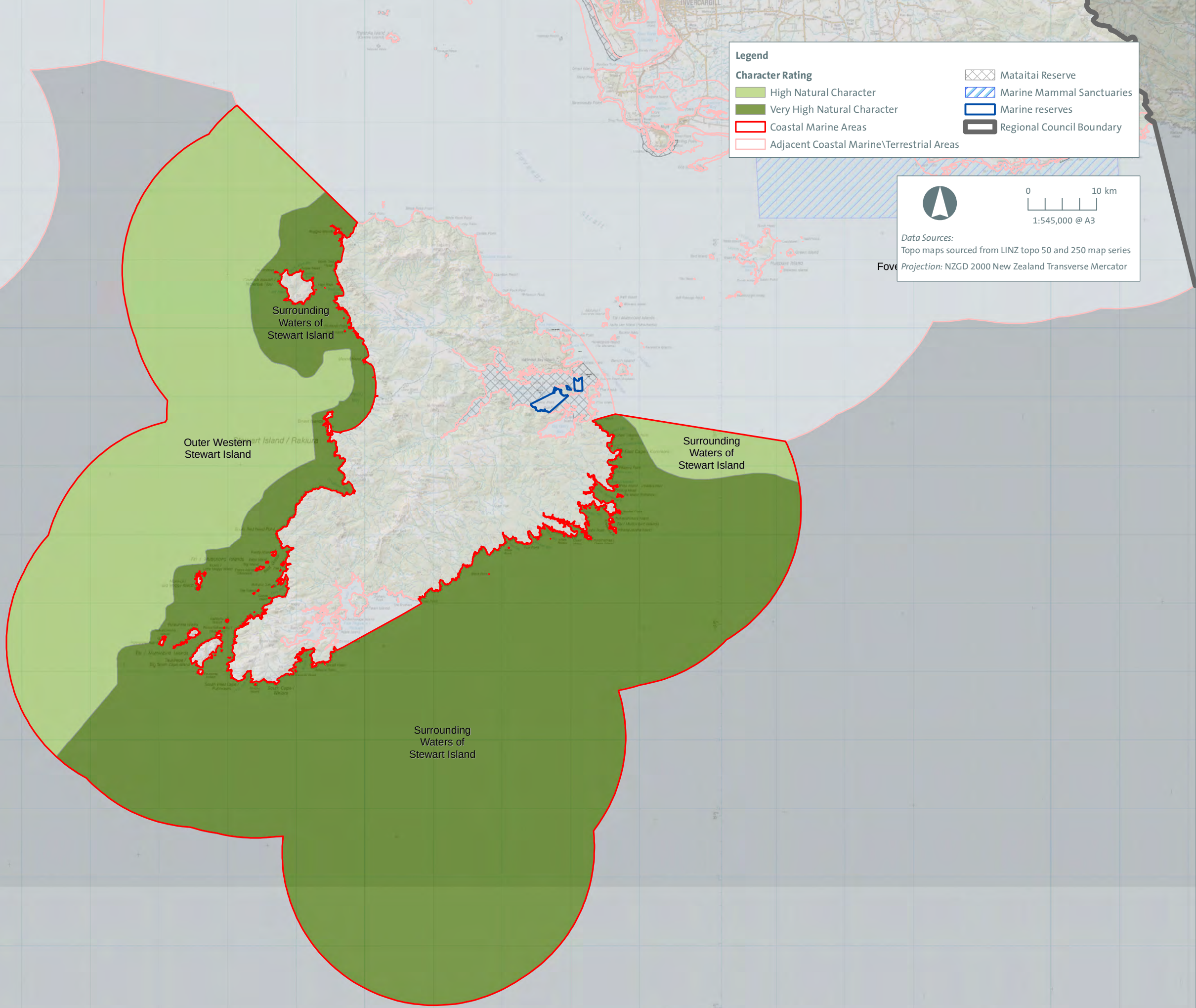


Figure 10: Natural Character rating of Coastal Marine Area C.

Coastal Marine Area C: Stewart Island

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 10

REFER TO COASTAL TERRESTRIAL AREAS 11 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
SURROUNDING WATERS OF STEWART ISLAND	 VH	 VH	 VH	 VH	- A series of short headlands with jagged margins extend into the open ocean. - Numerous offshore islets and exposed reefs, surrounded by surging white water. - High currents. - Bounds the Subtropical Convergence. The Tasman Sea water masses moderate the climate and protect it from the cooler Sub-Antarctic water from the south. - Known as an active area for the nationally endangered mangō-taniwha/great white shark, (<i>Carcharodon carcharias</i>). - Extremely high (globally) diversity of rocky reef species. - High diversity of macroalgal species. - Wild and scenic, open seascape. - Rugged and treacherous due to exposure to prevailing currents. - Remote and rugged character. - Dominant forces of the waves tides and winds, contribute to wildness and isolation. - Very high degree of naturalness due to no or very limited human activity. - Sunset opportunities. - Known as an active area for the nationally endangered mangō-taniwha/great white shark, (<i>Carcharodon carcharias</i>). - Wild and scenic, open seascape. - Rugged and treacherous due to exposure to prevailing currents. - Dominant forces of the waves tides and winds, contribute to wildness and isolation.	- The rocky outer shore and near-shore reef environments have been commercially fished, especially for pāua (<i>Haliotis iris</i>), crayfish and rawaru/blue cod, (<i>Parapercis colias</i>). - The soft outer shore (sand and mud) and shelf environments to the north have been affected by oyster dredging and changes to the composition of the seabed biota will have occurred, particularly in regard to the diverse biogenic reef communities once reported to have occurred in Foveaux Strait. As a consequence, this small part of this Area is rated as High. - Trawling and dredging for commercial fishing occurs in areas of this Coastal Marine Area.
OUTER WESTERN STEWART ISLAND	 H	 H	 H	 VH	- Known as an active area for the nationally endangered mangō-taniwha/great white shark, (<i>Carcharodon carcharias</i>). - Wild and scenic, open seascape. - Rugged and treacherous due to exposure to prevailing currents. - Dominant forces of the waves tides and winds, contribute to wildness and isolation.	Bottom trawling, set netting and dredging for commercial fishing occurs in this part of the Coastal Marine Area.



View overlooking the Paterson Inlet Coastal Marine Area. Boffa Miskell, 2016.

4.4 COASTAL MARINE AREA D: PATERSON INLET

This Coastal Marine Area is the largest coastal inlet on Stewart Island, and is reasonably sheltered from the prevailing westerly winds. The area has an average depth of 0-30 metres, predominantly gravel habitat, and high currents in terms of exposure (Department of Conservation & Ministry of Fisheries, 2011).

This Coastal Marine Area also retains Stewart Islands' most modification, with Big Glory Bay harbouring the majority of the Southland regions aquaculture. Despite the modification (which is centred on only a few parts of the Coastal Marine Area, the majority is relatively untouched, supporting an overwhelming sense of naturalness, notably within the more sheltered parts of the Inlet. There is a marine reserve located between southern Paterson Inlet and Ulva Island, which supports an array of endemic species. Boating, fishing and diving also occur more frequently within this Coastal Marine Area than others around the island (Boffa Miskell Ltd, 2017). Refer to Figure 11 for the extent of the Paterson Inlet Coastal Marine Area.

ABIOTIC

An analysis of this CMA's habitat type comprises of 32% sand, 23% mud, 22% gravel, 19% reef and 4% biogenic. The approximate size of this CMA is 14,000 hectares.

This Coastal Marine Area comprises a large inlet containing a wide diversity of habitats including exposed and sheltered waters, coasts and beaches, tidal flats and estuaries. Hydro-systems in this area include deep drowned valleys and coastal embayments. There are also a range of beach habitats evident in this Coastal Marine Area from exposed, well sorted sandy beaches near the entrance of the Inlet, through to the more sheltered beaches located near the head of the inlet.

Water depths within this Coastal Marine Area are typically below 25m, apart from isolated areas between The Neck and Ulva Island which are deeper. A large number of freshwater watercourses drain into this Coastal Marine Area, with Freshwater River being the largest and retaining the Islands largest estuary. Much of the estuarine environment comprises sand and mud substrates, whilst other, more deeper parts are comprised of rocky reefs and steep walls. The estuarine mudflats at the head of Paterson Inlet and around the upper reaches of its bays and arms are some of the few in New Zealand still in their natural state. They are considered vital for the functioning of the entire inlet.

The coastline is intricate and numerous islands are contained within this Coastal Marine Area. Despite the relative sheltered nature of this Coastal Marine Area, there are strong tidal currents evident in some more

exposed areas. The tidal reaches entering Paterson Inlet form part of a near pristine freshwater system now rare in New Zealand, with low sediment inputs. Brackish waterways are evident at the head of the Inlet with tidal influences extending some 5km upstream from the estuary in Freshwater River.

Paterson Inlet along with Port Pegasus are the southern-most temperate inlets in New Zealand.

BIOTIC

Large areas of unmodified terrestrial vegetation flank the inland catchments containing this Coastal Marine Area which is significant for its land/ sea ecotones from a national perspective. Consequently, this Coastal Marine Area contains some of the largest areas of near pristine marine habitat surrounded by catchments of native vegetation in New Zealand. A mataitai reserve covers Paterson Inlet/Whaka a Te Wera in addition to Ulva Island/ Te Wharawhara Marine Reserve which covers 1075 hectares, or about 15% of the inlet adjoining Ulva Island. This marine reserve provides a safe haven and nursery not only for fish and shellfish, but also for animals such as seals, penguins and other seabirds that breed on land but feed at sea (DOC, 2013).

Within the broader Coastal Marine Area, this area represents one of the richest shallow water brachiopod habitats in the world. It also contains some unique biogenic reefs (for example, serpulid tubeworm reefs, bryozoan reefs) and extensive beds of red algae specifically *Lenormandia chauvinii*, including the highest diversity of algal species in New Zealand. Extensive kelp forests (e.g. giant kelp *Macrocystis pyrifera*) are also found here.

The wetland/estuary complexes of Freshwater and Rakeahua Rivers which drain into this Coastal Marine Area are important feeding habitats for various wader species on Stewart Island (more broadly) as well as acting as a habitat for Inanga and the tuna kuwharuwharu/longfin eel (*Anguilla dieffenbachii*) and a number of endangered native fish such as the taiwharu/giant kōkopu (*Galaxias argenteus*) and banded kōkopu (*Galaxias fasciatus*).

As well as being clear, the coastal waters of Stewart Island lie close to the subtropical convergence zone, a zone characterised by its high productivity of phytoplankton and zooplankton. The high productivity combined with exceptionally clear water gives rise to a diverse array of marine species notable for their large size and often brilliant colour.

As a consequence, this Coastal Marine Area is the southernmost destination of northern migrant waders and is a significant habitat for a wide range of shags, terns, gulls and penguins. 67 species of birds have been recorded in the inlet, including several threatened bird species such as the nationally endangered reef heron and the nationally vulnerable New Zealand dotterel (*Charadrius obscurus*), which feed on the tidal flats at river mouths and in bays. Other birds use this area for nesting and foraging, including the at risk tītī/sooty shearwater (*Puffinus griseus*), the nationally vulnerable kawai/Stewart Island shag (*Leucocarbo chalconotus*), the nationally vulnerable Foveaux shag (*Leucocarbo stewarti*), variable and pied oystercatcher, the nationally vulnerable pohowera/banded dotterel (*Charadrius bicinctus*), kuaka/eastern bar-tailed godwit (*Limosa lapponica*), the nationally endangered black-fronted tern Trans-equatorial migrant waders also feed on the tidal flats. The area is also an important nesting and foraging habitat for nationally endangered hoiho/yellow-eyed penguin (*Megadyptes antipodes*.)

The nationally endangered bottlenose (*Tursiops truncatus*) and dusky dolphins (*Lagenorhynchus obscurus*) are often present in Paterson Inlet as is the nationally endangered mangō-taniwha/great white shark (*Carcharodon carcharias*). Other mammals spotted include the nationally critical whakahao/New Zealand sea lion (*Phocarctos hookeri*) which currently reside in Port Pegasus, and kekeno/New Zealand fur seals (*Arctocephalus forsteri*), and the aihe/common dolphin (*Delphinus delphis*). The estuarine mudflats at the Paterson Inlet headlands are nursery areas for many fish species, and feeding grounds for many wading birds (Environment Southland, 2013).

Freshwater fish, including inanga, shortfin and longfin eels, and bullies such as the giant bully (*Gobiomorphus gobioides*), upland bully (*Gobiomorphus breviceps*), common bully (*Gobiomorphus cotidianus*), the at risk bluegill bully (*Gobiomorphus hubbsi*) and the at risk Redfin bully (*Gobiomorphus huttoni*) migrate through the inlet and/or utilize tidal habitats.

There are also areas of marine farming (restricted solely to Big Glory Bay) within this Coastal Marine Area. Marine farming has modified the central coastal waters of Big Glory Bay, however the coastal interface area adjacent to the land retains generally very high levels of naturalness due to the lack of modifications.

All expected species are present and their population structure virtually unmodified.

EXPERIENTIAL

This Coastal Marine Area occupies the greatest amount of modification within Stewart Island, where the sheltered bays enable people to experience greater senses of calmness, quietness and remoteness from the more open ocean that surrounds this Island. However, these modified areas are concentrated to specific areas, such as Big Glory Bay, Halfmoon Bay and Horseshoe Bay with the remaining areas (and vast majority) retaining strong remote and naturalness values. Whilst this reduces natural character in the immediate vicinity, they are relatively small and isolated compared to the broadness of the overall Coastal Marine Area, where human influence is rare.

Paterson Inlet is accessible by boat, where direct ferries from Bluff operate for visitors and locals. Whilst fishing, boating and some diving is popular within the marine environment, tramping and hunting is popular on the land, with large numbers of people visiting the island and its coastal waters for a sense of remoteness, 'getting-away-from-it-all', and getting back to nature. Areas at the head of Paterson Inlet, such as South West Arm provide opportunities for kayakers and boaties to experience remote and very natural parts of the inlet.

Diving is also popular within the marine reserve, where approximately 170 species of seaweed and over 50 species of fish can be observed (Stewart Island Promotion Association, 2018).

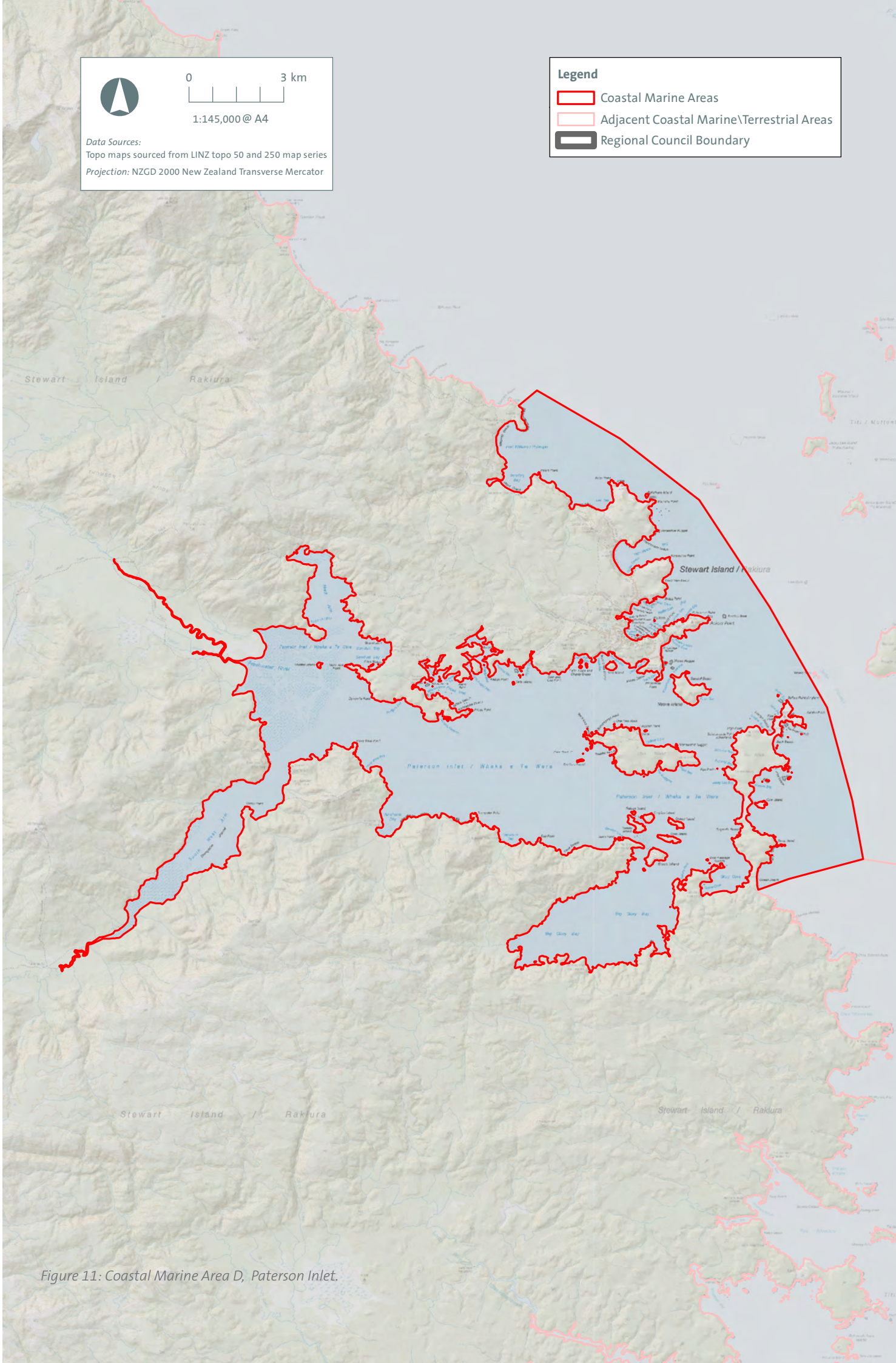
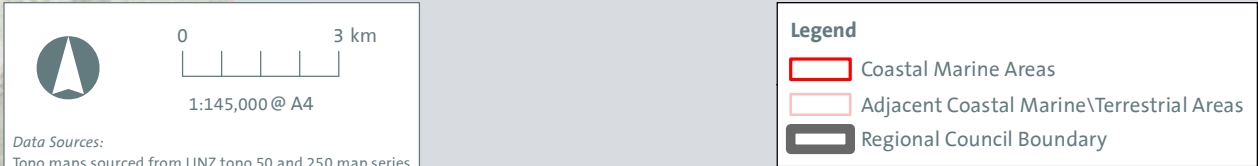


Figure 11: Coastal Marine Area D, Paterson Inlet.

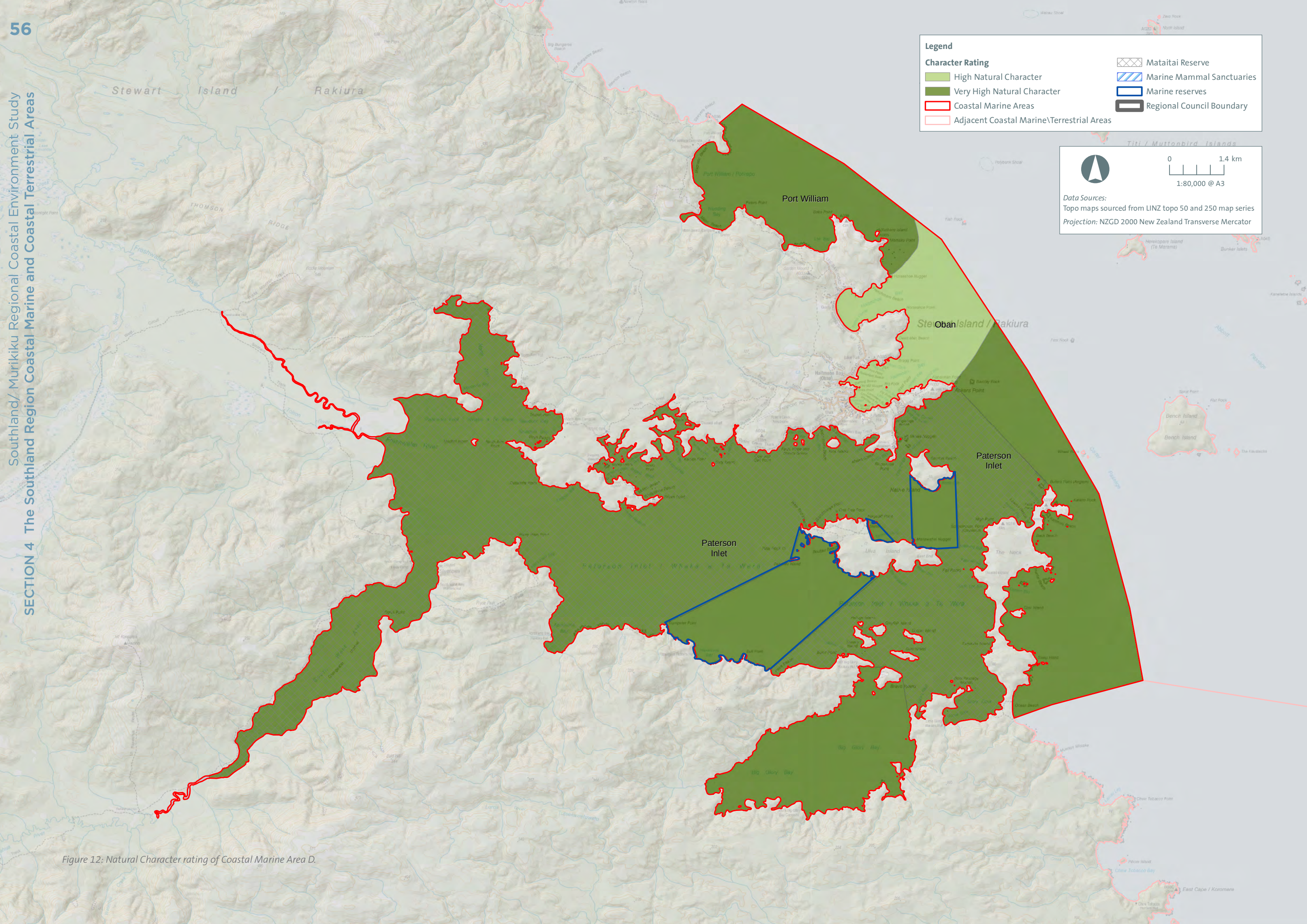


Figure 12: Natural Character rating of Coastal Marine Area D.



Above: Rocky outcrop and beach in the Paterson Inlet.
Boffa Miskell, 2016.

Level 3 Rating: Coastal Marine Area D Paterson Inlet			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓	✓	✓
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

Coastal Marine Area D: Paterson Inlet

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 12

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
PATERSON INLET	VH	VH	VH	VH	- Intricate coastline and estuarine environment. - Numerous islands and intertidal flats with shell banks surrounded by forest that often overhangs the water. - Large inlet containing a wide diversity of habitats e.g. exposed and sheltered waters, coasts and beaches, tidal flats and estuaries and associated diversity of species and communities. - Benthic sediments ranging from sand to mud. - Rocky reef and moderately steep walls. - Low sediment inputs. - Apart from isolated areas in channel between Ulva Island and The Neck, all of inlet is <25 m depth. - Strong tidal currents in some areas. - The tidal reaches entering Paterson Inlet form part of a near pristine freshwater system now rare in New Zealand. - Brackish waterways e.g. tidal influence extends 5km upstream from the estuary in Freshwater River. - A range of beach habitats from exposed, well sorted sandy beaches near the entrance, through the sheltered beaches located near the head of the inlet. - Paterson Inlet and Port Pegasus are the southern-most temperate inlets in New Zealand. - Marine reserve within Paterson Inlet between the Mainland and Ulva Island. - Richest shallow water brachiopod habitats in the world. - Unique biogenic reefs (for example, serpulid tubeworm reefs, bryozoan reefs). - Extensive beds of red algae and the highest diversity of algal species in New Zealand (inlets and adjacent Stewart Island). - Extensive kelp forests (e.g. giant kelp <i>Macrocystis pyrifera</i>). - Extensive saltmarsh and at-risk seagrass beds on tidal flats.Used by the nationally endangered mangō-taniwha/great white shark (<i>Carcharodon carcharias</i>). - Used by the nationally critical whakahao/New Zealand sea lion (<i>Phocarctos hookeri</i>) and kekeno/ New Zealand fur seals (<i>Arctocephalus forsteri</i>), aihe/ common dolphin (<i>Delphinus delphis</i>), nationally endangered terehu/bottlenose dolphins (<i>Tursiops truncatus</i>).	- Big Glory Bay has a considerable quantity (36 farms covering 161.74 ha of the total area of 1,157ha of Big Glory Bay) of Marine Farms present. To the northern side of Big Glory Bay there are some dredging consent areas too. One Commercial Salmon Farm (1.5ha) in Big Glory Bay. - Boating including cruise ships are most frequent within this Character Area and includes the ferry route to the Bluff.

Continued from previous page

Coastal Marine Area D: Paterson Inlet

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 12

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
PATERSON INLET	VH	VH	VH	VH	- Intertidal area is a significant habitat for wading birds, in particular the nationally critical Southern New Zealand dotterel (<i>Charadrius obscurus</i>). - Nesting and foraging area for many seabirds, including tītī/sooty shearwater (<i>Ardenna grisea</i>), the nationally vulnerable Stewart Island Shag (<i>Leucocarbo stewarti</i>), variable and pied oystercatcher, nationally vulnerable pohowera/banded dotterel (<i>Charadrius bicinctus</i>), kuaka/eastern bar-tailed godwit (<i>Limosa lapponica</i>), nationally vulnerable black-fronted tern. - Southern-most feeding areas reached by northern hemisphere migrant waders e.g. godwit, golden plover, turnstone. - Freshwater fish, including Inanga, shortfin and longfin eels, and bullies migrate through the inlet and/or utilize tidal habitats. - Important nesting and foraging habitat for the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>). - First impressions of visitors are of “an island swathed in naturalness, with forest descending to the shoreline”. - Remote character.	
OBAN	H	H	H	VH	- Exposed and sandy beach habitats - Benthic sediments ranging from sand to mud. - Rocky reef and moderately steep walls. - Low sediment inputs. - Expansive views out towards Foveaux Strait	Presence of boats, plus some evidence of dredging
PORT WILLIAM	VH	H	VH	VH	- Long, sweeping sandy beaches - Large area of intact indigenous forest - Uninterrupted views of Foveaux Strait - Part of the Rakiura Track	



View overlooking the Port Pegasus Coastal Marine Area. Boffa Miskell, 2016.

4.5 COASTAL MARINE AREA E: PORT PEGASUS

Port Pegasus is the southernmost inlet on Stewart Island, and the most isolated and remote. It retains a highly indented shoreline with two broad ‘arms’ – North Arm and South Arm. The general landscape formation of this area is a depth of 30 -200 metres, predominantly gravel habitat, and high currents in terms of exposure (Department of Conservation & Ministry of Fisheries, 2011).

The inlet has been used for many years by seafarers as an area of refuge from the rough Southern Ocean. Numerous historical associations are associated with this inlet, although today much of the infrastructure has either been removed or succumbed to the forces of nature. This Coastal Marine Area retains very high levels of naturalness, through the lack of modification apparent. Freshwater quality is very high. A number of endemic species can be found in this area, including the nationally endangered hoiho (yellow-eyed penguin, *Megadyptes antipodes*), the nationally critical New Zealand sea lions and a high abundance of small fish (Boffa Miskell Ltd, 2017). Refer to Figure 13 for the extent of the Port Pegasus Coastal Marine Area.

ABIOTIC

An analysis of this CMA's habitat type comprises of 58% sand, 22% reef, 18% gravel and 2% mud. The approximate size of this CMA is 7,200 hectares.

The hydro-systems present in this Coastal Marine Area include deep drowned valleys and coastal embayments. Water depths within North Arm vary between 30 to 40m with isolated shallower patch reefs present, North Arm has steep drop-offs along much of the coastline and has relatively deep water when compared to other embayments around Stewart Island/Rakiura, including South Arm. North Arm has a surface area of about 1,120 ha. Depths of greater than 40m are present off Chase Head (Pearl Island), and within the southern part of Big Ship Passage. The area is relatively exposed to wave action through the southern entrance, Big Ship Passage; however, Pearl Island in the east provides shelter from the easterly and south-easterly swells (Boffa Miskell Ltd, 2017).

The benthic conditions in this Coastal Marine Area comprise namely mud, sand, rocky reefs/ soft sediment (i.e. patch reefs or boulder substrate with surrounding areas of mud or sand) and rocky reef and northwest of Chase Head (Pearl Island), in areas of increased water depth and lower wave energy. Sand habitats are extensive, ranging from fine rippled sand (Big Ship Passage) through to coarse sand and cobble habitat

(entrance to Whale Passage). Rocky reef habitats are present in all shallow areas at the shoreline and are particularly extensive along the western edge of Pearl Island. It is understood that there has been some disturbance to parts of the benthic environment but how recent and significant is difficult to ascertain. This Coastal Marine Area contains low levels of sediment inputs.

BIOTIC

Large areas of unmodified terrestrial vegetation flank the inland catchments containing this Coastal Marine Area which is significant for its land/ sea ecotones from a national perspective. Consequently, this Coastal Marine Area contains some of the largest areas of near pristine marine habitat surrounded by catchments of native vegetation in New Zealand (although some historic modifications are still apparent in localised areas, including former fire damage).

There is a high level of freshwater input into this Coastal Marine Area, with the naturally vegetated catchment leading to tannin-laden waters in the harbour, creating a unique environment, akin to some parts of Fiordland. This is evidenced by the presence of shallow-water black coral in both places.

This Coastal Marine Area contains a large, reasonably sheltered inlet of two ‘arms’ containing a wide diversity of habitats e.g. exposed and sheltered waters, coasts and beaches, wetlands and associated diversity of species and communities.

Generally, within the mud and sand substrates, epifaunal assemblages are relatively sparse, however in some areas both substrates can be punctuated by occasional hard substrate (i.e. cobble, shell debris) which harbours significant epifaunal diversity. Of these species found, Brittle stars (mostly *Ophiopsammus maculata*), purple fanworms (*Branchiomma* sp.), sea cucumbers, sponges, brachiopods (likely *Neothyris lenticularis* and *Magasella sanguinea*), tube-dwelling anemones (*Cerianthus* sp.), black coral (order *Antipatharia*), sea pens (likely *Virgularia* sp.), and scallops (*Pecten novaezelandiae*) have been identified. In addition, horse mussels (*Atrina zelandica*) and unidentified solitary ascidians were noted on mud substrates, and occasional sea stars on sand substrates.

Within the coarse sand and cobble habitat, such as close to the entrance of Whale Passage in North Arm, there are a diverse range of sessile invertebrate species (e.g. sponges, ascidians, anemones, tubeworms). Scallops, brachiopods, dog cockles (*Tucetona laticostata*), flat oysters (*Ostrea chilensis*), horse mussels, brittle stars, sea cucumbers, eleven-armed sea stars (*Coscinasterias* sp.) and unidentified bivalves and gastropods have also been identified.

Within the rocky reef habitats (which includes areas of rocky reef with surrounding areas of soft sediment), a greater abundance of epifaunal species and demersal fish were present, which included sponges, sea cucumbers, colonial ascidians, anemones and tubeworms. In addition, encrusting and turfing coralline algae and various kelp species (e.g. *Ecklonia*, *Carpophyllum*, *Macrocystis*, *Caulerpa*) were abundant, and kina (*Evechinus chloroticus*), cup sponges (*Cymbastela* sp.) and pāua (*Haliotis iris*) were occasionally noted.

There is a high abundance of small fish present, including juveniles that may be indicative of high quality nursery habitat. Freshwater fish, including Inanga, shortfin and longfin eels, smelts, bullies such as the giant bully (*Gobiomorphus gobioides*), upland bully (*Gobiomorphus breviceps*), common bully (*Gobiomorphus cotidianus*), the at risk bluegill bully (*Gobiomorphus hubbsi*) and the at risk Redfin bully (*Gobiomorphus huttoni*) migrate through the inlet and/or utilize tidal habitats in this Coastal Marine Area.

This Coastal Terrestrial Area supports a nationally critical whakahao/New Zealand sea lion (*Phocarctos hookeri*) breeding site, creche and haul-out area, as well as being an important foraging habitat for nationally endangered hoiho/yellow-eyed penguin). Nesting and foraging habitats are also noted in this Coastal Marine Area for Declining kororā/blue penguin (*Eudyptula minor*) (Boffa Miskell, 2017, Port Pegasus, p31). This is the first confirmed breeding colony site of New Zealand sea lions in New Zealand waters outside of the Sub-Antarctic. In 2018, 55 new born pups were produced in this area.

All expected species are present and their population structure virtually unmodified.

EXPERIENTIAL

This Coastal Marine Area retains much of its experiential character from its remote and isolated location. Few people travel this distance, but those few that do, are rewarded by a highly remote and natural setting. It is understood that there are few commercial recreational activities occurring in the area due to Port Pegasus’ remoteness. Generally small, private parties access the area for hunting, fishing, kayaking, walking and occasionally boating (Department of Conservation, 2012). Diving is also undertaken, which contributes to the experiential aspects of natural character beneath the water.

The experiential aspects here are also transitory, where weather patterns can change experiences dramatically. Remote and wild qualities can be experienced during wilder weather however quite different experiences can occur on calm, sunny days. Dominant forces of the waves tides and winds, contribute to wildness and isolation. The lack of modification within the area has a profound impact on the level of naturalness experienced.

The calmer waters of North Arm lend their way to even calmer waters within the numerous located inlets, including Albion Inlet and Bens Bay. The presence of native wildlife also amplifies one’s experience of natural character (Boffa Miskell Ltd, 2017).

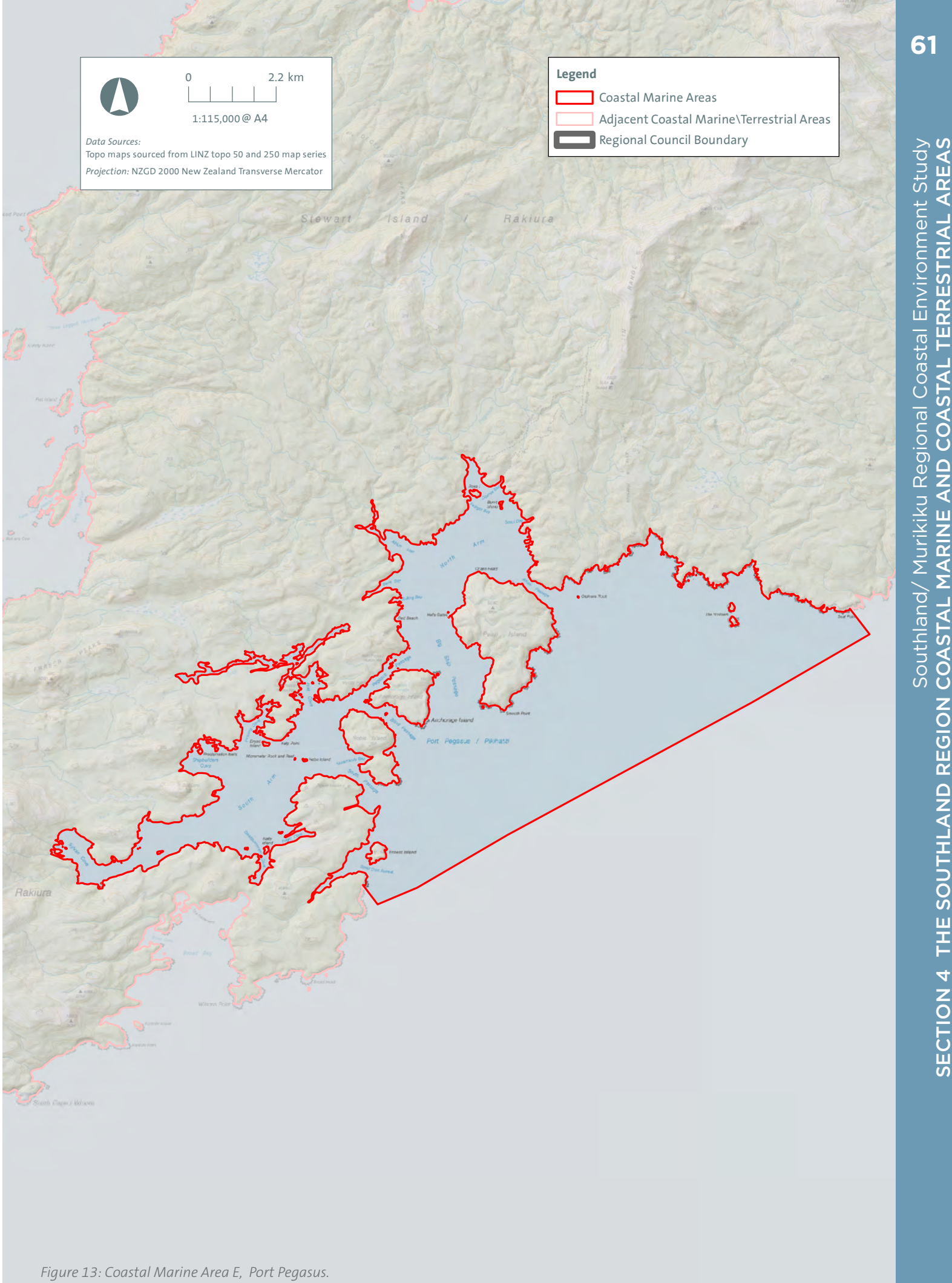


Figure 13: Coastal Marine Area E, Port Pegasus.

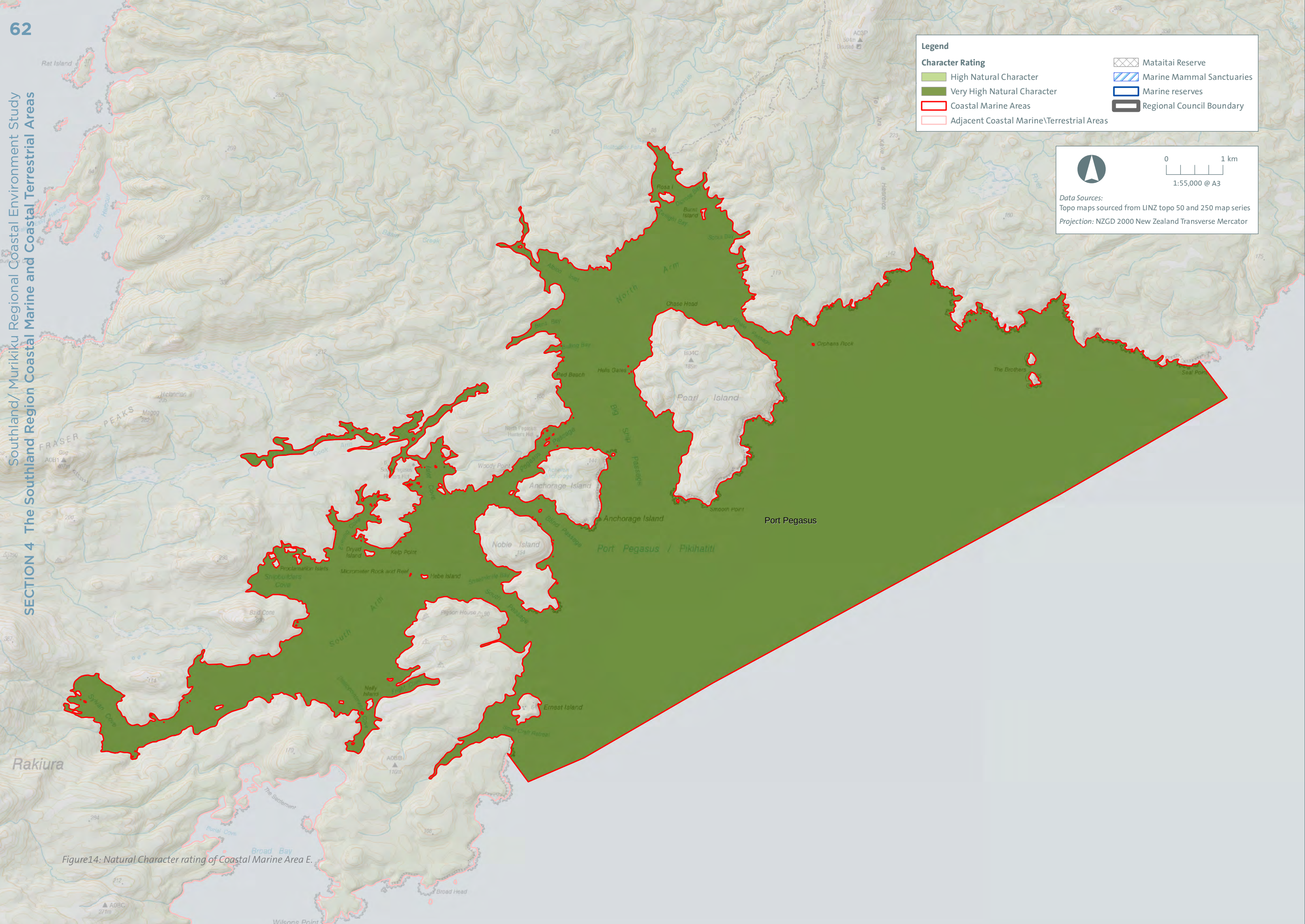


Figure14: Natural Character rating of Coastal Marine Area E.



Above: Rocky outcrop. Boffa Miskell, 2016

Level 3 Rating: Coastal Marine Area E Port Pegasus			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓	✓	✓
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

Coastal Marine Area E: Port Pegasus

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 14

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
PORT PEGASUS	VH	VH	VH	VH	- The clarity of water in the sandy bays. - High freshwater input and the naturally vegetated catchment leads to tannin-laden water in the harbour creating a unique environment, akin to some parts of Fiordland, evidenced by the presence of shallow-water black coral in both places. - Contains some of the largest areas of near pristine marine habitat surrounded by catchments of native vegetation in New Zealand. - Large inlet of two 'arms' containing a wide diversity of habitats e.g. exposed and sheltered waters, coasts and beaches, wetlands and associated diversity of species and communities. - In places has an intact ecosystem extending from the tops of the granite peaks to the floor of the seabed. - Brackish waterways e.g. tidal influence extends in rivers. - The tidal reaches entering the Inlet form part of a near pristine freshwater system now rare in New Zealand. - Low sediment inputs. - Important foraging habitat for the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>). - Nesting and foraging habitat for declining kororā/blue penguin (<i>Eudyptula minor</i>). - High natural state and functional integrity of benthic communities. - Very high and stable seaweed diversity with limited presence of opportunistic species. - Black coral (<i>Antipathes sp</i>) colonies thought to be free of invasive marine pests. - High abundance of small fish, including juveniles that may be indicative of high quality nursery habitat. - Nationally critical whakahao/New Zealand sea lion (<i>Phocarctos hookeri</i>) creche and adult haul-out site. - Presence of brachiopods. - Aggregations of upright colonial ascidians, some of which may be unique to Port Pegasus. - Freshwater fish, including Inanga, shortfin and longfin eels, smelts, bullies migrate through the inlet and/or utilize tidal habitats. - The strong feeling of containment and enclosure due to the sheltered bays and coves. - Remote character.	Very limited modification is evident.

Large embayment surrounded by rocky outcrops at Port Pegasus. Boffa Miskell, 2016.





View overlooking the mouth of the Hollyford River. Boffa Miskell, 2018.

4.6 COASTAL MARINE AREA F: FIORDLAND

The Fiordland Coastal Marine Area extends from Big Bay in the north to Sand Hill Point in the south. The general landscape formation of this coastal marine area has an average depth of 500 – 1000 metres, predominantly mud habitat to the west and sandy habitat to the south, and high levels of exposure (Department of Conservation & Ministry of Fisheries, 2011).

The western boundary extends out 12km to include part of the exposed Tasman Sea as well as the more sheltered, deeply incised fiords. This Coastal Marine Area also includes part of the Southern Ocean as it is associated with Solander Island/Hautere and Little Solander Island. The Fiordland Coastal Marine Area along with the rest of Fiordland is a part of Fiordland National Park.

The unique ecosystems of the inner fiords differ from the exposed coast of Fiordland due to being more sheltered from the extreme wind and waves that lash the outer coastline but are less productive than the exposed outer fiords. The coastal seafloor drops quickly ranging in depths over 3,000 – 4,000 metres as a narrow continental shelf exists west of the fiords.

There are several marine reserves within the fiords. These can be found in Milford Sound/ Piopiotahi; Sutherland Sound/Te Hapua; Clio Rocks/Hawea in Bligh Sound; Gold Arm/Kahukura in Charles Sound; Gaer Arm/Kutu Parera in Bradshaw Sound; The Gut/Te Awaatu Channel and Elizabeth Island/Taipari Roa in Doubtful Sound; Wet Jacket Arm/Moana Uta off Acheron Passage; Five Finger Peninsula/Taumoana near Dusky Sound and Long Sound/Te Tapuwae o Hua. Refer to Figure 15 for the extent of the Fiordland Coastal Marine Area.

ABIOTIC

An analysis of this CMA's habitat type comprises of 34% lower slope, 21% sand, 16% upper slope, 14% mid slope, 9% mud and 6% reef. The approximate size of this CMA is 1,040,000 hectares.

This Coastal Marine Area is characterised by narrow, steep-walled fiords with deep basins separated from the open coast by shallow sills. The drowned u-shaped fiords were carved out by glaciers. Water depths vary greatly within the inner fiords with the deepest fiord being 434m in Doubtful Sound. The continental shelf west of Fiordland is relatively narrow and the exposed, coastal waters which border Fiordland drop off to 3,000 – 4,000 metres deep (Environment Southland, 2013).

The fiords can be characterised by three distinct habitats the sheltered, inner fiords with vertical rock walls, broken rocky reefs and soft bottoms; the semi-sheltered to sheltered fiord entrances and the shallow, sandy exposed outer coast.

The entirety of Sutherland Sound can be described as an inner fiord with a soft substrate on the seafloor with an estuarine character. The entrance to this fiord is constricted by a sandspit and has tidal sand

and mudflats that are crossed by sinuous channels that emerge at low tide. A deep muddy inner basin is located behind the flats. Bligh Sound, between Turn Point and Clio Rocks can be described as an inner fiord with vertical rock walls. Charles Sound, Bradshaw Sound, Acheron Passage and Preservation Inlet can be described as inner fiords with vertical rock walls, broken rocky reefs and a soft substrate. Within Bradshaw Sound, a sill at the entrance of Precipice Cove makes it a fiord within a fiord. Long Sound, within Preservation Inlet, is regarded as one of the most pristine sounds. Doubtful Sound can be described as an inner fiord with a boulder substrate, large kelp beds and rock lobster stocks. Dusky Sound can be characterised as a fiord entrance and outer coast habitat which includes rocky reef, sandy bottom, estuarine and kelp habitats.

Localised areas of modification are apparent; however, these are small-scale. In Milford Sound, some modification has occurred to the coastal margins to facilitate a wharf and a tailrace, boat ramp and jetties have been established at Deep Cove/ Doubtful Sound (part of the Manapori power scheme).

The outer waters of this marine area are very exposed to high wind and high energy wave action in comparison to the sheltered inner waters of the fiords. These waters to the south of Fiordland and near the Solander Islands have been trawled, however not to the level of modification found in Te Waewae Bay. Set-net activity is also high in a small area around the edge of the islands. The inner fiords experience strong tidal currents where the land narrows.

Fiordland's high rainfall provides for a very unique marine environment within the inner fiords. A tannin stained freshwater layer sits on top of the seawater beneath. Light penetration is restricted through this water which has encouraged many species to establish in shallower waters than normal.

BIOTIC

The ecosystems of Fiordland's marine environment stand out nationally and internationally due to the extreme diversity of communities that are represented over a dramatically dense area. The inner fiords can include estuarine, outer reef/kelp forest, open water pelagic and deep-water communities all within 10km (Teirney, 2003).

The intertidal habitats are made up almost entirely of steep shores of solid rock overhung by terrestrial vegetation and the steep rock walls of the fiords in the shallow subtidal (4-5m deep) are strongly influenced by the low salinity surface layer. Below the shallow subtidal zone (30m deep) there are large patches of high species diversity interspersed with barren patches of low diversity (Darby, J; Fordyce, R; Mark, A; Probert, K; Townsend, C., 2003). Near the entrance to the fiords, fresh and salt water mix from wave action which creates different marine communities than what is found in the inner fiords .

Due to the high amount of rainfall in Fiordland, there is a three to four-metre-deep freshwater layer that has been drained through the lush and leafy terrestrial forest floor. This results in a tannin or tea stained coloured runoff as it meets the sea.

A diverse range of species can be found within the fiords due to the forty-metre band of light penetrating through the freshwater layer and into the seawater below it. There are areas within Fiordland's marine environment known as 'China shops.' These small areas contain an abundance of diverse plant and animal communities and can often be found where the currents are strong such as where fiords change direction sharply or the channels narrow around islands.

The rock walls within Milford Sound host communities of black and red corals in addition to various brachiopods. Dense beds of horse-mussel, dense stands of Cerianthus (tube-dwelling anemones) and Ecklonia (kelp) are found at Harrison Cove. Sutherland Sound provides a pristine habitat in which Spiky dogfish, stargazers, pātiki (flounder) and red decorative crabs are commonly found. Near Turn Point within Bligh Sound, spectacular red, pink and black coral colonies and an abundance of sponges on the Turn Point rock wall are outstanding. The underwater visibility is excellent due to a lack of sedimentation.

George Sound contains cliff face communities where seaweeds grow adjacent to black corals and feather stars. At the base of the wall there is a spectacular field of large sea pens and tube anemones that extends beyond diving depths. This is one of the few sea pen localities in the northern fiords (Teirney, 2003).

The shear rock walls in Caswell Sound support abundant corals and starfish. Within the mix of inner fiord and open coast habitats, Ecklonia forest can be found descending to black coral. An abundance of spectacular red and black corals, sponges, fish and rock lobster can be found within Charles Sound. The estuarine environment at the head of Bradshaw Sound provides a habitat for Groper, tarakihi, other finfish and rock lobster.

Doubtful Sound has high biodiversity including abundant coralline algae and bryozoans, its diverse, steep wall communities support high densities of brachiopods and black coral. An outstanding example of red coral on black sand can be found on the south end of Elizabeth Island. Opposite Hall Arm, a unique assemblage of bright yellow glass sponges can be found at a depth of 30-35m. The trench off Brigg Point hosts a white coral community.

A marine reserve within Te Awaatu Channel (The Gut) is the smallest in New Zealand and protects a fragile reef community within Doubtful Sound. It contains the most diverse deep reef system yet discovered in Fiordland and is renowned for beds of sea pens, zoanthid anemones and red hydrocorals. Almost every species found throughout the fiords occurs there, including deep-water fish, various brachiopod species, gorgonians, feather stars and lace corals (Teirney, 2003).

Breaksea Sound is the only place in Fiordland certain sea stars are found and the diverse rock wall communities feature brachiopods. Wet Jacket Arm, off of Acheron Passage, contains all inside fiord habitats and has the highest density of black coral. High currents passing through narrow passages foster dense colonies of large bryozoans, black corals and red corals in Dusky Sound. Chalky Inlet has a forest of huge black coral trees with abundant gorgonians.

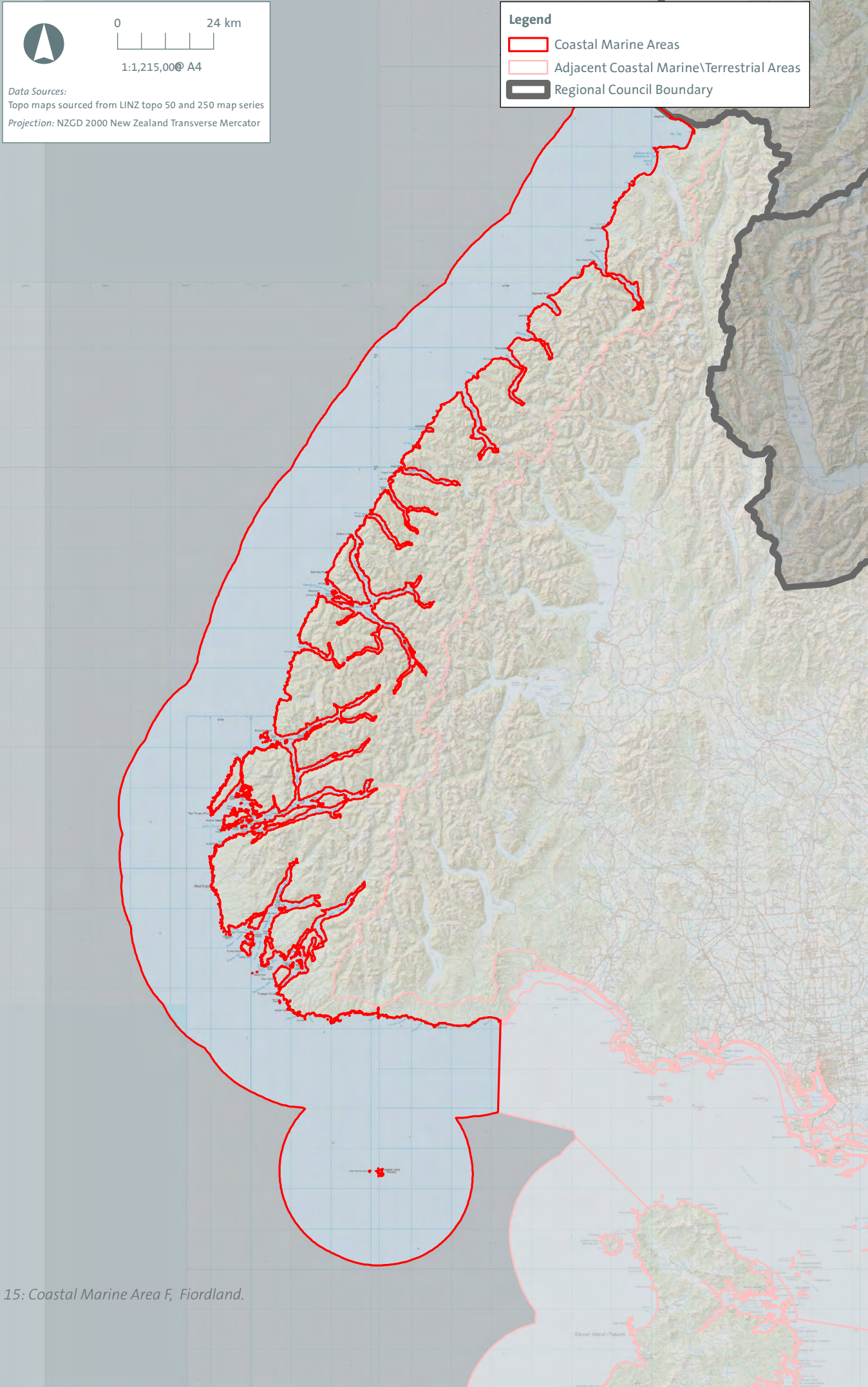


Figure 15: Coastal Marine Area F, Fiordland.

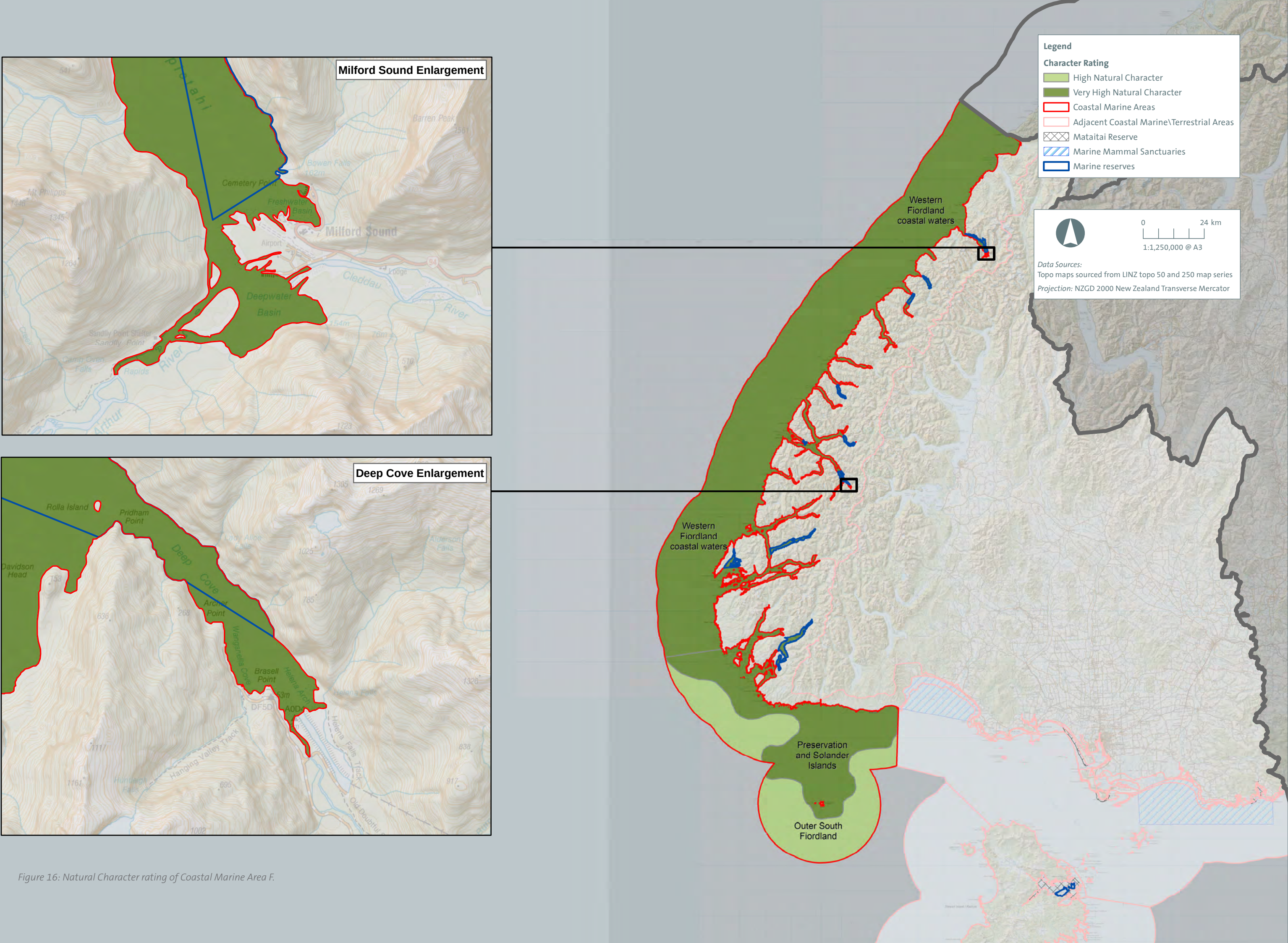


Figure 16: Natural Character rating of Coastal Marine Area F.

An abundance of sea pens occurs on the sand near the Narrows within Preservation Inlet. Scallops are scattered amongst the sea pens. Other exceptional features found within the Narrows include Holothurians (strawberry fields), red coral and white brachiopods. Long Sound is very important for splendid perch, an emergent fish species (normally only found at depth in the ocean) (Teirney, 2003).

Typical fish found within the fiords include rāwaru/blue cod (*Parapercis colias*), rock lobster, groper, pāua (*Haliotis iris*), scallops, jock stewart (sea perch), red banded perch, butterfly perch, spotty and kina (sea urchins). Lanternfish and hoki are found within Milford Sound.

Marine mammals that can be found within Fiordland include populations of the nationally endangered bottlenose, common and dusky dolphins in addition to popoikore/leopard seals (*Hydrurga leptonyx*), the nationally critical Southern elephant seal (*Mirounga leonine*), the nationally critical orca/killer whale (*Orcinus orca*), nationally vulnerable tohorā/southern right whales (*Eubalaena australis*), paikea/humpback whales (*Megaptera novaeangliae*) and parāoa/sperm whales (*Physeter macrocephalus*). There are three small, largely discrete, sub-populations of bottlenose dolphin that are resident to Fiordland (DOC, 2007) . Colonies of kekeno/New Zealand fur seals (*Arctocephalus forsteri*), and Declining kororā/blue penguin (*Eudyptula minor*) can also be found within these waters.

The nationally vulnerable whio/blue duck (*Hymenolaimus malachorhynchos*), brown teal, the nationally endangered reef heron, the nationally critical kotuku/white heron (*Ardea modesta*) and the tōrea pangol/ variable oystercatcher (*Haematopus unicolor*) use tidal areas at fiord heads and at river mouths. The nationally vulnerable Fiordland crested penguin feed in these waters and roost/nest on the rocky shore in the forest margins.

EXPERIENTIAL

This Coastal Marine Area is primarily experienced through visitors on chartered cruises within Milford and Doubtful Sounds. Fishing and diving charters also operate in more remote fiords within the region. The serenity, solitude and remoteness of being in nature is what draws people to this place. The extensive area of this Coastal Marine Area and its close relationship to the terrestrial environment provides an overwhelming sense of naturalness. Many fiords and close, more exposed coastal waters are devoid of any form of modification and an overwhelming sense of naturalness is obtained in these areas. The sounds and smells of the natural environment contribute to the very high experiential values.

For places such as Milford and Doubtful Sound however, commercialisation and boating activity are apparent, and these activities, along with others, including aircraft movements affects the sense of naturalness of the area to varying degrees. In 2017 Milford Sound had approximately 15,917 boat trips, while Doubtful Sound had a much smaller but significant 5,868 (Environment Southland, 2017). The amount of boat trips into these areas is much higher than, for example the 977 that were made into Dusky Sound, and has a significant impact on the character of the marine environment.

Recreational opportunities include kayaking, diving, swimming and viewing wildlife, specifically the nationally endangered bottlenose dolphin and fur seals.

Outside of the marine reserves, recreational and commercial fishing for rock lobster and pāua (*Haliotis iris*) take place within the fiords and along the coastline.

Level 3 Rating: Coastal Marine Area F Fiordland			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓	✓	✓
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

Coastal Marine Area F: Fiordland

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 16

REFER TO COASTAL TERRESTRIAL AREAS 9-11 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WESTERN FIORDLAND COASTAL WATERS (INCLUDING MILFORD SOUND AND DOUBTFUL SOUND)	VH	VH	VH	VH	- The unique ecosystems of the inner fiords differ from the exposed coast of Fiordland due to be being more sheltered from the extreme wind and waves that lash the outer coastline. - The coastal seafloor drops quickly ranging in depths over 3,000 – 4,000 metres as a narrow continental shelf exists west of the fiords. - The fiords are drowned u-shaped glacial valleys with sills separating the fiords from the open coast and their deep seafloors were carved out by glaciers. - Fiordland's high rainfall provides for a very unique marine environment within the inner fiords. A tannin stained freshwater layer sits on top of the seawater beneath. - A diverse range of species can be found within the fiords due to the forty-metre band of light penetrating through the freshwater layer and into the seawater below it. 'China shops' are small areas containing an abundance of diverse plant and animal communities and can often be found where the currents are strong such as where fiords change direction sharply or the channels narrow around islands. - Nine marine reserves are within Western Fiordland. - Forms the strong hold of the Fiordland Crested Penguin which are nationally vulnerable. - Remote and isolated sense of wildness and tranquillity within part the most unmodified coastal waters in the country.	Both Milford Sound and Doubtful Sound form part of the Western Fiordland coastal waters, however, a separate (sub) section has been provided below for greater details.
MILFORD SOUND	VH	VH	VH	H	The values listed above for Western Fiordland coastal waters are relevant for Milford Sound, including the following: Localised reduced level of naturalness apparent at head of Milford Sound due to presence of modifications, boating activity and aircraft movements.	Vessels frequent the waters, more than any other fiord in Fiordland. Small marina and boat terminal.
DOUBTFUL SOUND	VH	VH	VH	H	The values listed above for Western Fiordland coastal waters are relevant for Doubtful Sound, including the following: Localised reduced level of naturalness apparent at head of Deep Cove due to presence of modifications, however this is small, set within native bush setting.	Tailrace, boat ramps, jetties and vessels present
OUTER SOUTH FIORDLAND	H	H	H	VH	- Remote and isolated sense of wildness and tranquillity within part the most unmodified coastal waters in the country. - Highly productive and intact waters. - High experiential values.	Offshore dredging, set netting and trawling occurs

Continued from previous page

Coastal Marine Area F: Fiordland

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 16

REFER TO COASTAL TERRESTRIAL AREAS 9-11 FOR FURTHER INFORMATION RELATING TO THE TERRESTRIAL COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
PRESERVATION AND SOLANDER ISLANDS COASTAL WATERS	VH	VH	VH	VH	- The unique ecosystems of the inner fiords differ from the exposed coast of Fiordland due to be being more sheltered from the extreme wind and waves that lash the outer coastline. - The fiords are drowned u-shaped glacial valleys with sills separating the fiords from the open coast and their deep seafloors were carved out by glaciers. - Fiordland's high rainfall provides for a very unique marine environment within the inner fiords. A tannin stained freshwater layer sits on top of the seawater beneath. - A diverse range of species can be found within the fiords due to the forty-metre band of light penetrating through the freshwater layer and into the seawater below it. 'China shops' are small areas containing an abundance of diverse plant and animal communities and can often be found where the currents are strong such as where fiords change direction sharply or the channels narrow around islands. - One marine reserve is found within Long Sound. - Remote and isolated sense of wildness and tranquillity within part the most unmodified coastal waters in the country. - Highly productive and intact waters. - High experiential values.	- Very limited modification along the coastline. Offshore trawling, potting and dredging occurs in greater intensity beyond mapped area. - Moderate to high levels of set netting activity has occurred to the north-west of the Solander Islands and excluded from the mapping.



View overlooking the Waikawa Coastal Terrestrial Area from the Brothers Point. Boffa Miskell, 2018.

4.7 COASTAL TERRESTRIAL AREA 1: WAIKAWA

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area is located south of the Catlins Conservation Area and extends from Waipapa Beach to Waiparau Head on the Southland Regional boundary. This area includes the settlement of Waikawa, Porpoise bay and overlooks the Waikawa Harbour, Haldane Estuary and surrounding bays. Long sweeping, sandy beaches can be found at Long Beach, Porpoise Bay and Haldane Bay. Small, intimate inlets are also tucked in between the rocky cliffs and platforms providing a contrast along the coastline.

Key coastal characteristics include: a diverse coastline ranging from rocky headlands to estuarine habitats; native forests which meet the sea in some places, rolling farmland surrounds the Waikawa Harbour and Haldane Estuary with native vegetation present in the gullies and rocky points such as The Sisters, Brothers Point, North Head and Slope Point, the southernmost point of the South Island.

The inland extent of the coastal environment follows the edges of the adjacent plains surrounding Waikawa Harbour and Haldane Estuary and borders the Catlins Conservation Park and Progress Valley, where the terrain becomes much steeper. The boundary primarily follows the topography change.

Beyond the coastal environment, the Coastal Context Area predominately comprises of rolling farmland and the Catlins Conservation Park. This area has a steeper terrain and has many small watercourses that drain into the coastal marine area. The Catlins Conservation Park is predominantly made up of native vegetation with the more developed land on the lower hill slopes. Predominant landscape features such as Mt Darby, and Bush Cone can be seen overlooking the Coastal Terrestrial Area, with Bush Cone reaching an elevation of 397 metres above sea level. Refer to Figure 17 for the extent of the Waikawa Coastal Terrestrial Area.

ABIOTIC

The Waikawa Coastal Terrestrial Area includes sand spits, sandy beaches, rocky bluffs, cliffs and nearshore rock platforms extending into the sea which form part of the Catlins and the Southland Syncline. This area also contains coastal ponds, Waikawa Harbour and Haldane Estuary, which are two geologically significant estuaries on the south-east coast. Sweeping, sandy beaches are found at Porpoise Bay and Haldane Bay in addition to petrified forests at Curio Bay.

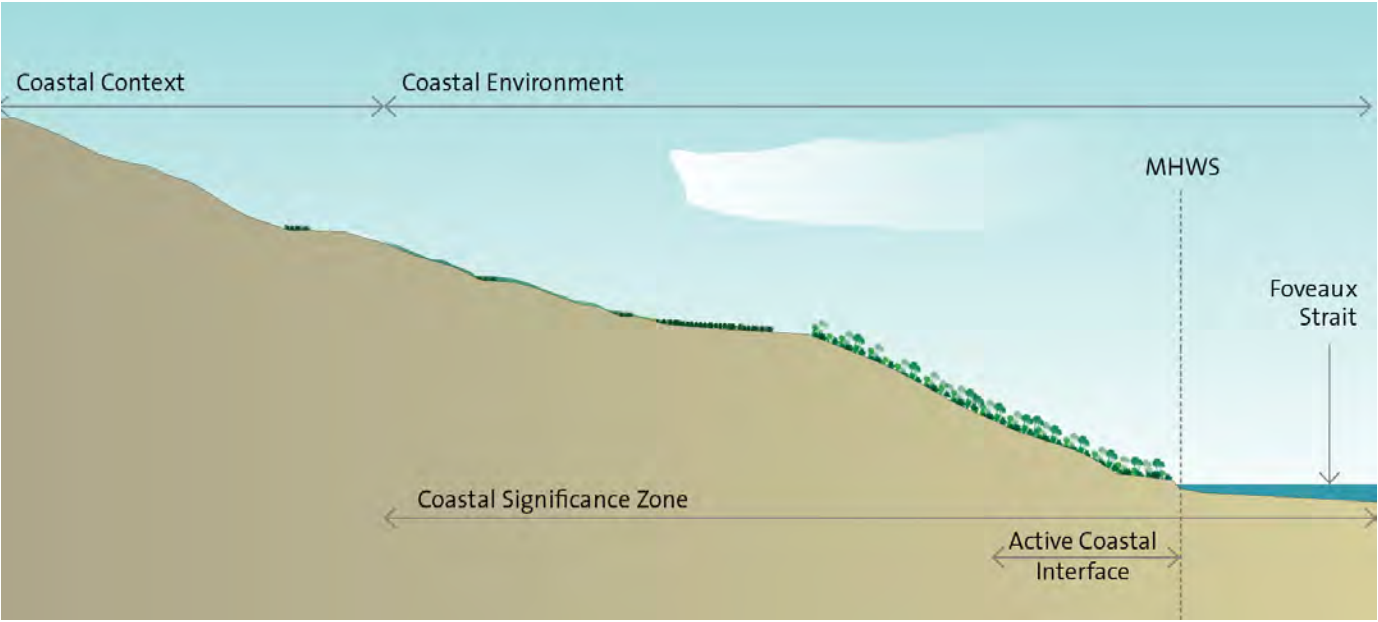


Diagram 5: Representative Coastal Environment diagram of the Waikawa Coastal Terrestrial Area.

North of Teahimate Bay, one of the best sections of ragged, creviced headlands have been identified as a Geopreservation Site of regional significance. These headlands formed by the truncation of steeply-dipping Jurassic strata of the southern limb of the Southland Syncline as it is eroded by the sea (Turnbull, I.M.; Allibone, A.H. (compilers), 2003).

The Waikawa Harbour mouth meets the sea at Porpoise Bay near North Head. The mouth and spit are exceptionally dynamic as the size of the spit has varied over the last few decades. Sedimentation from the estuary and sand movement have affected navigability of the Harbour in the past.

Along this stretch of coast, two long curving bays exist amongst the rocky headlands. Porpoise Bay, a sweeping sandy beach, extends from the mouth of the Waikawa Estuary to South Head which separates it from Curio Bay. Haldane Bay is an easily accessible example of a remnant area of sand dunes and wetlands that is being remobilised and eroded. A small valley has been dammed by dune sand, creating a 2 km-long lake 'The Reservoir' which is public conservation land. The sea cliffs separate indented sandy bays along the Haldane coast. The Haldane Estuary is listed as a Geopreservation Area due to it being a good example of a Southland estuary.

Curio Bay, located between Porpoise and Haldane Bays, is home to 160-million-year-old fossilised ancient forest remains. The intertidal shore platform containing the exposed logs and stumps is the most extensive and least disturbed examples of a Jurassic fossil forest internationally. The sea has eroded the sandstone over time exposing the forest fossils which also hold scientific reserve status.

Annual rainfall is 1,500mm. Elevation ranges from 0 to 277m near Waiparau Head. Annual sunshine hours are 1,550 per year. Median temperatures range from 17° Celsius in Summer and 3° Celsius in Winter.

BIOTIC

The total land area within Waikawa Coastal Terrestrial area is 3,748 ha, of which 16% is in native forest, 7.9% in native shrubland, 0.3% in fernland, 1.4% in wetland communities, 0.5% in exotic treeland, 1.9% in exotic scrub, 62.9% in pasture, 6.5% in bare or lightly-vegetated surfaces, 2.4% in water bodies and 0.2% in artificial surfaces.

Originally, the vegetation cover would have been kahikatea, tōtara, mataī forest, kāmahi, southern rātā, podocarp forest areas of wetland, flaxland/rocklands, coastal shrubland, turf communities and herbfields (Boffa Miskell Ltd, 2006). Most of the coastal edge has now been modified and developed into farmland, which reduces biotic levels of natural character. This occurs up to the edge of rocky cliffs or just behind the sand dunes in some places.

Although development has occurred along the coastal edge, the exposed headlands retain localised areas of naturally rare coastal turfs (Rance, 2018). This ecosystem has a threat status of critically endangered. The Te Rere Private Scientific Reserve is also an uncommon area containing remnant forest which extends to the coastline. Forest extending to the coastal edge is uncommon for the Southland Coast except for in areas such as Fiordland and the Waitutu Rowallan coastline. The reserve itself is home to both the yellow-eyed penguin and the blue penguin with actively managed predator control systems in place to protect the rare fauna in the area (Rance, 2018).

Between the Sisters and Waiparau Head, windswept native forest covers the rocky headlands and backs the sandy beaches making this part of the coastline the most abundant of indigenous vegetation cover.

The rocky cliffs and headlands within Waikawa Harbour have native vegetation following the shoreline and up through the gullies. Pastoral land exists beyond the immediate vegetated harbour margins. On the eastern shore of the harbour is a stand of totara forest. The forest has established on ancient stabilised sand dunes, making it a naturally rare ecosystem. The cliffs along the coast, such as Curio Bay headland, support populations of coastal carrot (*Anisotome lyallii*) and the local Stewart Island forget-me-not (*Myosotis rakiura*) along with other notable coastal species (Rance, 2018).

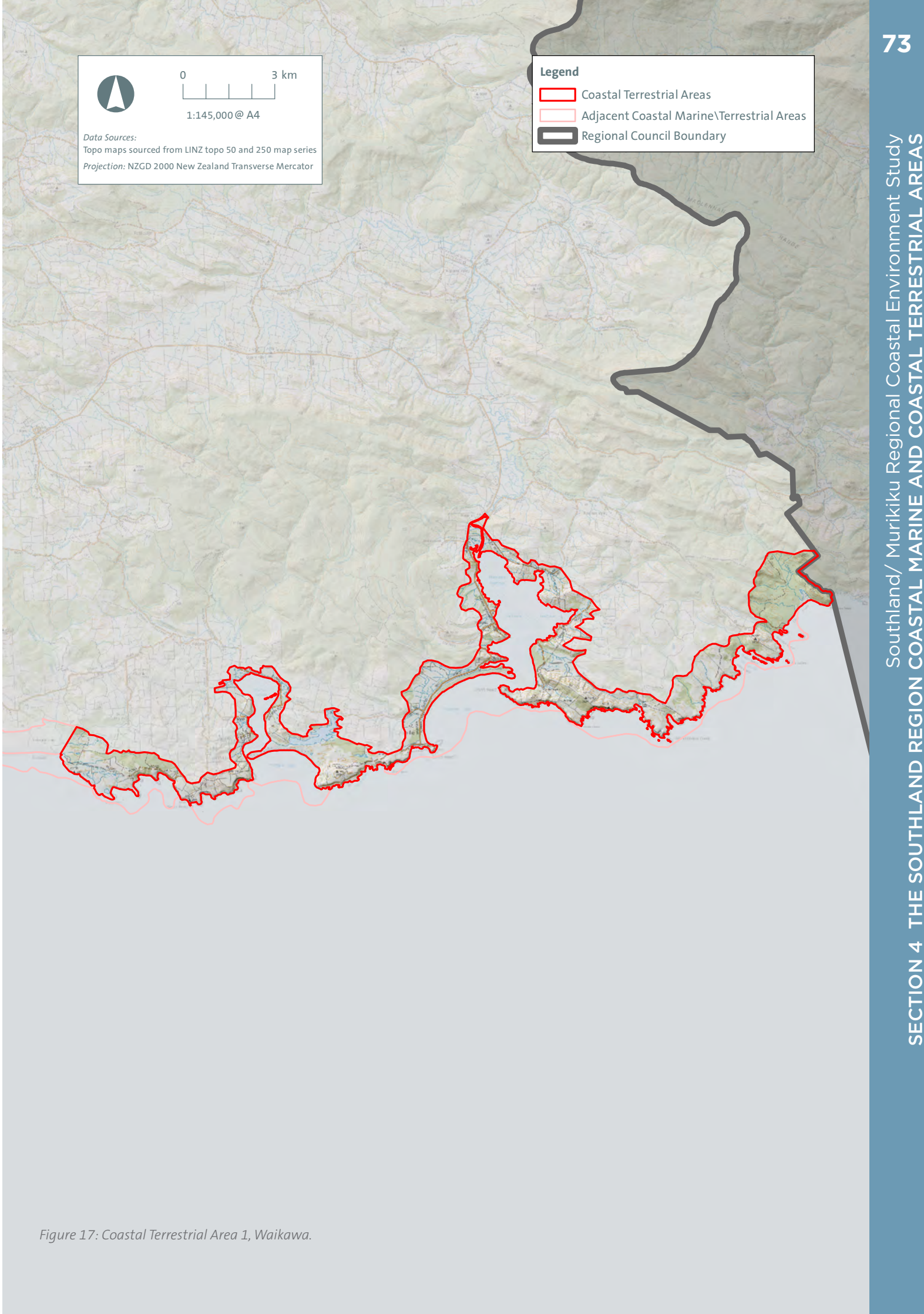


Figure 17: Coastal Terrestrial Area 1, Waikawa.

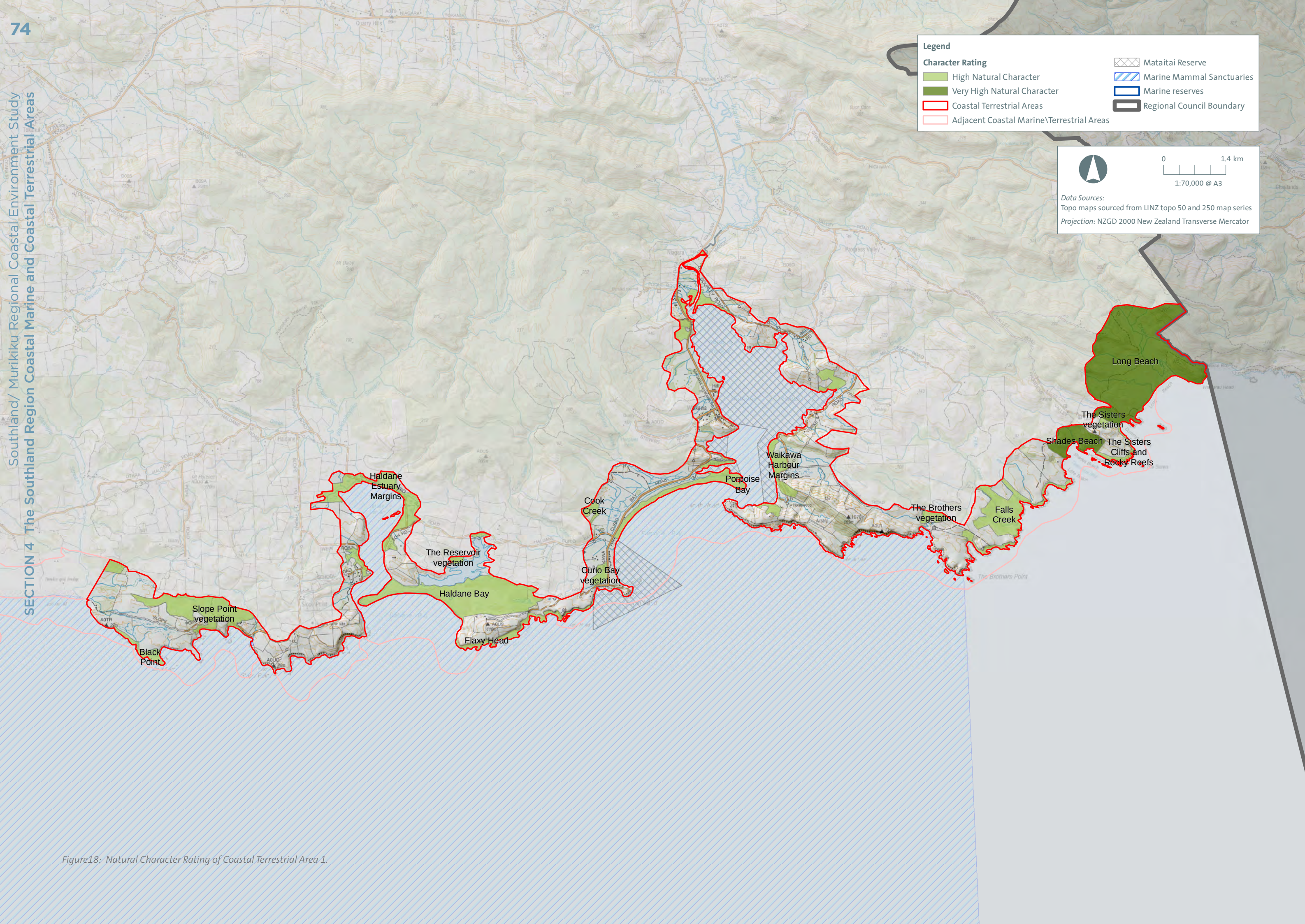


Figure18: Natural Character Rating of Coastal Terrestrial Area 1.

The sandy, sweeping Porpoise Bay is backed by a thin belt of marram grass which covers the dunes. Haldane Bay and its associated sand spit have marram grass extending from the dune systems to the edge of The Reservoir with large native vegetation portions throughout. The eastern end of Long beach however retains a population of the at risk pingao (*Ficinia spiralis*) while Dummys beach contains a small population of the at risk sand spurge (*Euphorbia glauca*) (Rance, 2018).

The immediate margin of the Haldane Estuary is surrounded by patches of native vegetation and wetlands; however, farmland does meet the water in some places resulting in modified estuary edges.

The remaining headlands protruding into the sea are predominately modified and farmed to the cliffs edge along with the more accessible lowlands and lower slopes. Generally, the gullies contain the more intact vegetation and large remnant forests are found near Long Beach, The Reservoir and Slope Point. There are also patches of pikao (*Ficinia spiralis*) on dunes along this part of the coast.

The Waikawa River provides a habitat for spawning Inanga and the Waikawa Estuary is known as a nursery area for pātiki/flounder (*Rhombosolea spp.*), taiwharu/giant kōkopu (*Galaxias argenteus*), shortfin and longfin eels and the nationally vulnerable kanakana/lamprey (*Geotria australis*) populations. The Waikawa Estuary is also recorded as a Wetland of National Importance to Fisheries, is relatively unmodified and is covered by a maitaitai reserve specifically because of its cockle populations. The Reservoir supports a range of native fish species, namely the threatened taiwharu/giant kōkopu (*Galaxias argenteus*).

This coastline acts as a feeding ground for several birds including godwits, matuku moana/white-faced herons (*Egretta novaehollandiae*), at risk tōrea/South Island pied oystercatcher (*Haematopus finschi*), the nationally vulnerable ngutuparore/wrybill (*Anarhynchus frontalis*), poaka/pied stilts (*Himantopus himantopus*), spur-winged plovers (*Vanellus miles*) and mallard ducks (*Anas platyrhynchos*). Other threatened birds that frequent this coast include the nationally vulnerable pohowera/banded dotterel (*Charadrius bicinctus*), the nationally vulnerable kawau/Stewart Island shag (*Leucocarbo chalconotus*), the nationally endangered reef heron and tōrea pango/variable oystercatcher (*Haematopus unicolor*).

The nationally endangered yellowy-eyed/hoihoi and at risk Declining kororā/blue penguin (*Eudyptula minor*) have several breeding sites along this coast in addition the world's rarest sealion, the nationally critically threatened whakahao/New Zealand sea lion (*Phocartos hookeri*). Curio and Porpoise Bay have a healthy, resident population of nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) over the summer months. Fur seals can also be found in this area.

EXPERIENTIAL

Access to this Coastal Terrestrial Area is fairly easy given there are roads bordering both the Waikawa Harbour and Haldane Estuary. The remaining roads are primarily used to access farms, tourist destinations and Porpoise Bay. Access to the rocky cliffs and headlands is not easily gained due to them being more remote.

The main recreational areas along this coast include Porpoise Bay, Curio Bay and Slope Point. Porpoise Bay is a popular swimming beach where nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) often swim close to the shore (Environment Southland, 2013). Sightseeing, beach walks and picnics are among the more passive recreational activities that occur along Porpoise Bay.

Established camping grounds are located at Weirs Beach (Haldane Estuary) and Curio Bay near the popular destination of the fossilised forests. At low tide, the fossilised forest can be best seen from the viewing platforms. The protected and nationally endangered hoiho/yellow-eyed penguin (*Megadyptes antipodes*) come onshore after their day at sea and can be seen around Curio Bay. Guided tours are available to view marine mammals as well from Curio Bay.

Recreational fishing is also common with boat launching available from Waikawa Harbour and Haldane Estuary. Additionally, the Waikawa River provides angling opportunities. The rocky shores provide great opportunities for gathering pāua (*Haliotis iris*), scuba diving, snorkelling, spearfishing, crayfishing and surfcasting from the rocks. Slope Point is one of more accessible areas along this coast where these activities can take place without having a boat.

Porpoise Bay has a resident population of internationally significant nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) during the months of October to March. These dolphins are endemic to New Zealand and the population located here is nationally significant. This is also one of the only places nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*)s can be viewed easily from the beach. The beach is also used as a popular surfing spot, with multiple established surf schools.

Level 3 Rating: Coastal Terrestrial Area 1 - Waikawa			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH	✓		✓
MODERATE TO HIGH		✓	
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		HIGH	

Coastal Terrestrial Area 1: Waikawa					
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)					
THESE ARE MAPPED WITH REFERENCE TO FIGURE 18					
REFER TO COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.					
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS
LONG BEACH	VH	VH	VH	VH	- Extensive indigenous forest cover with rocky headlands and reefs protruding into the sea. - High level of intactness and sense of wildness.
THE SISTERS VEGETATION	H	MH	H	M	- Remnant indigenous forest. - High sense of naturalness and remoteness.
THE SISTERS CLIFFS AND ROCKY REEFS	H	H	M	VH	- Impressive strike ridge headland which has eroded along the coast to create a series of dramatic cliffs and parallel spurs jutting out into the sea. - Landform forms part of the southern limb of the Southland Syncline and is identified as regionally important in the Geopreservation Inventory. - High sense of naturalness, exposure and remoteness.
SHADES BEACH	VH	VH	H	H	- Extensive indigenous forest cover with a rocky headland and rocky platforms protruding into the sea with sandy beaches tucked in between the headland. - High level of intactness and sense of wildness.
FALLS CREEK	H	H	H	H	- Exposed and eroding rocky headlands with rocky slabs and platforms protruding into the sea. - Extensive indigenous shrub, scrub and forest cover. - High level of intactness, remoteness and exposure.
THE BROTHERS VEGETATION	H	MH	H	MH	- Small remnant indigenous shrub, scrub and forest cover. - High level of intactness, remoteness and exposure.

Continued from previous page

Coastal Terrestrial Area 1: Waikawa					
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)					
THESE ARE MAPPED WITH REFERENCE TO FIGURE 18					
REFER TO COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.					
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS
WAIKAWA HARBOUR MARGINS	H	H	MH	MH	- Geologically significant estuary. - Estuarine and wetland habitats support Inanga spawning. - Remnant indigenous shrub, scrub and forest cover some included within conservation land. - The Waikawa Estuary is Wetland of National Importance to Fisheries. - High level of intactness and sense of wildness.
PORPOISE BAY	H	H	H	H	- The sand spit is exceptionally dynamic as the size of the spit has varied over the last few decades. - Long, sandy sweeping beach with dune system. - Popular swimming beach where nationally endangered tūpoupou/Hector's dolphin (<i>Cephalorhynchus hectori</i>) often swim close to the shore. - High level of recreation, intactness and sense of wildness.
CURIO BAY VEGETATION	H	MH	H	MH	- Small, remnant indigenous shrub, scrub and forest cover. - High level of intactness and sense of wildness.
FLAXY HEAD	H	H	MH	H	- Exposed and eroding rocky headlands with rocky slabs and platforms protruding into the sea. - High levels of recreation and exposure.
HALDANE BAY	H	H	H	H	- Easily accessible example of a remnant area of sand dunes and wetlands that is being remobilised and eroded. - Dramatic, windswept vegetation. - Dynamic sand spit with dune systems within conservation land. - High level of intactness and naturalness.
THE RESERVOIR VEGETATION	H	MH	H	MH	- Remnant indigenous shrub, scrub and forest cover. - High level of naturalness and remoteness.
HALDANE ESTUARY MARGINS	H	H	H	MH	- Haldane Estuary is listed as a regionally important Geopreservation Site due to it being a good example of a Southland estuary. - Estuarine and wetland habitats with remnant indigenous shrub, scrub and forest cover with some included within conservation land. - High level of recreation and naturalness.
SLOPE POINT VEGETATION	H	H	MH	H	- Large, remnant indigenous shrub, scrub and forest cover. - High level of isolation, naturalness and exposure.
BLACK POINT	H	H	MH	H	- Small, sandy beach with rocky shelves and platforms. - Safe, bathing/swimming area behind rocky reefs. - High level of intactness and sense of wildness.



View overlooking Waipapa Point with the Waipapa lighthouse in the foreground. Boffa Miskell, 2018.

4.8 COASTAL TERRESTRIAL AREA 2: WAIPAPA

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area is located between Fortrose and Waipapa Beach. This coastal landscape is relatively flat with sweeping, sandy beaches backed by coastal ponds and wetlands. The remaining landscape is highly modified farmland. Along this stretch of coast, the lighthouse at Waipapa Point separates Waipapa Beach from Frasers Beach.

Key coastal characteristics include: broad sand dunes and beaches backed by coastal ponds, highly modified sand plains due to farming, notable wind exposure and eroding sand dunes along Waipapa Beach, brackish coloured water in coastal lakes and local tributaries and a clear, distinctive boundary between the coastal margin and intensive farmland.

The inland extent of the coastal environment primarily follows the wetland ecosystems of water bodies such as Lakes Brunton, Vincent, and Cook where the distinctive farmland boundary is clear.

Beyond this Coastal Terrestrial Area is heavily modified, undulating farmland with the Catlins Conservation Park in the background. This farmland makes up the catchment which deposits into small streams leading to Lake Cook, Lake Vincent and Lake Brunton. This environment still shows signs of its previous wetland ecology with small water bodies and patches of native vegetation being present in lower points of the undulating plains. Refer to Figure 19 for the extent of the Waipapa Coastal Terrestrial Area.

Diagram 6: Representative Coastal Environment diagram of the Waipapa Coastal Terrestrial Area.

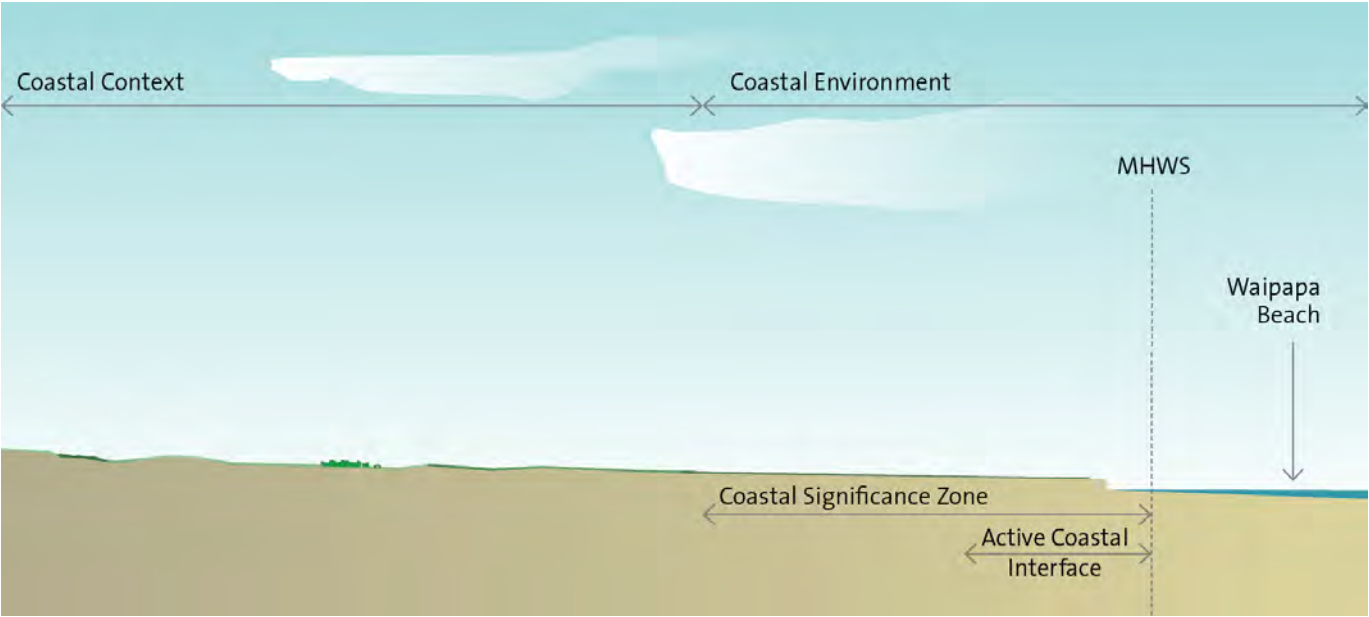


Diagram 6: Representative Coastal Environment diagram of the Waipapa Coastal Terrestrial Area.

ABIOTIC

The Waipapa Coastal Terrestrial Area includes Waipapa Beach, Waipapa Point and Frasers Beach in addition to several coastal lakes. This coastal terrestrial area is heavily exposed to wind and swell from the southerly quarter, however some of the headlands provide shelter. The majority of the coastline is comprised of steep medium to coarse grained beaches and exposed rocky cliff faces (Walls, 2006). A series of rocky reefs extend quite a distance offshore at Waipapa Point which delineates the western end of Waipapa Beach.

To the east of Waipapa Point, Waipapa Beach is a long sweeping, sandy beach which extends to Black Point and is backed by broad dunes and two coastal lakes, Lake Cook and Lake Brunton. The dunes are protected and within public conservation land. To the west of Waipapa Point, several low headlands with offshore reefs are interspersed with a series of beaches, specifically Frasers Beach. This area has slightly steeper terrain with some reefs and rocky outcrops offshore.

Annual rainfall is 1,500mm. Elevation ranges from 0 to 52m south of the Tokanui River mouth. Annual sunshine hours are 1,650 per year. Median temperatures range from 18° Celsius in Summer and 3-4° Celsius in Winter.

BIOTIC

The total land area within Waipapa Coastal Terrestrial area is 1,562 ha, of which 0.6% is in native forest, 0.4% in native shrubland, 0.3% in fernland, 5.4% in wetland communities, 0.5% in exotic treeland, 3.3% in exotic scrub, 76.6% in pasture, 9.5% in bare or lightly-vegetated surfaces, 3.3% in water bodies and 0% in artificial surfaces.

The long, sandy Waipapa Beach is backed by steep, windswept sand dunes covered in exotic and weedy marram grass, some pingao sedglands and peatlands near the coastal lakes which is protected and within conservation land. The Waipapa beach dunes have the largest dune slack system known to occur on the Southland coast (Rance, 2018). This wetland type contains several threatened plant species such as the at risk endemic plant the sand musk (*Mazus arenarius*). The vegetation is likely to have been pingao sedglands with some fragmented kāmahi, southern rātā and podocarp forest, with some flaxland and wire rush around Lake Brunton. Marram grass has stabilised the dunes and resulted in the dunes growing in size. Intensively farmed sand plains back sand dunes and surround the coastal lakes and ponds. Behind the eastern end of Waipapa beach there is also scattered stands of totara forest. The forest has established on ancient stabilised sand dune, now an endangered and naturally rare ecosystem. The edge between farmland and the coastal margin is very distinctive.

In addition to sandy beaches, wetlands and peatlands are common along this coast. All the wetlands along this southern coast have been designated as wetlands of National Importance to Fisheries. Wetlands with specific significance include the Lakes Brunton, Cook and Vincent (DOC, 2000).

Lake Brunton is a shallow coastal lake that drains into the upper Waipapa Beach, east of Waipapa Point. The lagoon is separated from the sea by a barrier beach which, when not closed, drains through an unmanaged opening to the sea. This lake has a brackish colour and historically would have had extensive saltmarsh areas. The lagoon is bordered by extensive areas of saltmarsh (jointed wire rush and flax), and its bed has a high value *Ruppia*-dominated submerged aquatic plant community (Stevens, L; Robertson, B, 2013). East of Lake Brunton, the marram dunes are much wider and the back dunes are vegetated with exotic shrubs.

Lakes Brunton and Vincent provide habitats for threatened fish species such as the taiwharu (giant kōkopu, *Galaxias argenteus*) and the threatened isopod *Austridotea annectans*.

Waipapa Point has resident nationally critical Whakahao (New Zealand sea lion, *Phocarctos hookeri*) for over 20 years now and contains populations of the at risk coastal cress (*Lepidium tenuicale*) (Rance, 2018).)

The exposed headlands along the coastline contain localised areas of coastal turfs, a naturally rare ecosystem with a critically endangered threat status. These sites include Slope Point, Black Point, and Waipapa Point. Within these coastal turfs are endemic species which are threatened (Rance, 2018).

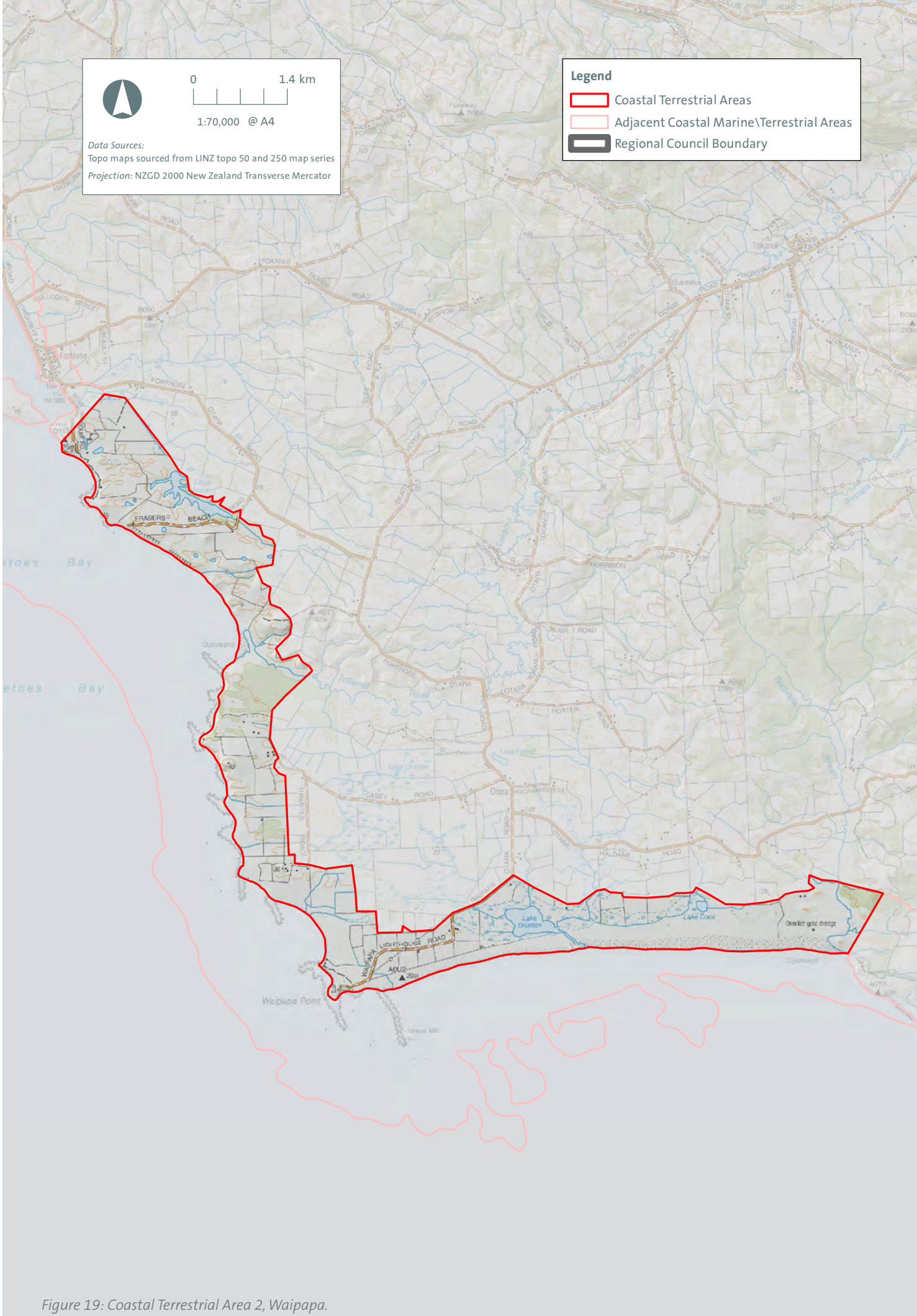
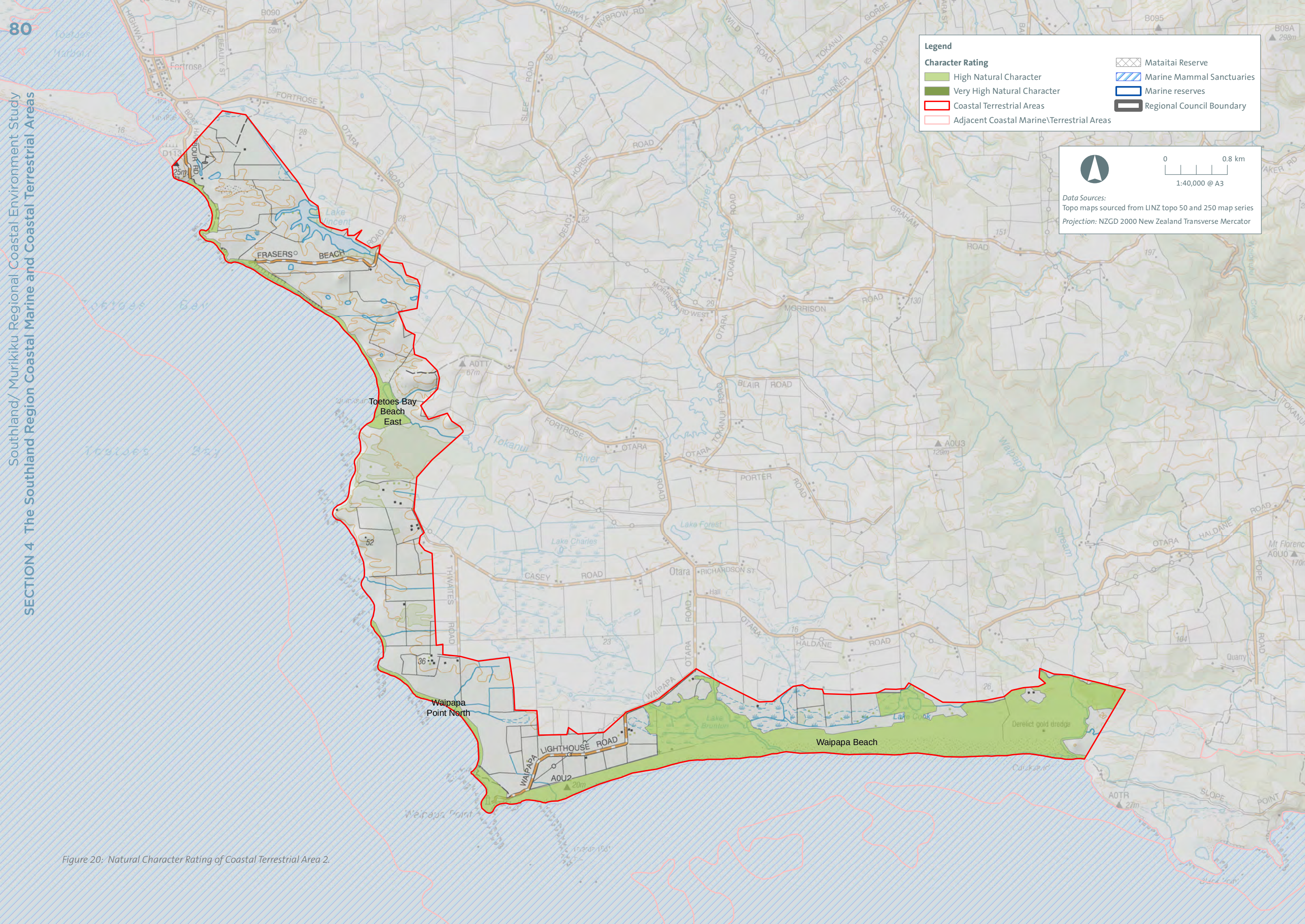


Figure 19: Coastal Terrestrial Area 2, Waipapa.



EXPERIENTIAL

Waipapa Point contains the highest concentration of access points and recreational opportunities within this Coastal Terrestrial Area. The rocky shores allow for pāua (*Haliotis iris*) gathering, scuba diving, snorkelling, spear fishing, crayfishing, and surfcasting from the rocks. Safe swimming areas are provided behind the rocky reefs near Waipapa Point.

Waipapa Beach has a rich history which includes gold mining attempts and shipwrecks on the rocky reefs off-shore. Remains of a derelict gold dredge dating back to 1935 can be found within the sandhills on the eastern side of Waipapa Beach. Historical gold mining attempts in the area date back to 1890.

The remains of the Taraua shipwreck, a steamship which sank in 1881, lies on a reef offshore to the south-east of Waipapa Point. Over a hundred lives were lost and this remains one of the worst civilian shipwrecks in the country. Eventually this led to the Waipapa Point lighthouse being constructed in 1883. Waipapa Point Lighthouse is the last wooden lighthouse built in New Zealand and stands out as a reminder of the shipwreck.

Overall, this Coastal Terrestrial Area provides a scenic and remote experience which is off the beaten track and close to the Catlins.

Level 3 Rating: Coastal Terrestrial Area 2 - Waipapa			
Degree of Natural Character	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH	✓		✓
MODERATE TO HIGH		✓	
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		HIGH	



Rocky beach and rolling hills common in this Coastal Terrestrial Area. Boffa Miskell, 2018

Coastal Terrestrial Area 2: Waipapa						
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)						
THESE ARE MAPPED WITH REFERENCE TO FIGURE 20						
REFER TO COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.						
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WAIPAPA BEACH	H	H	MH	H	• Waipapa Beach is a long sweeping, sandy beach which is backed by broad dunes and two coastal lakes, Lake Cook and Lake Brunton. • The sand dunes are protected and within conservation land at Waipapa Beach. • Several low headlands with offshore reefs are interspersed with a series of beaches. • Lakes Brunton, Cook and Vincent have been designated as wetlands of National Importance to Fisheries. • Brackish coloured lakes of Brunton and Vincent provide habitats for threatened fish species such as the taiwharu/giant kōkopu (<i>Galaxias argenteus</i>) and the threatened isopod (<i>Austridotea annectans</i>). • Waipapa Point has resident nationally critical whakahao/New Zealand sea lion (<i>Phocarctos hookeri</i>) for over 20 years now. • Waipapa Point contains the highest concentration of access points and recreational opportunities along this coastline. • Waipapa Beach has a rich history which includes gold mining attempts and shipwrecks on the rocky reefs off-shore. • Waipapa Point Lighthouse is the last wooden lighthouse built in New Zealand and stands out as a reminder of the shipwrecks. • High level of recreation, exposure and wildness.	• Mapping excludes more modified adjoining land to the north, including paddocks and Waipapa Lighthouse Road. Area includes the lighthouse and derelict gold dredging site.
WAIPAPA POINT NORTH	H	H	MH	H	• Several low headlands with offshore reefs interspersed with a series of beaches. • High level of recreation, exposure and wildness.	• Slender strip which excludes the more modified land to the east.
TOETOES BAY BEACH EAST	H	H	MH	H	• Coastal cliffs with remnant vegetation. • Several low headlands with offshore reefs are interspersed with a series of beaches, specifically Frasers Beach. • High level of recreation, exposure and wildness.	• Slender strip which excludes the more modified land to the east.

View of Waipapa Point looking towards the lighthouse.
Boffa Miskell, 2018.





View overlooking Awarua Bay.
Boffa Miskell, 2018.

4.9 COASTAL TERRESTRIAL AREA 3: AWARUA

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area extends from Bluff Harbour to Fortrose and includes the wetlands and coastal lowlands of surrounding the waters of Bluff Harbour and Awarua Bay, as well as the Tiwai Point peninsula, Waituna Lagoon and Toetoes Estuary.

The Awarua Wetland Complex is one of three sites which make up the national Arawai Kakariki wetland restoration programme and is significant for both ecological and Maori cultural reasons (Department of Conservation, 2018). There are four major wetland types in this protected area, including coastal lagoons, freshwater swamps, extensive peatland, and estuaries. The wetlands were significant to Ngai Tahu as they were a place of resource collection (mahinga kai), such as the fishing of native shortfin and longfin eels.

This coastline is notable for its relatively steep, dynamic, sand and quartz gravel beaches bounded by low coastal vegetation specifically adapted to the southerly winds to which it is so exposed. This vegetation sits on relatively flat barrier beach/peninsula formations (Environment Southland, 2013).

The coastal wetlands extend for many kilometres in land and as a result, limited modification has generally been experienced in this area. The most substantial is the development at Tiwai Point with other areas containing small road, powerlines and the odd building.

Key coastal characteristics include: Estuarine environments such as the Toetoes Estuary and Waituna Lagoon, windswept beaches, tidal mudflats within Awarua Bay and Tiwai Peninsula and Tiwai Point which is the base for an aluminium smelter.

The inland extent of the coastal environment for this Coastal Terrestrial Area has been identified along the wetland and tidal limits of Bluff Harbour and Awarua Bay, Waituna Lagoon and the Maitaura river mouth at Toetoes Harbour. These areas border both developed plains and inland wetland environments.

Beyond this Coastal Terrestrial Area is the internationally important Awarua Wetlands and highly modified Southland Plains. Refer to Figure 21 for the extent of the Awarua Coastal Terrestrial Area.

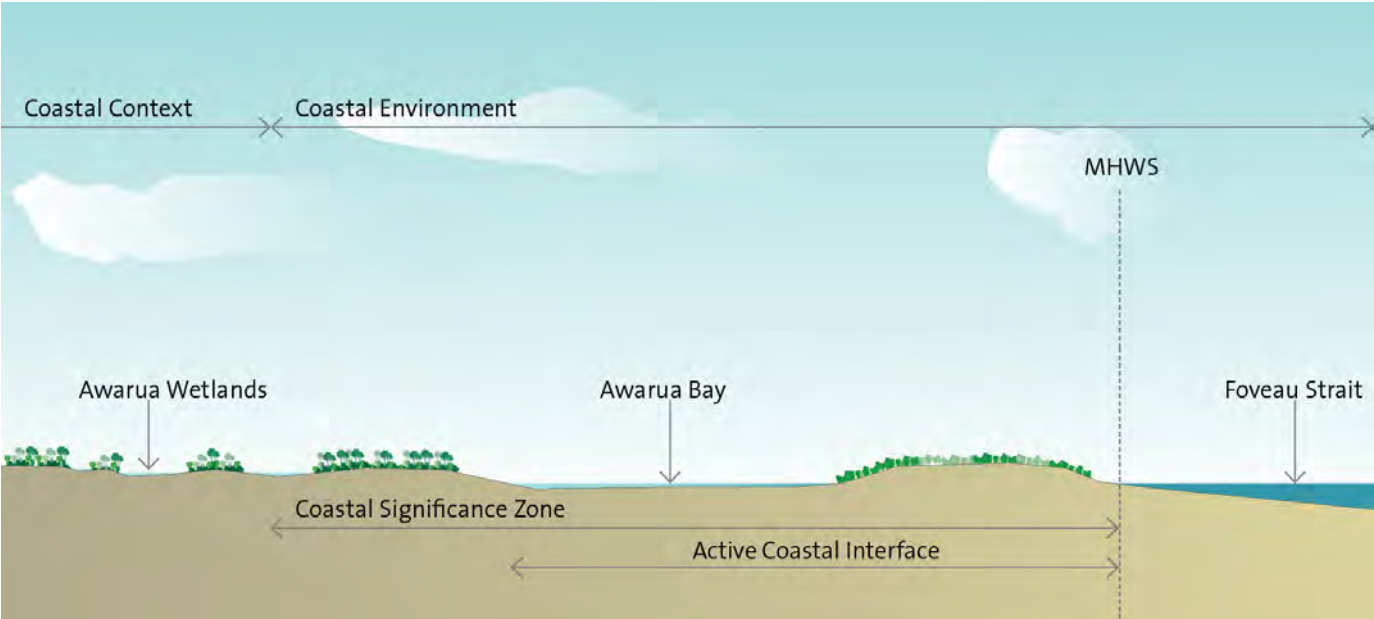


Diagram 7: Representative Coastal Environment diagram of the Awarua Coastal Terrestrial Area.

ABIOTIC

The Awarua Coastal Terrestrial Area includes extensive shingle beaches, gravel bars, dunelands and their associated native vegetation and the adjoining peatbogs, lagoons, estuaries, saltmarshes and tidal flats which are largely unmodified (Environment Southland, 2013).

Toetoes Estuary, Waituna Lagoon with associated wetlands and Awarua Bay form part of a much larger wetland complex located on the Awarua Plain. The beaches between Fortrose and Tiwai Point contain deposits of gold and platinum.

The Maitaura River barrier-enclosed Toetoes Estuary is one of the few remaining natural dune systems along an estuary-enclosing spit on the southern Southland coast with deltaic deposits. Listed as a Geopreservation Site of regional importance, Toetoes Estuary consists of 400 hectares of expansive tidal flats and is fed by both the Matarua River and Titiroa Stream. This estuary is more of a riverine composition when compared to the other Southland estuaries.

The Awarua Wetland Complex and Lagoon is one of the first to be recognised as a wetland of international importance in New Zealand. The Waituna Wetland Scientific Reserve was listed as part of New Zealand’s obligations when signing the Ramsar Wetland Convention (DOC, 2006). The Waituna coastal lake and lagoon are also identified in the Geopreservation Index as nationally important as they are a classic example in New Zealand of a largely unmodified coastal lake-type lagoon within an intact coastal wetland system trapped behind a barrier beach. Waituna Lagoon has formed on a gravel outwash plain into which three streams discharge. Longshore drift has produced a mixed sand and gravel barrier beach which restricts drainage, forming a brackish lagoon and wetland complex covering approximately 3,500 hectares.

The 5,700 hectare double estuary of Bluff Harbour and Awarua Bay are listed as nationally important in the Geopreservation Inventory as they are the largest estuaries and spit on the South Island’s south coast. They both are excellent examples of coastal features including flood-tidal deltas, tombolos, wetlands and one of the most extensive series of beach ridges in the country. Both Bluff Harbour and Awarua Bay have little freshwater inputs however, the harbour generally has better water quality than Southland’s other estuaries due to there being no rivers or streams into the harbour, however large stormwater events can cause the water quality to fluctuate (Robertson, B.; Stevens, L., 2008). This coastal landscape offers very little topography change since it is predominately peatland overlain with white quartz gravels. The upper parts of the foreshore are characterised by fine gravel beaches and iron-stained quartz pebbles, some of which are ventifacts. At lower levels, these give way to sand flats, rather than mud flats.

Ventifacts, rocks or stones that have been naturally shaped by the abrasive action of wind-borne sand approximately 10,000 years ago during periods of lowered sea levels and strong winds, can be found throughout the area (Boffa Miskell Ltd, 2010).

Interesting rock exposures of metamorphic Bluff hornfels rock, associated with volcanic intrusions, occur adjacent to the low-lying foreshore at Bluff township and at Tiwai Point. These hornfels are identified as nationally important in the Geopreservation Inventory.

Along the Waituna-Tiwai coast the beach has sediments sorted by long-shore drift grading from coarse gravel in the east to pea gravel to sand on Fortrose Spit. Most of the beach has pea gravel. Shingle beaches (including the gravel beach) are a naturally rare ecosystem with the threat status of Endangered. These gravel beaches contain some threatened plants including the Southland coast endemic biddibid (*Aceana microphylla* ssp. *pauciglochidiata*) (Rance, 2018).

Tiwai Peninsula along with Waituna Lagoon and Fortrose Spit are all geologically recent landforms connected to changes in sea level and the Maitaura River (Environment Southland, 2013).

Annual rainfall is 1,200mm. Annual sunshine hours are 1,500 – 1,600 per year (NIWA, 2013). Median temperatures range from 17° Celsius in Summer and 4° Celsius in Winter. Due to the coastal edge consisting primarily of wetlands and lagoons, there is little change in elevation. However, the elevation does range from 0 to 15m with the highest point being found between Awarua Bay and Waituna Lagoon.



Figure 21: Coastal Terrestrial Area 3, Awarua.

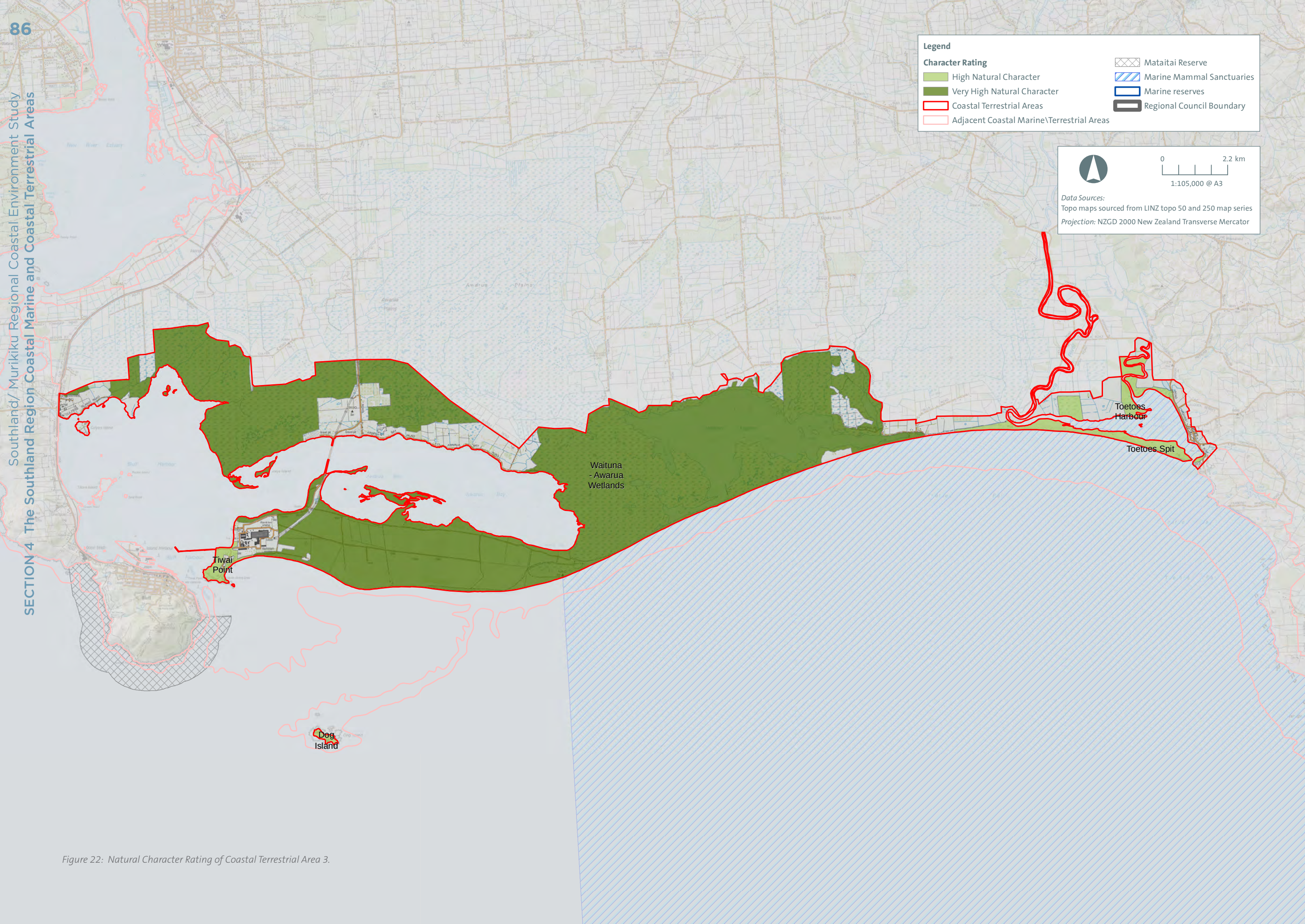


Figure 22: Natural Character Rating of Coastal Terrestrial Area 3.

BIOTIC

The total land area within Awarua Coastal Terrestrial area is 11,028 ha, of which 0.1% is in native forest, 1.2% in native shrubland, 4.5% in fernland, 56.5% in wetland communities, 1.1% in exotic treeland, 1.2% in exotic scrub, 18% in pasture, 2.1% in bare or lightly-vegetated surfaces, 13.8% in water bodies and 1.4% in artificial surfaces. The previous natural cover would have included a much larger extent of forest.

The Fortrose Spit is one of the most intact dune systems along the Southern coast besides Fiordland and Stewart Island (Rance, 2018). The dunes contain pingao and this is maintained by active marram grass control in the area. As well as being abundant in pingao, the Fortrose Spit is a national stronghold for the at risk mat daisy (*Raoulia sp. aff. Hookerii*), and the nationally vulnerable buttercup (*Ranunculus recens*). The dune also has hollows containing *Raoulia sp. aff. Hookerii*, a naturally rare ecosystem with an endangered threat status. However, these hollows are the most valuable cushion fields for *Raoulia sp. aff. Hookerii* Southland and likely nationally (Rance, 2018).

The margins of Toetoes Estuary are fringed by wetland habitats backed by farmland and contains an important population of at risk estuary sedge (*Carex litorosa*) (Rance, 2018). The most significant proportions of indigenous vegetation can be found on the northern and southern boundaries. An intact dune system contains significant areas of native (e.g. the nationally declining pingao) sand-binding species to the south. In addition to this, marram, the nationally declining hinarepe/sand tussock (*Poa billardierei*), the nationally declining sand pimeleae (*Pimelea lyallii*) and saltmarsh communities can also be found on the Toetoes Estuary spit.

The Toetoes Estuary is rated as outstanding by the 'Wetlands of national Importance to Fisheries Database' due to providing significant habitat for juvenile and adult flatfish and is a breeding area for most Inanga species (Environment Southland, 2013). The Mataura and Titiroa Rivers are the most productive Inanga fishery areas in the region.

Toetoes Estuary, Waituna Lagoon and Awarua Bay are identified as the most important bird habitat in Southland and of the five most important wading bird habitats in New Zealand (DOC, 2016). A total of 39 bird species have been recorded within Toetoes Estuary and while some may breed in vegetation on its margins, most use the estuary for feeding purposes (Environment Southland, 2013).

The coastal red tussockland complex on the Tiwai Peninsula is the largest in New Zealand. The vegetation in this area contains a mixture of red tussock land with short tussock land, flax land, shrubland, and bracken fern land (Rance, 2018). The peninsula supports a rich flora including several threatened or notable species such as the nationally vulnerable creeping iris (*Libertia peregrinans*) where the peninsula acts as a national stronghold for the species. Other threatened and notable species include the at risk matagouri (*Discaria toumatou*) and the speargrass (*Aciphylla glaucescens*). Tiwai Peninsula also supports the Australasian bittern, lizards, and invertebrate species of importance and overall the peninsula is considered of National Importance (Rance, 2018).

The Awarua Wetland Complex is one of the largest wetlands in New Zealand and is largely dominated by peat substrates and ecosystems (Rance, 2018). There is however a range of plant ecosystems and communities such as swamps, estuaries and forests. Awarua Bay holds large numbers of migratory waders, local waders and waterfowl. With its extensive low tide feeding areas, Awarua Bay is part of the internationally significant Southland estuaries wetland complex (RAMSAR site). Hundreds of migratory waders frequent Awarua Bay, including 21 species from the northern hemisphere. The Siberian tattler and the sandling are just two of the migrant waders which occur here and are rarely found in other New Zealand estuaries. The bay is also the autumn and winter habitat of the Southern New Zealand dotterel (*Charadrius obscurus*) whose status is nationally vulnerable. There are only about 100 birds in the total population (Environment Southland, 2013).

Awarua Bay also has areas of the at-risk sea grass (*Zostera muelleri ssp. novazelandica*), mudflats and estuarine vegetation including important populations of the nationally vulnerable grass (*Lachnagrotis tenuis*). The estuarine fringes of Awarua Bay and Cow Island are the major habitat for the nationally critical moth (*Asophodes frivola*) (Rance, 2018).

The Mataura River forms the western boundary and is more riverine than estuarine. The river banks are relatively modified and lack vegetation aside from some willows scattered along some sections.

The upper tidal mudflats (which lie above the MHWS) are an important component of the Awarua wetlands. The wetlands are surrounded by various forms of low indigenous vegetation, including sub-alpine or montane species. Sand flats are more prevalent at lower levels than mud flats. Much of the mudflat area in the Awarua wetland complex are dominated by seagrass beds (Walls, 2006). The mudflats support a rich fauna of worms, crustacea and shellfish which form an important food supply for the waterfowl (Walls, 2006).



Aerial of the Awarua Wetland complex. Boffa Miskell, 2018.

The wetland complex provides extensive spawning and nursery areas for both marine and freshwater fish species (Walls, 2006). Characteristic species include taiwharu/giant kōkopu (*Galaxias argenteus*), banded kōkopu (*Galaxias fasciatus*), Inanga (*Galaxias maculatus*), longfin eel (*Anguilla dieffenbachii*), tuna (shortfin eel, *Anguilla australis*), the nationally vulnerable kanakana/lamprey (*Geotria australis*), yellow-eyed mullet (*Aldrichetta forsteri*), kahawai (*Arripis trutta*), stargazer (*Leptoscopus macropygus*), and pātiki (flounder) species including black (*Rhombosolea retiaria*) yellowbelly (*Rhombosolea leporina*) and sand (*R. plebeia*) (Walls, 2006). The coastal situation of the wetland is also of importance. The wetland contains ecological gradients within the wetland between the wetland with the coast, estuaries, and forests (Rance, 2018).

Awarua Bay is considered to have significant values because of its unmodified habitat of national importance specifically providing for large seagrass beds and maritime marsh. The dynamic nature of the coast, with sand bars building up, water courses changing and seasonal animal movements and requirements are of particular importance.

EXPERIENTIAL

This Coastal Terrestrial Area is isolated, wild and windswept with its scenic beauty quite different from other coastal landscapes in Southland. The remote and flat landscape attracts visitors seeking relatively remote and isolated experiences.

Access to the Awarua Coastal Terrestrial Area is relatively easy and direct but can be limiting in the more remote areas. The small settlement of Fortrose is located in the south-east corner of Toetoes Estuary along the Southern Scenic Route. The Mataura River has roads on either side of it with small fishing huts and wharves scattered along its length. The river along with the Titiroa River is the most productive white bait fishery in the region, and is a significant habitat for both juvenile and adult breeding white bait of various species (Environment Southland, 2013).

The Waituna Lagoon is more difficult to access with only one road leading to it. The lagoon is a popular fishing and duck shooting area. Awarua Bay and Tiwai Point are more accessible than other areas within this coastal landscape.

Visitors frequent this part of the coast for recreational fishing, boating, picnicking, walking and bird watching. Awarua Bay is a popular windsurfing and kite-surfing area and is commonly used by people seeking more sheltered water for kayaking.

There is a bridge that crosses Awarua Bay to access Tiwai Point and the New Zealand Aluminium smelter. Twin rows of electricity towers follow the bridge and lead to the smelter resulting in a distinctive man-made feature.

Nearby to this Coastal Terrestrial Area are the populated areas of Invercargill and Bluff which contrast greatly with this remote coast.

Level 3 Rating: Coastal Terrestrial Area 3 - Awarua

DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓		
HIGH		✓	✓
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		HIGH	

Coastal Terrestrial Area 3: Awarua

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 22

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

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
TOETOES HARBOUR	H	H	H	MH	- The Mataura River barrier-enclosed Toetoes Estuary is one of the few remaining natural dune systems along an estuary-enclosing spit on the southern Southland coast with rare deltaic deposits. - High levels of remoteness and recreation.	Mapping includes several areas around the Harbour but excludes more modified adjoining land used for grazing.
TOETOES SPIT	H	H	H	H	- An intact dune system contains significant areas of native (e.g . pingao) sand-binding species to the south. - Sand tussock (<i>Austrofestuca liitoralis</i>), sand pimelia, saltmarsh communities can also be found on the Toetoes Estuary spit. - High levels of naturalness, recreation and exposure.	Entire spit included.

Continued from previous page

Coastal Terrestrial Area 3: Awarua						
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)						
THESE ARE MAPPED WITH REFERENCE TO FIGURE 22						
REFER TO COASTAL MARINE AREA A FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.						
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WAITUNA AND AWARUA WETLANDS	VH	VH	VH	VH	- The 3,500 hectare Awarua Wetland Complex is one of the first to be recognised as a wetland of international importance in New Zealand. - The Waituna Wetland Scientific Reserve was listed as part of New Zealand's obligations when signing the Ramsar Wetland Convention (DOC). - The Waituna coastal lake and lagoon are also identified in the Geopreservation Index as nationally important as they are a classic example in New Zealand of a largely unmodified coastal lake-type lagoon within an intact coastal wetland system trapped behind a barrier beach. - Awaura Bay has excellent examples of coastal features including flood-tidal deltas, tombolos, wetlands and one of the most extensive series of beach ridges in the country. - Strong levels of naturalness apparent due to lack of modification. - High levels of recreation, remoteness and isolation.	- Excludes the more modified pastoral land uses. - Mapping includes several areas surrounding Bluff Harbour and Awarua Bay
TIWAI POINT	H	H	H	MH	- Indigenous scrub and shrub land cover occupy much of the Tiwai peninsula. - Barren and wild experiential values. Isolated and remote.	This mapped area does not include the Aluminium Smelter, and transmission areas and is focussed on the extreme western end of the peninsula.

View of the Matarua River looking towards the Awarua Wetland. Boffa Miskell, 2018.





View overlooking Steep Head looking south towards Bluff. Boffa Miskell, 2018.

4.10 COASTAL TERRESTRIAL AREA 4: BLUFF/OMAUI

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area includes the Bluff peninsula and volcanic headland, the Mokomoko Inlet and Omaui/ Three Sisters peak. The area also includes various small islands, such as Tikore Island in the Bluff Harbour as well as the bays around the peninsula. The terrain around Bluff and Omaui is reasonably steep. Large rocky cliffs clad largely in indigenous vegetation face south-westwards towards Foveaux Strait around the southern part of the Bluff hillside, while the northern facing side forms the populated and highly modified township of Bluff.

Further northwards, the peninsula broadens, where much of the land modification and development is located on the eastern side. The western side retains patchy indigenous bush, however is predominantly farmland. The Mokomoko Inlet area is predominantly flat with patches of indigenous vegetation evident at its southern shores. Farming is the prominent land use activity in this part of this Coastal Terrestrial Area.

Key coastal characteristics include: rocky cliffs facing Foveaux Strait, highly modified coastline near the Bluff Port and township, volcanic landforms of Three Sisters and Bluff, sand dunes which have formed between the Three Sisters and Bluff, and offshore rocky outcrops.

The inland extent of the coastal environment for this Coastal Terrestrial Area is centred around and limited to the two volcanic land forms of Bluff and the Three Sisters near Omaui. Refer to Figure 23 for the extent of the Bluff/Omaui Coastal Terrestrial Area.

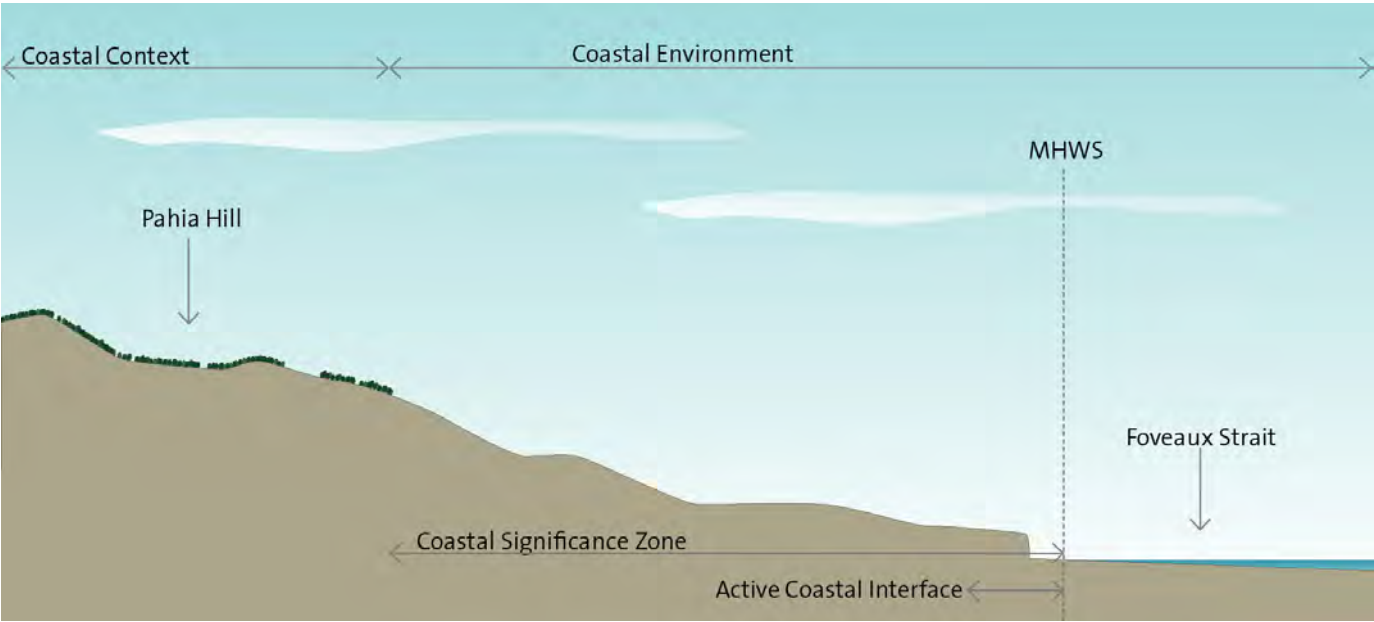


Diagram 8: Representative Coastal Environment diagram of the Bluff/Omaui Coastal Terrestrial Area.

ABIOTIC

The Bluff/Omaui Coastal Terrestrial Area includes the Bluff Peninsula, Port and numerous islands to the east within Bluff Harbour. This area is very exposed to the influences of Foveaux Strait's rough seas and coastal climate. Rocky shores border the western coastline with small sandy beaches scattered in between.

The geomorphology of this area is quite distinct in comparison to the surrounding areas. The volcanic landforms of Bluff Hill/Motupōhue and the Three Sisters contrast with the surrounding flat coastline and hinterland to the east. These visually prominent hills, cliffs, and the narrow neck of land between them appear as one distinctive landform. They form the visual backdrop when viewed across the flat land further north, including Oreti Beach and the New River Estuary.

The underlying volcanic geology (Greenhills ultramafic complex) is the most evident along the exposed coastline, (where some nationally significant examples of this rock type occur as listed in the Geopreservation Inventory). The shoreline, extending for approximately 500 metres eastward from Barracouta Point, contains a spectacular exposure of layered, deformed gabbroic rock.

The windblown sands and dunes at The Three Sisters contrast with the otherwise rocky shoreline, adding to the diversity of landforms (Boffa Miskell Ltd, 2010).

The Mokomoko Inlet, which is identified as a Geopreservation Site, is recognised for its exceptionally well-preserved sequence of well-bedded, indurated sandstones and mudstones.

Annual rainfall is 1,200 – 1,500mm. Annual sunshine hours are 1,500 – 1,600 per year (NIWA, 2013). Median temperatures range from 17° Celsius in summer to 3-4° Celsius in winter. Elevation in the Bluff / Omaui coastal terrestrial area ranges from 0 to 265 metres.

Bluff Hill/Motupōhue, at 265m, is the highest point in this area.

BIOTIC

The total land area within the Bluff/Omaui Coastal Terrestrial Area is 4,028 ha, of which 10.3% is in native forest, 18% in native shrubland, 1.9% in wetland communities, 2.9% in exotic treeland, 4.3% in exotic scrub, 53.9% in pasture, 0.9% in bare or lightly-vegetated surfaces, 0.4% in water bodies and 7.3% in artificial surfaces.

The majority of this Coastal Terrestrial Area is comprised of pasture, however there is a relatively high percentage of native vegetation evident, specifically around the steep coastal cliffs and headlands of the Three Sisters and Bluff Hill, where kāmahī, southern rātā, podocarp forest and shrubs, such as manuka, predominate. Some of this remnant vegetation is protected and forms part of Motupōhue, Omaui and Mokomoko Scenic Reserves. Omaui Scenic Reserve consists of a range of native flora and fauna which is typical of lowland Southland.

Bluff Hill has one of few stands of forest extending to the sea along the southern Southland coast. It contains a range of habitats and very rich flora including several threatened species, such as the southernmost known and largest Southland population of the at risk pygmy sundew (*Drosera pygmaea*) (Rance, 2018). Due to intensive community led pest control there has been a reintroduction of the South Island robin which has enhanced the overall birdlife (Rance, 2018). The Bluff Hill and Omaui Coast also forms the eastern distribution limit for muttonbird shrub (*Brachyglottis rotundifolia*) and teteaweta (*Olearia oporina*) (Rance, 2018).

The exposed coastal headlands retain localised areas of critically endangered coastal turfs (a naturally rare ecosystem). Some of these turfs are a stronghold for the at risk coastal cress (*Lepidium tenuicale*) (Rance, 2018).

A large and important dune system (outside of Fiordland and Stewart Island) is evident at the Three Sisters. It extends 1 km inland and approximately 100 m in altitude. It has rich flora, including over twenty nationally threatened and uncommon plant species. Extensive communities of nationally

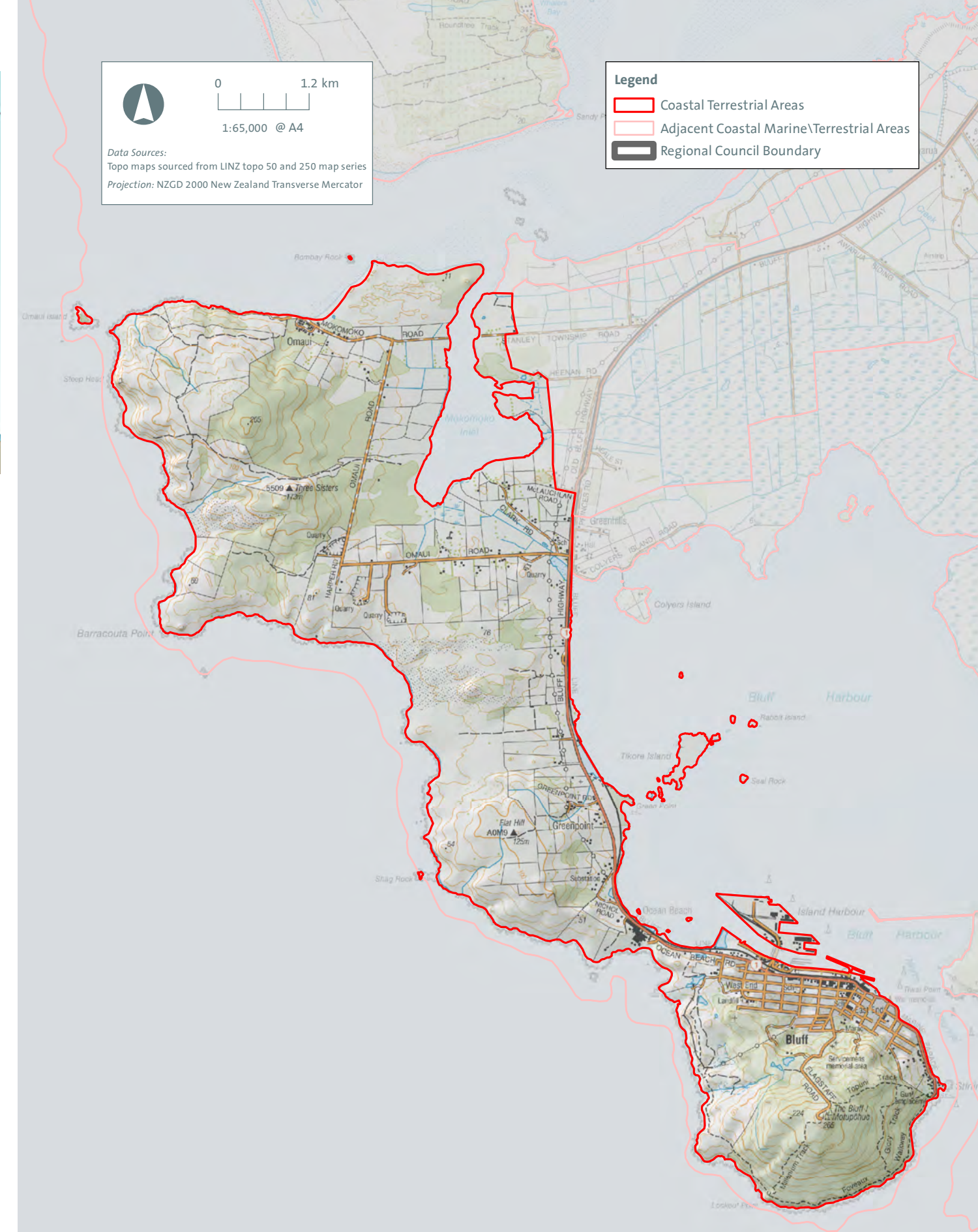


Figure 23: Coastal Terrestrial Area 4, Bluff/Omaui.

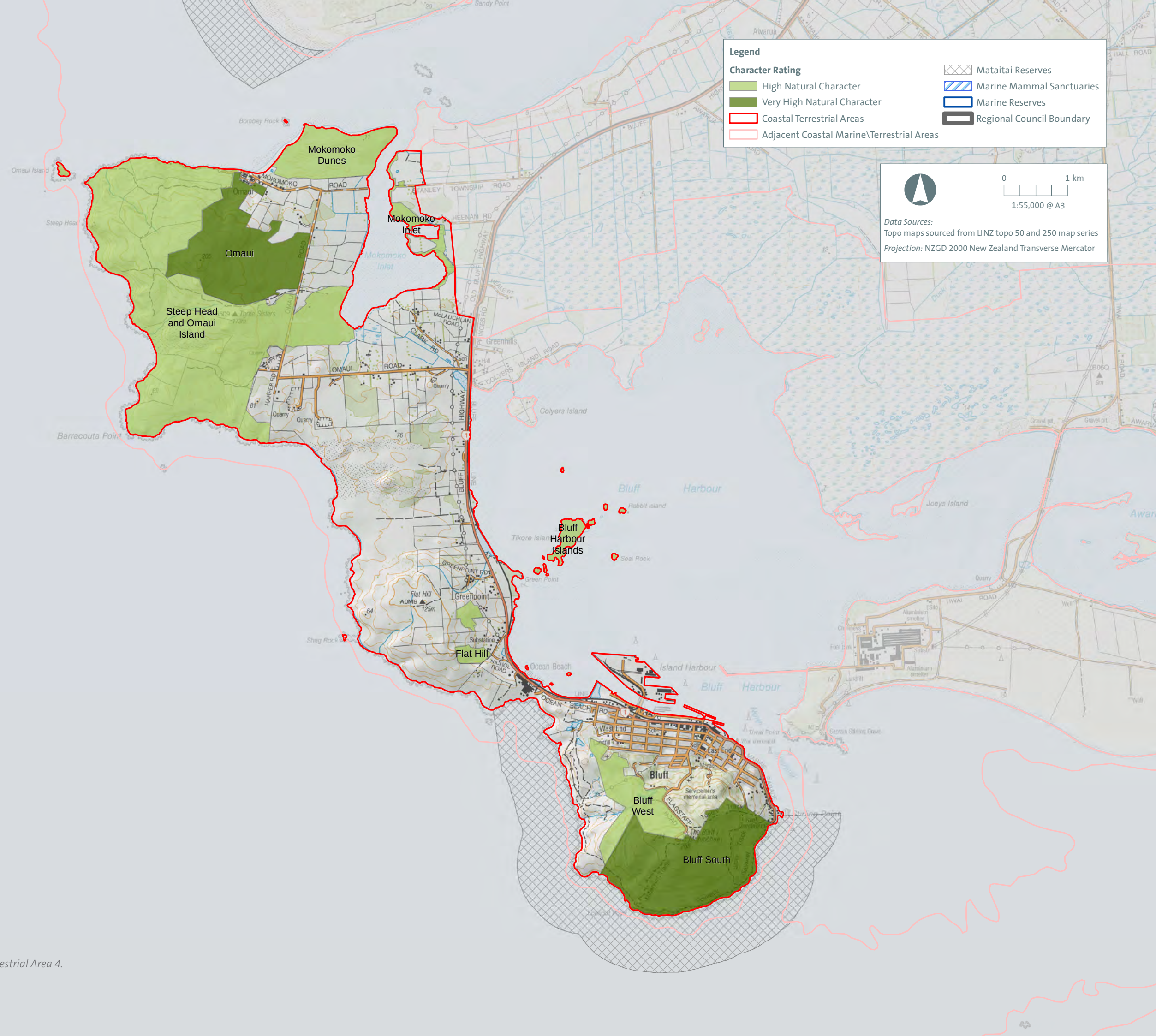


Figure 24: Natural Character Rating of Coastal Terrestrial Area 4.

declining pingao and carpets of low, salt-tolerant plants have established on the boundary of the mean high-water mark. This is a rare occurrence, as marram grass typically dominates most of the dunelands of Southland’s southern coast. This dune system includes habitat for the very rare ghost moth, and is the only known surviving site for the nationally critical plant *Gunnera hamiltonii*.

Parts of the western shore of Mokomoko Inlet are lined by stands of native vegetation, with the inlet as a whole considered internationally significant as part of the broader Awarua Plains wetlands group. The Mokomoko Inlet itself has Ramsar status (Rance, 2018).

Indigenous fauna within this Coastal Terrestrial Area include populations of fur seals and hoiho/yellow-eyed penguin (*Megadyptes antipodes*). These can specifically be seen on rock promontories or outcrops from Omaui Island to Stirling Point. This stretch of coast is also plentiful in pāua (*Haliotis iris*). Omaui Island is known as a breeding ground for several species of birds, including shags, gulls, declining kororā/blue penguin (*Eudyptula minor*), the at risk titi/sooty shearwater (*Puffinus griseus*) and the naturally uncommon royal spoonbill.

The occasional right whale can also be seen from Bluff (Environment Southland, 2013).

EXPERIENTIAL

Access to this Coastal Terrestrial Area is primarily along the eastern boundary via State Highway 1 which leads directly to the township of Bluff and terminates at Stirling Point. The railway line also extends in parallel to the State Highway. The main township is Bluff with smaller settlements located further north at Greenpoint, Greenhills and Omaui. Farm buildings and houses are also evident in low densities throughout across this Coastal Terrestrial Area.

A reclaimed wharf area close to the Bluff township, houses Southland’s major port facilities and is connected to the peninsula by a small bridge. The port is located immediately north of Bluff close to Ocean Beach, which is the main location for industrial facilities. A further small island, Colyers Island, located to the north of the port, is accessed by a bridge.

The windswept and wild coastline is appealing. Stirling Point is a popular destination for visitors as impressive views across Foveaux Strait, out to Stewart Island and the entrance to Bluff Harbour can be gained. The Te Araroa Trail (tramping track) and Tour Aotearoa (cycling route) both finish at Stirling Point.

A signpost with arrows pointing in different directions is located at Stirling Point and features in many tourist photos. From here, the Foveaux Walkway sees thousands of visitors per year, making it one of Southland’s most heavily used walking tracks.

Access to the coast for diving and sea fishing can be gained from this walkway and many locals use it on a daily basis. In addition to this, fisheries such as pāua (*Haliotis iris*), rock lobster and rāwaru/blue cod (*Parapercis colias*) are prevalent along this coast. Other activities including boating, windsurfing and commercial shipping vessels pass in and out of Bluff Harbour. A wind farm at Flat Hill contains eight turbines and is visible from Bluff Harbour and Foveaux Strait.

Bluff Hill is of particular significance to Ngai Tahu, as it is the burial site for the Kāti Māmoe leader Te Rakitauneke. He wished to be buried so that he could look over Murihiku (Southland) and gaze upon Foveaux Strait (Te Rūnanga o Ngāi Tahu, 2018) .

Level 3 Rating: Coastal Terrestrial Area 4 – Bluff/Omaui			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High	✓		
Moderate to High		✓	
Moderate			✓
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating		Moderate to High	

Coastal Terrestrial Area 4: Bluff/Omaui

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 24

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
BLUFF SOUTH	 VH	 VH	 VH	 VH	- Distinctive volcanic landform. - Large, remnant indigenous forest. - Popular recreational walking track which provides access to the coast for diving and fishing. - High level of naturalness, remoteness and exposure to the climatic conditions of Foveaux Strait.	Limited to the southern flanks of the hillside, including walking tracks and part of the mountain bike trails. This excludes the lookout and car park.
BLUFF WEST	 H	 H	 H	 H	- Distinctive volcanic landform. - Large, remnant indigenous forest. - High level of recreation, naturalness and exposure.	Includes upper part of peninsula which is less modified than lower sections, and includes walking tracks and mountain bike trails. This area excludes the lookout and associated car park.
FLAT HILL	 H	 H	 H	 H	- Small, remnant indigenous forest and shrubs. - High level of naturalness and exposure.	Mapping includes two areas of indigenous vegetation, but surrounded by modified grassland.

Continued from previous page

Coastal Terrestrial Area 4: Bluff/Omaui

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 24

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
BLUFF HARBOUR ISLANDS	 H	 H	 H	 H	- Remnant indigenous shrubs and small area of saltmarsh vegetation. - Significant landmark in Bluff Harbour. - High level of exposure and naturalness.	Mapping extends to all small islands/ islets and rocky outcrops associated with this group.
STEEP HEAD AND OMAUI ISLAND	 H	 H	 VH	 H	- Distinctive volcanic landform features. - Spectacular polished coastal cliff faces at Steep Head and on Omaui Island. - Three Sisters steep dunes display spectacular wind erosion of rock exposures. - Barracouta Point has spectacular exposures of layered gabbroic rocks which are of regional significance. - Remnant indigenous forest and shrubs. - Presence of fur seals and hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>). - High level of naturalness, remoteness and exposure to Foveaux Strait.	Includes all mid and lower slopes used primarily for grazing purposes west of Omaui Hill. Includes some tracks.
OMAUI	 VH	 VH	 VH	 H	- Distinctive volcanic landform. - Large, remnant indigenous forest. - High level of naturalness, remoteness and exposure to Foveaux Strait.	Includes all forest areas on hill and associated tracks. Contained to north-east by modified paddocks.
MOKOMOKO DUNES	 H	 H	 H	 H	- Intact dune system with limited modifications. - Open and exposed at mouth of estuary. - High level of naturalness and exposure to coastal and estuarine processes.	Contained to south by more modified paddocks.
MOKOMOKO INLET	 H	 H	 H	 H	- Wetland habitats border the Inlet's margins. - Remnant indigenous forest and shrubs. - High level of naturalness within enclosed inlet.	Excludes modified pasture further from water.



View overlooking margins of the New River Estuary. Boffa Miskell, 2018.

4.11 COASTAL TERRESTRIAL AREA 5: NEW RIVER ESTUARY

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area is located to the south of Invercargill City and sheltered from Foveaux Strait by the Oreti Beach spit, Sandy Point. The area is a relatively flat wetland margin surrounding New River Estuary which gradually rises in elevation towards the Coastal Context Area and adjacent plains. A number of rivers flow into this area, including the larger Waihopai and Oreti Rivers as well as smaller watercourses, including the Waimatua (or Duck Creek), Mokotua Stream and Waipaka Creek. Vegetation in this Coastal Terrestrial Area has been highly modified due to surrounding farming and the growth of residential developments around Invercargill. Bushy Point remains the most unmodified part of this Coastal Terrestrial Area, with intact saltmarsh ecosystems and many wading bird species still present. The waters of the estuary are tidal and referenced within Coastal Marine Area A.

Key coastal characteristics of this Coastal Terrestrial Area include: Prominent views of human settlement and broader land use modification, nearshore saltmarsh and bird habitats, the estuary walkway which is located along the north-eastern side of the estuary, sandy beaches at the New River Estuary mouth, and the main tributaries of the estuary including the Waihopai River and Oreti River.

The inland extent of the coastal environment for this Coastal Terrestrial Area follows the wetland margins and tidal limits of the New River Estuary. Land based modifications have restricted the coastal environment due to intensive development in Invercargill and of the surrounding farmland. The tidal reaches of the estuary allow for the inclusion of both the Oreti and Waihopai rivers as part of the coastal environment.

Beyond this Coastal Terrestrial Area is the Coastal Context Zone which consists of Invercargill City, Otatara and the wider modified farmland and industrial areas. The plains surrounding this Coastal Terrestrial Area have been highly developed, however remnants of previous wetland systems still exist and patches of indigenous vegetation such as the Seaward Bush Reserve and the expansive Awarua Wetlands are still present in the landscape. Refer to Figure 25 for the extent of the New River Estuary Coastal Terrestrial Area.

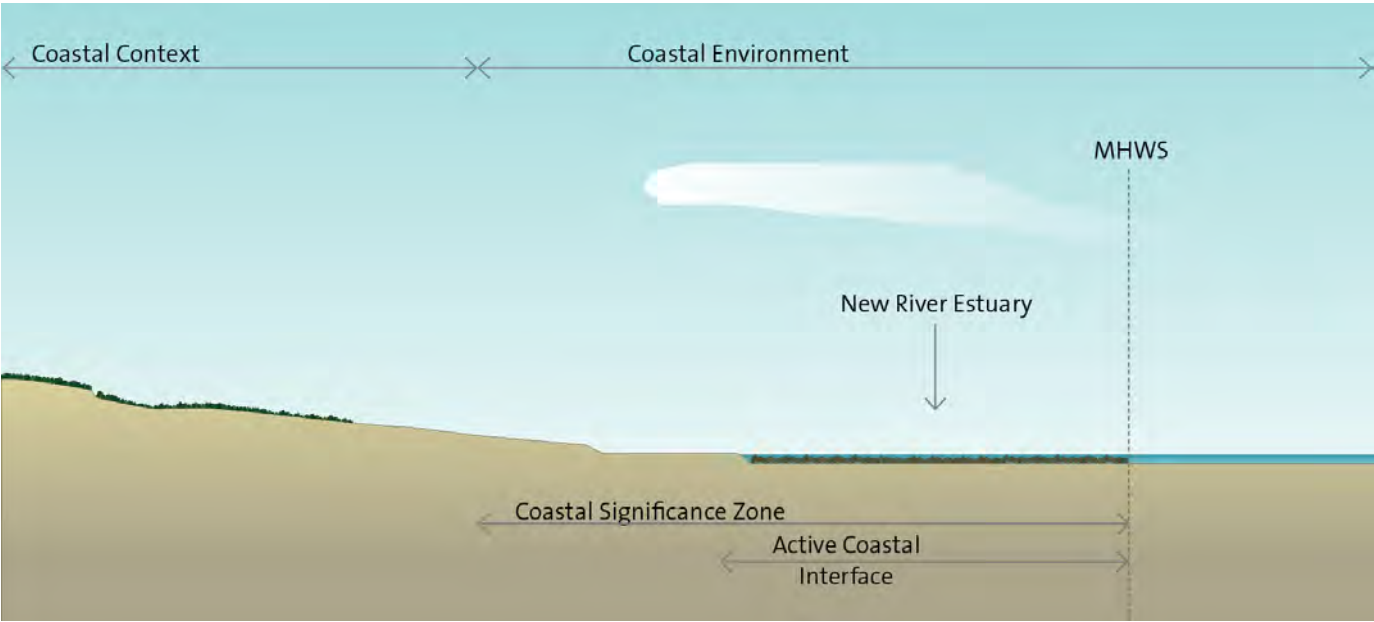


Diagram 9: Representative Coastal Environment diagram of the New River Estuary Coastal Terrestrial Area.

ABIOTIC

The New River Estuary Coastal Terrestrial Area consists of tidal flats, wetland and saltmarsh margins surrounding the estuary. This estuary forms part of the wider Awarua Plains wetlands complex and empties and fills by 73.5 billion litres each time (i.e. tidal prism mid-way between neap and spring tides). The New River Estuary is a large 'tidal lagoon' type estuary located at the confluence of the Oreti and Waihopai Rivers. This shallow estuary drains a mostly agricultural catchment which has degraded the water quality and created sedimentation issues. However, the estuary and associated mudflats are very important from a morphological perspective.

The estuary is sheltered from the rough seas of Foveaux Strait by the Oreti Beach spit, Sandy Point.

The Oreti river mouth has variable river flows from the Oreti, Waikiwi, and Makarewa rivers. The range in flow rate can be from six to one-thousand and ninety-five cumecs, and this is also influenced by the tidal forces in the estuary. The river enters the New River estuary resulting in sediment flocculation giving the appearance of muddy clumps throughout the estuary. The mouth of the estuary has gravel and mud bars which have built up over time.

Annual rainfall is 1,200mm. Annual sunshine hours are 1,650 – 1,7000 per year. Median temperatures range from 18° Celsius in Summer and 4° Celsius in Winter. Elevation in the New River Estuary is low, with the highest point being 20 metres near Busy Point at the north-western end of the estuary.

BIOTIC

The total land area within New River Estuary Coastal Terrestrial area is 1,950 ha, of which 4% is in native forest, 2% in native shrubland, 0% in fernland, 19% in wetland communities, 4% in exotic treeland, 2% in exotic scrub, 56% in pasture, 1% in bare or lightly-vegetated surfaces, 7% in water bodies and 3% in artificial surfaces.

The dynamic tidal area and adjacent wetland complex of the estuary has significance for its plants and animals. The shallow New River Estuary is bordered by a mix of land uses consisting of pasture, halls tōtara and kahikatea dune forest remnants and a mix of saltwater and freshwater vegetation. The totara dune forest is the largest and most intact forest of it' type. Pine plantations can also be found around Sandy Point at the mouth of the estuary. This Estuary was once the largest estuary in Southland, however its size has been reduced through land reclamation near the Waihopai River mouth. Prior to settlement, the estuary would have been connected to the larger Awarua Plains wetlands. Mainly saltmarsh and freshwater marsh has been lost since 1910 equating to 26% of its area. The result of this has led to reducing ecological values through weed infestation and lowered the habitat quality in some areas. The once extensive beds of exotic *Spartina* cordgrass, originally introduced in the 1930s to trap sediment and enable land reclamation in the estuary, have been largely eradicated in the estuary.

However, the overall ecological values are still very high given the diversity of habitats provided within the estuary. The New River Estuary forms part of the internationally significant bird habitat under the RAMSAR convention.

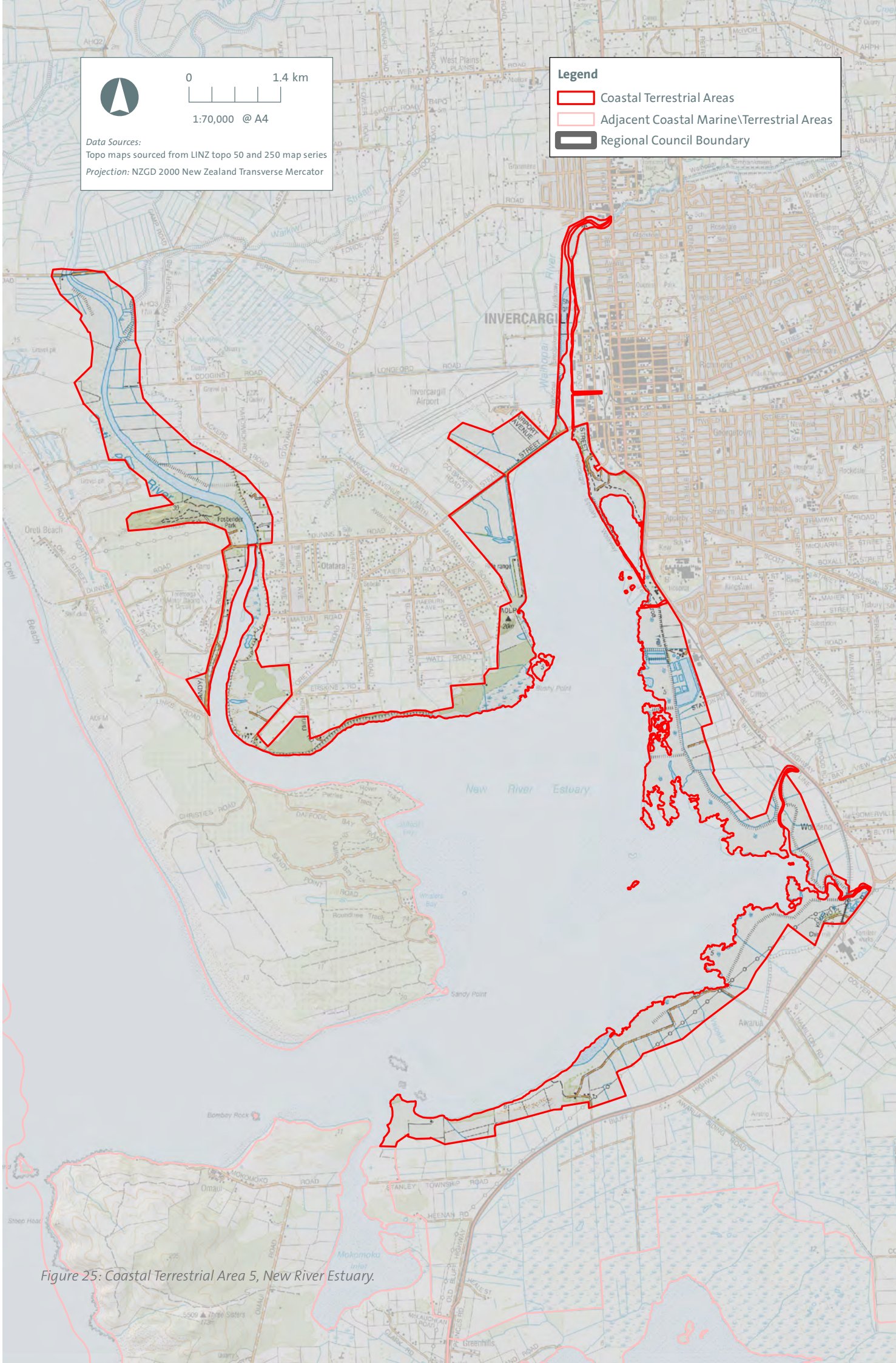
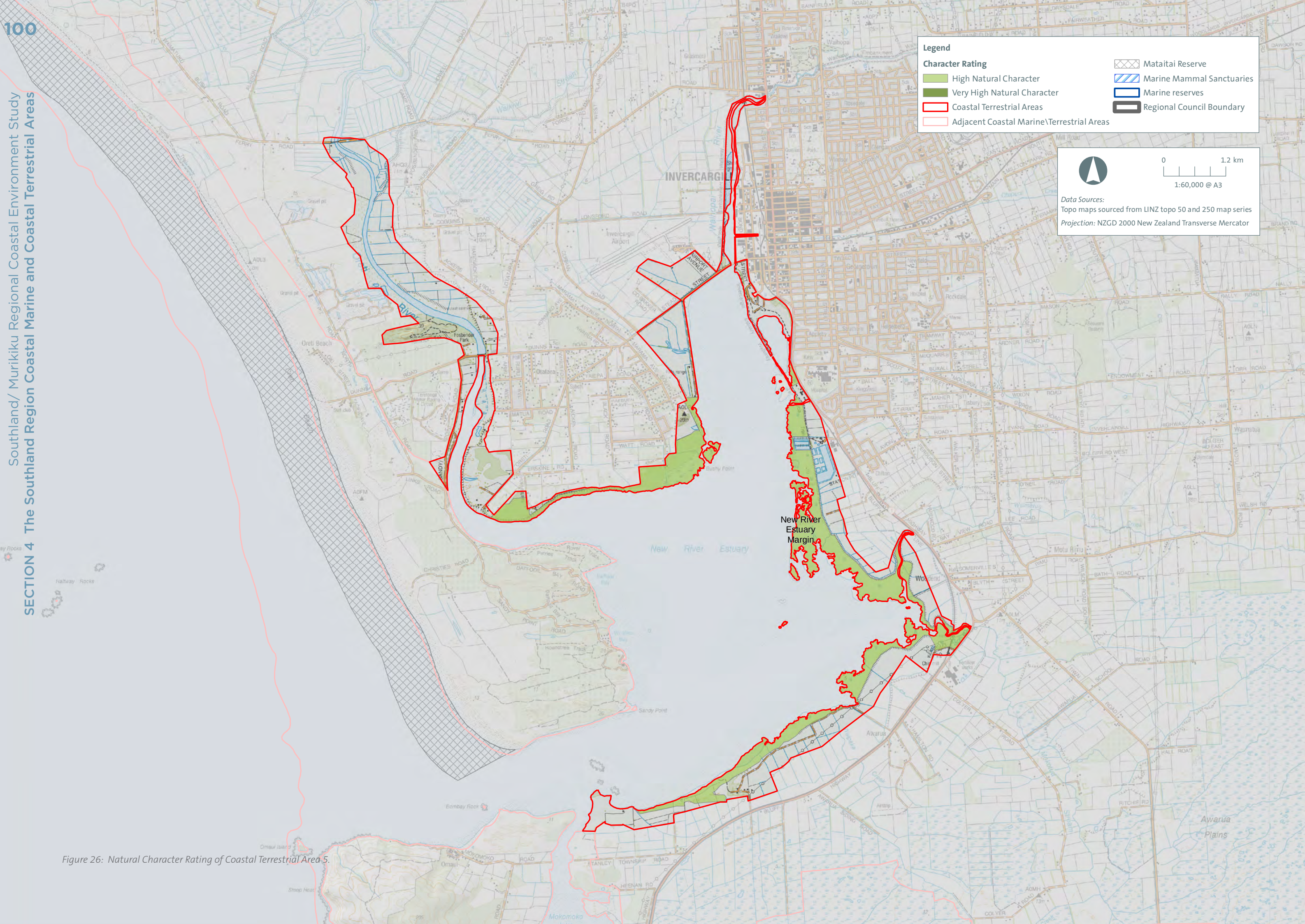


Figure 25: Coastal Terrestrial Area 5, New River Estuary.



Significant indigenous vegetation and habitats still exist near the Oreti River mouth and at Bushy Point. The nationally declining grass *Deschampsia cespitosa* is found at the estuary edge at Bushy Point (DOC, 2000). The Southern Otatara shoreline, including Bushy Point, contains extensive maritime marshes including an excellent sequence of marsh to sand dune thin-barked totara forest (*Podocarpus laetus*), which is of national significance (Boffa Miskell Ltd, 2010). A mosaic of forest communities, from manuka shrubland to mature mixed podocarp forest are contained in the reserve and a canopy of thin-barked totara (*Podocarpus laetus*), matai, lemonwood, pokaka and occasional rimu can be found (Boffa Miskell Ltd, 2010). A remnant of kahikatea forest is found near Kew Hospital on the eastern margin of the estuary. Bushy point itself is included in the Ramsar site and the estuarine fringe manuka shrublands support the nationally critical dwarf mistletoe (*Podocarpus laetus*).

These important estuary ecosystems provide good saltmarsh vegetation and habitats for interesting birdlife including 74 wading and waterfowl species. The estuarine fringe retains important populations of South Island fernbird and the At-Risk estuary sedge (*Carex litorosa*). The estuary also has the highest usage by trans-equatorial waders including several threatened species (DOC, 2000). These species consist of New Zealand dotterels (*Charadrius obscurus*), kuaka/eastern bar-tailed godwit (*Limosa lapponica*), tōrea/South Island pied oystercatcher (*Haematopus finschi*), turnstone and knot. An intensive spartina control programme has also been incredibly successful in the estuary with the plant on the verge of being eradicated from the area (Rance, 2018).

Shell banks are also found within the estuary which provide a significant breeding site for the nationally vulnerable Caspian tern (*Hydroprogne caspia*). This colony of terns is the southernmost in the world.

The estuary provides a nursery and spawning habitat for numerous marine and freshwater fish species including Inanga, flatfish, giant and banded/kōkopu (*Galaxias fasciatus*), the nationally vulnerable kanakana/ lamprey (*Geotria australis*) and tuna kuwharuwharu/longfin eel (*Anguilla dieffenbachii*).

Adjacent to the estuary are stands of totara forest. These are notable at Sandy Point and the Otatara South Scenic Reserve. The totara stands in the Otatara and Sandy Point areas are considered some of the most extensive and best remaining stands remaining nationally. These stands occur on ancient stabilised sand dunes and as such is a naturally rare Ecosystem with a threat status of Endangered (Rance, 2018).

EXPERIENTIAL

The New River Estuary Coastal Terrestrial Area is commonly used for walking, shellfish collection, studying birds, fishing and whitebaiting. An interpretation walkway along the estuary has been created as a recreational asset and to provide access to the scenic values of the estuary. The Te Araroa Trail also follows this walkway. Wading birds can also be seen on receding tides.

The Oreti River is a very popular fishery in the upper reaches and provides a habitat for trout, where it meets the New River Estuary. This Coastal Terrestrial Area, despite its modified context, retains aspects of wildness and remoteness, especially along the area’s southern extents.

Level 3 Rating: Coastal Terrestrial Area 5 – New River Estuary			
Degree of Natural Character	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH		✓	
HIGH			
MODERATE TO HIGH	✓		✓
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		HIGH	

Coastal Terrestrial Area 5: New River Estuary

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 26

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

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
NEW RIVER ESTUARY MARGINS	H	MH	VH	H	- This estuary forms part of the wider Awarua Plains wetlands complex. - Internationally significant bird habitat under the RAMSAR convention. - The New River estuary is a large 'tidal lagoon' type estuary and its associated mudflats are very important from a morphological perspective. - The estuary is rated nationally important as a habitat for wader bird species, as well as a nationally important nursery area for numerous fish and invertebrate species, including galaxiids. - It also has the highest usage by trans-equatorial waders including several threatened species. - Wetlands extend along the shoreline of estuary and the rivers/ streams. - Remote and wildness values are experienced, especially along the area's southern extents, where modification is least. - High recreational values e.g. day walks, bird watching.	- Excludes modified paddocks and built-up city margins. - Mapping includes several areas surrounding the estuary.

Right: Foliage of a mature Totara tree. Alistair Marshall, 2012.





View overlooking the windswept dunelands along Oreti Beach. Boffa Miskell, 2018.

4.12 COASTAL TERRESTRIAL AREA 6: ORETI

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

The Oreti Coastal Terrestrial Area consists mainly of Oreti Beach, extending from Sandy Point in the south to the Jacobs River Estuary and Riverton to the north-west. The coastline consists of a long, sweeping, sandy beach with a series of small lagoons which run parallel to the beach. The Jacobs River Estuary, where both the Pourakino River and Aparima River drain, is a reasonably well-defined estuary, with a heavily modified mouth (which forms part of the township of Riverton) and contained further inland by grazed paddocks. Some limited wetland vegetation is evident.

Key coastal characteristics include: The narrow dune ecosystem along Oreti Beach which has been intensively farmed in some areas, the tidal estuarine environment of the Jacobs River Estuary, few structures present along the coastline, and long vistas which extend along the beach due to relatively flat terrain.

The inland extent of the coastal environment is greatly dictated by the level of development nearby and its proximity to the coastline. The coastal environment follows the boundary of narrow dunelands along Oreti Beach which border with neighbouring farmland. The coastal environment extends inland in areas along Oreti Beach where tidal estuaries such as the Jacobs River Estuary, and small lagoons such as Long White Lagoon are present.

Beyond this Coastal Terrestrial Area, the Coastal Context Area consists of vast expanses of farmland and the small township of Riverton. The lower reaches of the Pourakino River and Aparima River are found in the Coastal Context Area and are tributaries of the Jacobs River Estuary. Although not directly within the Coastal Context Area, the Longwood Forest is a prominent feature and can be seen across the plains. Refer to Figure 27 for the extent of the Oreti Coastal Terrestrial Area.

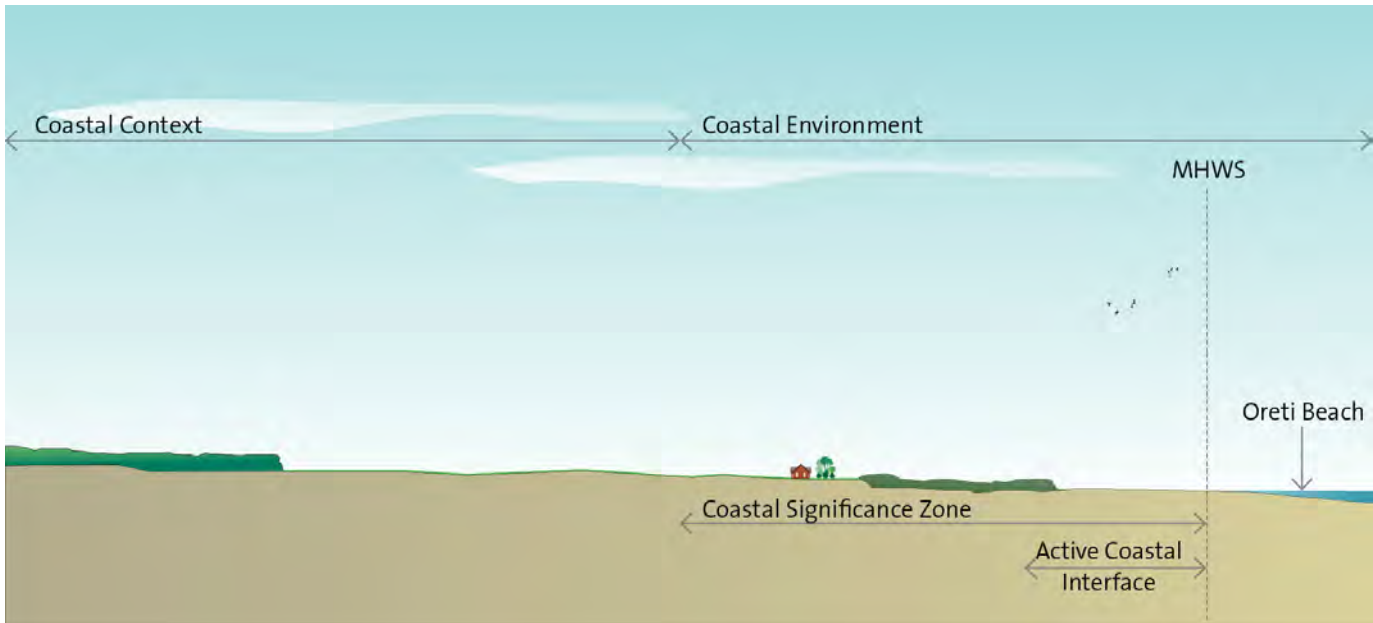


Diagram 10: Representative Coastal Environment diagram of the Oreti Coastal Terrestrial Area.

ABIOTIC

The Oreti Coastal Terrestrial Area is influenced primarily by longshore drift in a south-east direction and prevailing wind exposure along the exposed Oreti beachlands and by the river mouths of Pourakino and Aparima rivers around the Jacobs River Estuary.

Oreti Beach is a 29 kilometre curving beach with a predominately narrow strip of dunelands. The eastern end of the beach contains more extensive areas of dunelands in comparison to the remaining beach. Duneland ponds, peatlands and back water near river mouths are also common landforms along this coastal stretch. This beach is backed by intensively farmed sand plains.

The beach exhibits periods of erosion and aggradation. The current mean high water mark position is generally seaward of the 1950 mark, the date of the earliest reliable records (Environment Southland, 2013).

Sandy Point, the southernmost part of the beachlands, is a large sand and gravel spit and separates Foveaux Strait from New River Estuary. The spit/ peninsula is composed of sand, gravel and water-borne silt, which was deposited approximately 4000-5000 years ago, when sea levels were higher. This means that the landform is comparatively young in geological terms (Boffa Miskell Ltd, 2010).

Mid-way along Oreti Beach, the mouth of the Waimatuku Stream offers a unique estuarine ecosystem that is riverine in appearance yet quite marine in character when it flows parallel to the coast (Environment Southland, 2013).

Jacobs River Estuary is of regional importance and listed as a Geopreservation Site for its extensive area of shallow intertidal mudflats, sandflats and saltmarshes. It is the westernmost and most unusual of Southland's large tidal estuaries and lagoons. It is a bi-inlet estuary, pinched off between the Pourakino Arm and the main Jacobs River Estuary at The Narrows.

Annual rainfall is 1,100-1,200mm. Annual sunshine hours are 1,600 – 1,650 per year. Median temperatures range from 19° Celsius in Summer and 3° Celsius in Winter. Oreti Beach has a very low elevation of 0 and 35 metres above sea level. The highest point is situated above Daffodil Bay on the Daffodil Bay Track.

BIOTIC

The total land area within Oreti Coastal Terrestrial area is 3,473 ha, of which 2.8% is in native forest, 6.2% in native shrubland, 0% in fernland, 1.9% in wetland communities, 19.9% in exotic treeland, 0.8% in exotic scrub, 53.7% in pasture, 9.1% in bare or lightly-vegetated surfaces, 2.7% in water bodies and 2.9% in artificial surfaces.

The Oreti Coastal Terrestrial Area has a windswept, remote and natural appearance but it has been highly modified. Marram grass covers much of the foredunes, it was introduced to trap and retain windblown sand to stop erosion of the dunes. However, it is highly weedy and has outcompeted the indigenous pingao communities. The illegal use of motorbikes on the beach also negatively impacts the health of the dunes. Remnant native scrub and shrubs can be found in the duneland ponds and peatlands and behind the dunes a series of coastal wetlands can be found including Big Lagoon, Long White Lagoon and Silver Lagoon (Rance, 2018). Coastal turf is also found around the saltmarsh edge and around these dune lakes.

The most extensive area of native forest occurs between Daffodil and Whalers Bay on the eastern side of Sandy Point. Sandy Point's ancient sand dune forest of wind-sculpted totara and matai is visually impressive. Other native podocarps include rimu, miro and kahikatea (Boffa Miskell Ltd, 2010). Plantation forest does exist on Sandy Point in addition to small, windswept groupings scattered along the dunelands of Oreti Beach.

Jacobs River Estuary is surrounded by a narrow strip of saltmarsh vegetation with the most extensive areas located in the northern Aparima Arm

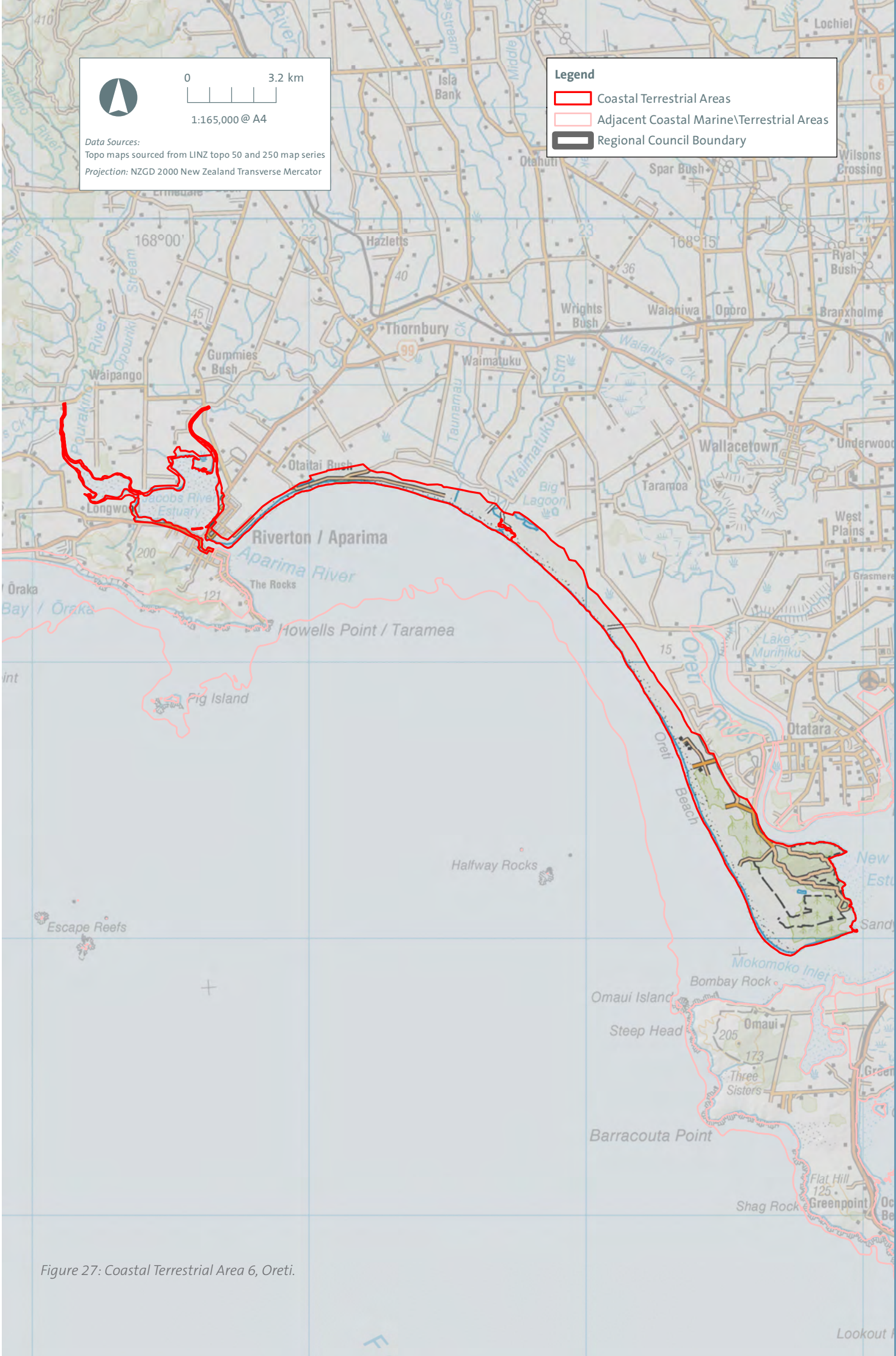


Figure 27: Coastal Terrestrial Area 6, Oreti.

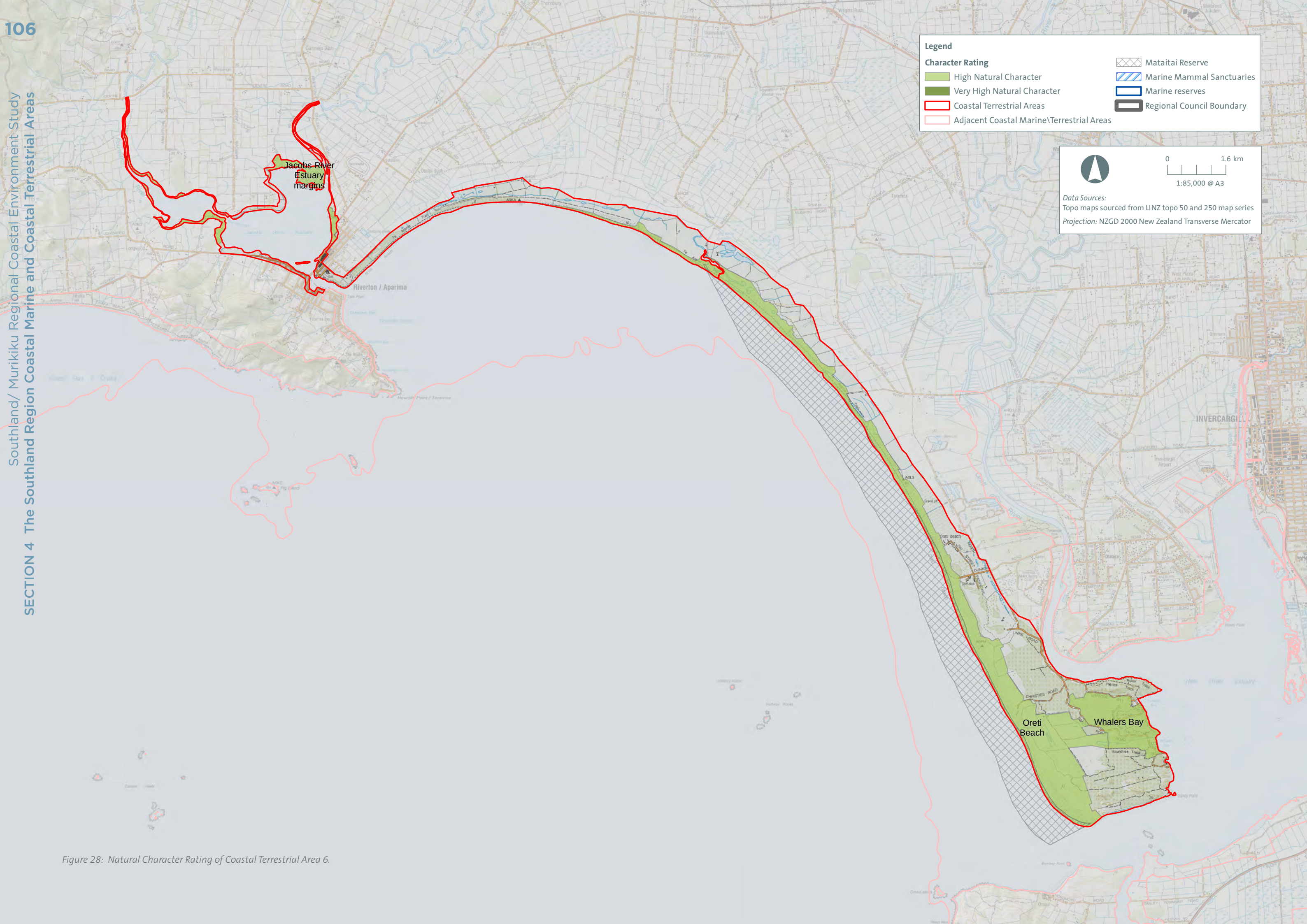


Figure 28: Natural Character Rating of Coastal Terrestrial Area 6.

where wide beds of rushland extend out over large intertidal flats. The upper Pourakino Arm also has saltmarsh vegetation on its northern bank.

Oreti Beach is nationally significant for its toheroa (*Paphies ventricosa*) beds and they are the largest, most resilient in New Zealand. In addition to this, surf clams occasionally wash up in large numbers beyond the surf zone. These are known as sou'westers (Environment Southland, 2013).

The Oreti River is nationally significant for the nationally critical black-billed gull, whose breeding colonies extend to the mouth of the river.

Although the water quality is not high, the Waimatuku mouth is ranked as a nationally important nursery for flatfish, coastal invertebrates and threatened wildlife. nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) are commonly seen from Oreti Beach as well. Jacobs River Estuary supports a plentiful waterfowl and wading bird habitat. Species include the nationally vulnerable Caspian tern, nationally endangered matuku-hūrepo/Australasian bittern (*Botaurus poiciloptilus*), tōrea pango/variable oystercatcher (*Haematopus unicolor*), the nationally vulnerable pohowera/banded dotterel (*Charadrius bicinctus*) (threatened), the shoveller and paradise duck (Environment Southland, 2013).

The coastal margin lacks structures along Oreti Beach however closer to Riverton this changes with structures along the coastal edge.

EXPERIENTIAL

The Oreti Coastal Terrestrial Area is a very popular coast for recreational opportunities. Easy access along much of its length makes it an attractive place to walk along the beach, exercise dogs and learn to surf. There is a surf-life saving club which operates near the small settlement of Oreti Beach. Driving on the beach and collecting washed up seaweed, kelp and driftwood are also common on the beach.

Coastal vistas are gained along Oreti Beach from Riverton to Omaui with Stewart Island and smaller islands visible on the horizon towards the west. The Te Araroa Trail follows the sandy Oreti Beach. Riverton is the largest settlement within this coastal stretch.

Whitebaiting also takes place in the coastal Waimatuku Stream and Aparima and Pourakino Rivers.

There are many sites of importance to Iwi in this coastal area including: mahinga kai sites for resources and food sources. Taonga species present here include mussels, pāua (*Haliotis iris*), kina and koura, harakeke and raupo, and urupa sites, waahi tapu sites, azullite, middens and waka landing sites (Boffa Miskell Ltd, 2006).

Jacobs River Estuary provides an important coastal experience to visitors and locals of Riverton, where it provides a more sheltered estuarine experience that the windswept open coastline of Oreti.

Level 3 Rating: Coastal Terrestrial Area 6 - Oreti			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High			
High	✓	✓	✓
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating		High	

Coastal Terrestrial Area 6: Oreti

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 28

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

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WHALERS BAY	H	H	H	H	- Extensive windswept, indigenous forest and shrubs. - Sandy Point's ancient sand dune forest of wind-sculpted thin-barked totara and matai is nationally important. Other native podocarps include rimu, miro and kahikatea. - High level of remoteness, naturalness and exposure to both Oreti Beach and New River Estuary.	Excludes adjacent forestry areas.
ORETI BEACH	H	H	MH	H	- Influenced by longshore drift in a south-east direction and prevailing wind exposure. - The Waimatuku mouth offers a unique estuarine ecosystem that is riverine in appearance yet quite marine in character when it flows parallel to the coast. - Oreti Beach is nationally significant for its toheroa beds and they are the largest, most resilient in New Zealand. - Wild and windswept experiences. - High degree of naturalness.	- Exotic vegetation species such as marram grass are present within the dunelands. - Vehicles are often present on this beach.
JACOBS RIVER ESTUARY MARGINS	H	MH	H	MH	- Jacobs River Estuary is of regional importance and listed as a Geopreservation Site for its extensive area of shallow intertidal mudflats, sandflats and saltmarshes. - It is the westernmost and most unusual of Southland's large tidal estuaries and lagoons. It is a double estuary, pinched off between the Pourakino Arm and the main Jacobs River Estuary at The Narrows. - Supports a diverse range of waterfowl and wading bird habitats. - Ranked nationally important as a flatfish nursery. - Sheltered experiences contrast with adjacent exposed open coast.	- Excludes modified built-up areas and pastureland which have an influence on the level of naturalness. - Mapping includes several areas surrounding estuary that demonstrate areas that are more intact.

Right: View looking down Oreti beach towards Riverton. At Risk species. Boffa Miskell, 2018.





View from Howells Point. Boffa Miskell, 2018.

4.13 COASTAL TERRESTRIAL AREA 7: ORAKA

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area extends from Riverton in the east to Monkey Island in the west and includes Pig Island and the series of small outcrops of rocks and reef off a number of the rocky headlands. The Coastal Terrestrial Area focuses on the bays and rocky peninsulas that divide the broader sweeping sandy embayments of neighbouring Coastal Terrestrial Areas 6 and 8. Within the eastern part of this Coastal Terrestrial Area are two sandy beaches being Colac Bay and Kawakaputa Bay. Both contained by rocky headlands. Beyond these embayments, further west to Pahia Point, the coastline becomes more indented, steeper and rocky. A series of small coves, such as Cosy Nook are framed by these rocky outcrops and small, stony beaches. This rocky shoreline is orientated south and exposed to the forces of Foveaux Strait.

Key coastal characteristics include: The rugged, exposed coastline between Pahia Point and Kawakaputa Bay, small sandy inlets scattered amongst the rocky coastline, the long sweeping sandy beaches of Colac Bay and Kawakaputa Bay, and three distinctive rocky headlands at Pahia Point, Oraka Point, and Howells Point/Taramea.

The inland extent of the coastal environment is dictated by the level of modification in the landscape and its proximity to the coastline. The headlands of Pahia, Oraka and Howells Point extend inland to include remnant native vegetation and a border around the headland landform. Colac and Kawakaputa Bays coastal extent include small low-lying wetlands and native scrubland. Pastoral farming comprises the majority of land use activities.

Beyond this Coastal Terrestrial Area, the Coastal Context Area extends across the modified pastoral plains with the Longwood Forest in the background. Directly beyond the inland coastal environment is Lake George near Colac Bay, a wetland complex. Refer to Figure 29 for the extent of the Oraka Coastal Terrestrial Area.

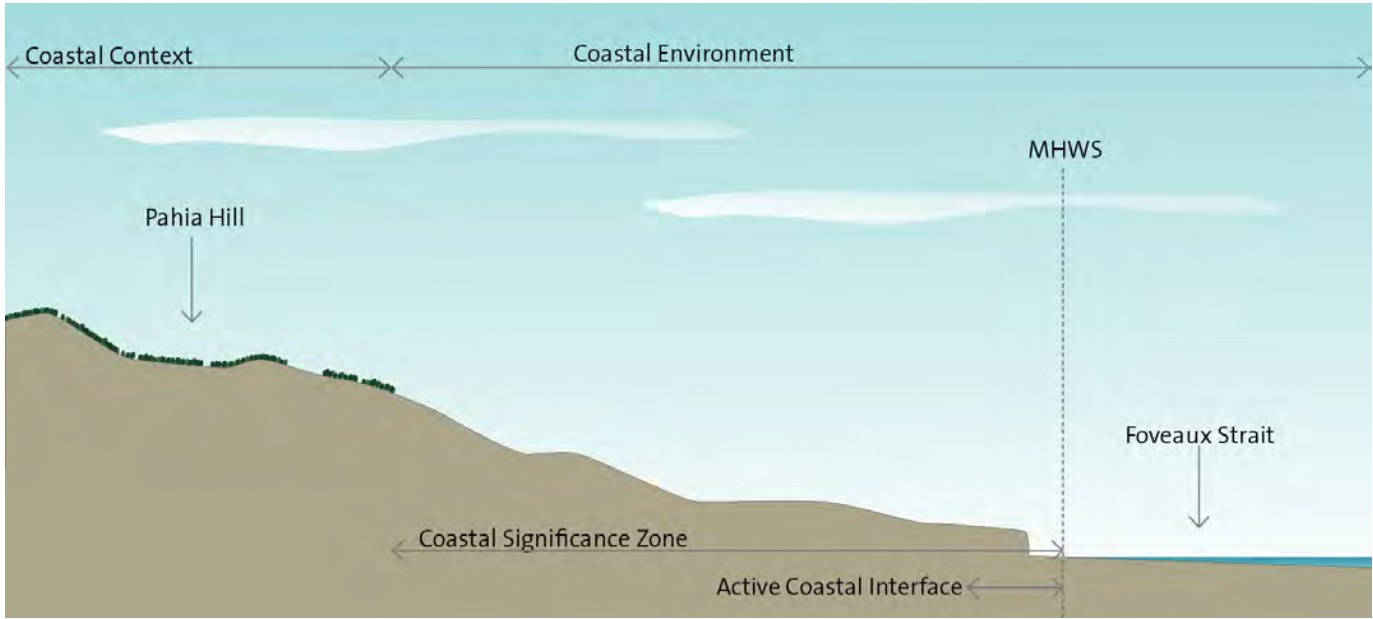


Diagram 11: Representative Coastal Environment diagram of the Oraka Coastal Terrestrial Area.

ABIOTIC

The Oraka Coastal Terrestrial Area is characterised by rocky shores, reefs indented with small beaches and the two large, sandy embayments of Colac and Kawakaputa Bays. Rock features on the headlands include crags, pillars, boulder beaches, reefs or low near-shore islands such as Pig Island are also found along this coastline.

The pillow lava formations at Howells Point, the assimilation of basic rocks by a high-level granitic magma at Oraka Point and the layered mafic rocks and shore platform potholes between Pahia Point and Monkey Island are excellent examples of such landforms. The landforms at Pahia and Oraka Point are regionally important, and the Howells Point formations are nationally important as listed in the Geopreservation Inventory.

Colac Bay has a small portion of dunelands compared to Kawakaputa Bay. A majority of Colac Bay's coastal edge is bordered by a road with rock riprap in places to protect the road from debris during high seas. The primary dunelands and saltmarshes are located at Kawakaputa Bay which are backed low-lying, swampy ground that includes the Lake George Wetland Reserve.

This coastline is exposed to the big stormy seas of Foveaux Strait and the continual westerly swell.

Annual rainfall is 1,500mm. Annual sunshine hours are 1,500 per year. Median temperatures range from 19° Celsius in Summer and 3° Celsius in Winter.

Elevation is between 0 and 227 metres with the highest point being at Pahia Hill. Oraka Point has an elevation of 163 metres.

BIOTIC

The total land area within Oraka Coastal Terrestrial area is 2,415 ha, of which 5.5% is in native forest, 2.0% in native shrubland, 0% in fernland, 0.9% in wetland communities, 1.3% in exotic treeland, 2.0% in exotic scrub, 79.2% in pasture, 7.6% in bare or lightly-vegetated surfaces, 0% in water bodies and 2.7% in artificial surfaces.

The Oraka Coastal Terrestrial Area is highly modified with nearly 80% in pasture however it does include some remnant native shrublands and coastal herbfields of importance for habitat, such as the forest remnants on Pahia Hill.

Apart from the physical characteristics of the coastal landforms, they are also very important in terms of vegetation and fauna which rely on rocky habitat for cover and permanent attachment. Above mean high water, these rock forms provide nesting and roosting sites for many seabirds (Environment Southland, 2013).

The exposed headlands along the coast retain localised areas of critically endangered coastal turfs, a naturally rare ecosystem. Locally these turf communities support several threatened plant species and are thought to be a stronghold for the at risk coastal cress (*Lepidium tenuicale*) (Rance, 2018).The most extensive forest cover is found west of Howells Point and on Pahia Point. Remnants of native forest are also found within the gullies of Oraka Point.

Pastoral farming extends to the coastal edge and to the cliffs for much of this stretch of coast.

Lake George, located behind Kawakaputa Bay is considered to be a regionally important wetland. This coastal terrestrial area contains invasive weed species such as marram grass but is also home to a stretch of coastal turfs of national significance.



Figure 29: Coastal Terrestrial Area 7, Oraka.

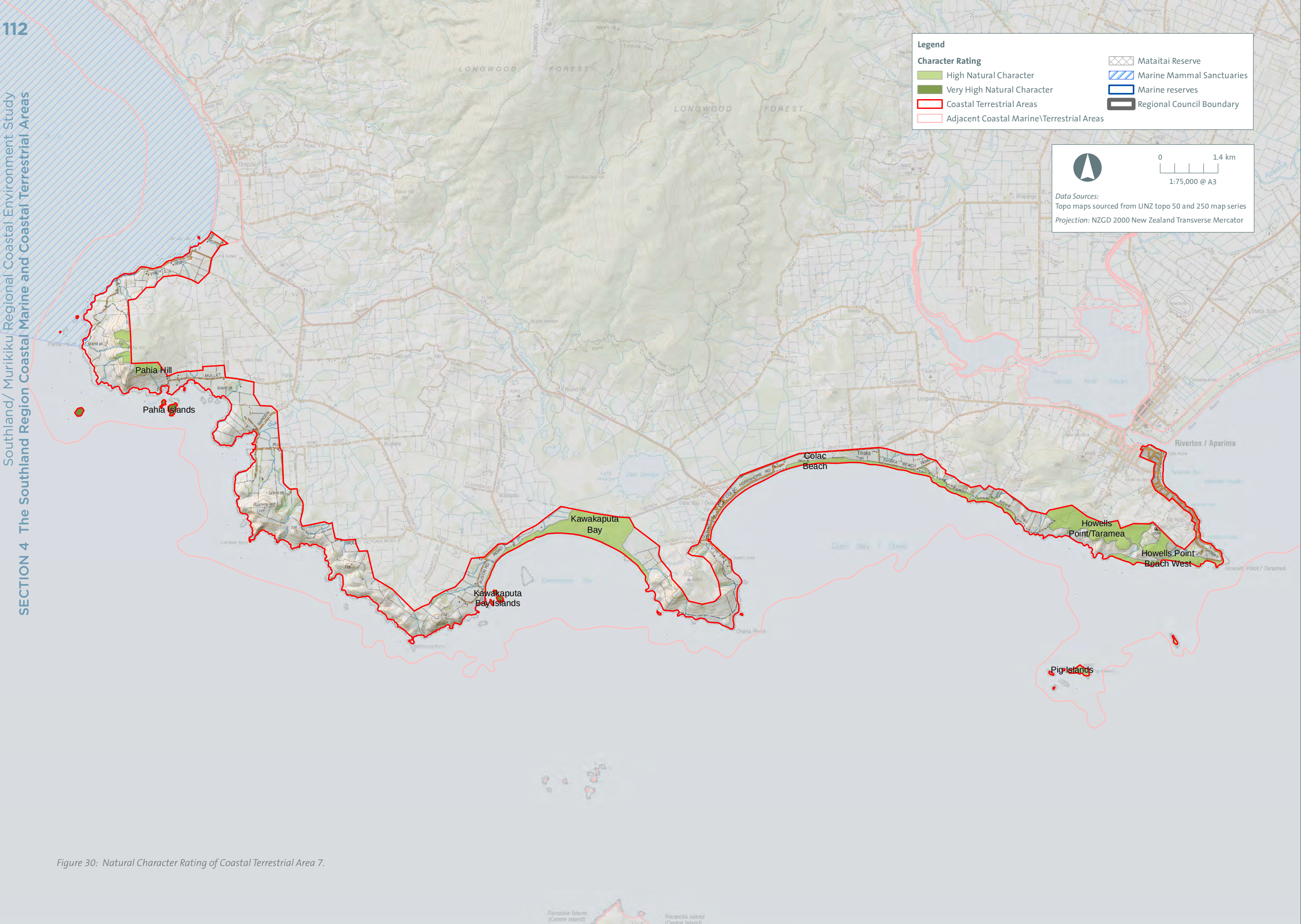


Figure 30: Natural Character Rating of Coastal Terrestrial Area 7.

EXPERIENTIAL

The Oraka Coastal Terrestrial Area is widely used by the general public. Activities such as recreational diving, swimming, picnicking, walking and rock climbing occur. Nationally known surf locations are found either side of Howells Point, specifically 'Porridge' and 'Beatons' which is the best spot in Southland.

The Te Araroa Trail meets and follows the beach at Colac Bay/Oraka before heading to Riverton or the Longwood Forest.

This stretch of coastline is one of the most utilised by recreational fishermen with boat launching facilities at Riverston, Colac Bay and Cosy Nook. Whitebaiting is also popular at the mouth of the Ourawera Stream along on Kawakaputa Beach.

A blow hole located between Taihaka and Howells Point also draws in people to this area. Being located so close to Invercargill and Riverton, weekend drives to visit this area is common. Impressive views are gained of Foveaux Strait, out to Stewart Island and Bluff.

The coastline east of Monkey Island provides a pleasant picnic and camping site surrounded by farmland. The island is accessible at low tide and a set of steps allows access to climb to the top for views across Te Waewae Bay. This location is also known for wind surfing and its incredible sunsets.

Access along this stretch of coast is generally very easy with many direct roads available. Riverton and Colac Bay are the main settlement areas and both are located on the coastal edge.

Level 3 Rating: Coastal Terrestrial Area 7 - Oraka to Pahia Point			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH	✓		
MODERATE TO HIGH			✓
MODERATE		✓	
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		MODERATE - HIGH	

Coastal Terrestrial Area 7: Oraka

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 30

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

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
HOWELLS POINT BEACH WEST	H	H	H	H	- Small sandy beaches separated by rocky outcrops backed by dunelands. - Nationally important exposed pillow lava landform. - Above mean high water, rock forms provide nesting and roosting sites for many seabirds. - High levels of naturalness, exposure, and remoteness.	Excludes more modified surrounding pastoral land.
HOWELLS POINT/ TARAMEA	H	H	H	H	- Large area of remnant indigenous scrub, shrub and forest. - High levels of naturalness and remoteness.	Mapping includes two areas of vegetation
PIG ISLANDS	H	H	H	H	- Rugged and windswept scenic reserve with small sandy beaches. - Extensive rocky reefs. - High levels of naturalness, exposure, and remoteness.	Includes the total extent of the islands, islets and rocky outcrops.
COLAC BEACH	H	MH	H	MH	- Long sweeping beach with smaller beaches separated by rocky outcrops. - Dunelands and remnant indigenous scrub and shrubs. - Above mean high water, rock forms provide nesting and roosting sites for many seabirds. - Well known surfing location. - The Te Araroa Trail meets and follows the beach at Colac Bay/Oraka. - High level of recreation.	Includes beach and adjacent dunes. Excludes more modified land further north.
KAWAKAPUTA BAY	H	H	VH	H	- Long sweeping beach backed by dunelands. - Large area of indigenous scrub and shrubs forms part of the Lake George wetland ecosystem. - Whitebaiting is also popular at the mouth of the Ourawera Stream. - High level of naturalness and recreation.	Contained by more modified land to east and west.
KAWAKAPUTA BAY ISLANDS	VH	VH	VH	H	- Remnant native vegetation. - Nearshore rugged and rocky islands. - High level of naturalness and exposure.	Mapping includes several rocky islands.
PAHIA ISLANDS	VH	VH	VH	H	- Remnant native vegetation. - Nearshore rugged and rocky islands. - High level of naturalness and exposure.	Mapping includes several rocky islands.
PAHIA HILL	H	H	H	MH	- Large area of remnant indigenous scrub, shrub and forest. - Exposed, with open panoramic views of the surrounding environment.	Mapping includes several areas of vegetation.



Aerial of the rocky outcrops common in the Oraka Coastal Terrestrial Area. Boffa Miskell 2018.



View looking towards Fiordland from the south-eastern end of Te Waewae bay. Boffa Miskell, 2018.

4.14 COASTAL TERRESTRIAL AREA 8: TE WAEWAE

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

Te Waewae Bay Coastal Terrestrial Area extends from the Rowallan Burn water course in the west to the settlement of Orepuki in the east and includes a very long, variable, sweeping sandy embayment, labelled as the largest on the Southland coast. This Coastal Terrestrial Area also includes the Waiau River mouth and associated coastal lagoon which runs parallel to the coastline for several kilometres.

Extensive land use activities and modifications have prevented this Coastal Terrestrial Area from extending further inland.

Key coastal characteristics include: Highly modified areas of farmland in close proximity to the coastline, a long sandy beach with outlooks towards Pahia Hill and Fiordland National Park, small cliff faces which are being eroded by the sea and the Waiau River mouth.

As outlined, the inland extent of the coastal environment is relatively narrow due to the intensive farming development on the edge of the coastline. Between Orepuki and the Waiau River, the coastal environment follows or includes State Highway 99, known as the Southern Scenic Route. The widest part of the coastal environment is associated with the Waiau River mouth and its lagoon.

Beyond the Coastal Terrestrial Area, the Coastal Context Area extends further up the Waiau Valley into the rural flat plains. Undulating terrain frames the Lower Waiau Plains with the mighty Fiordland National Park to the west and the Longwood Forest is to the east. Refer to Figure 31 for the extent of the Te Waewae Coastal Terrestrial Area.

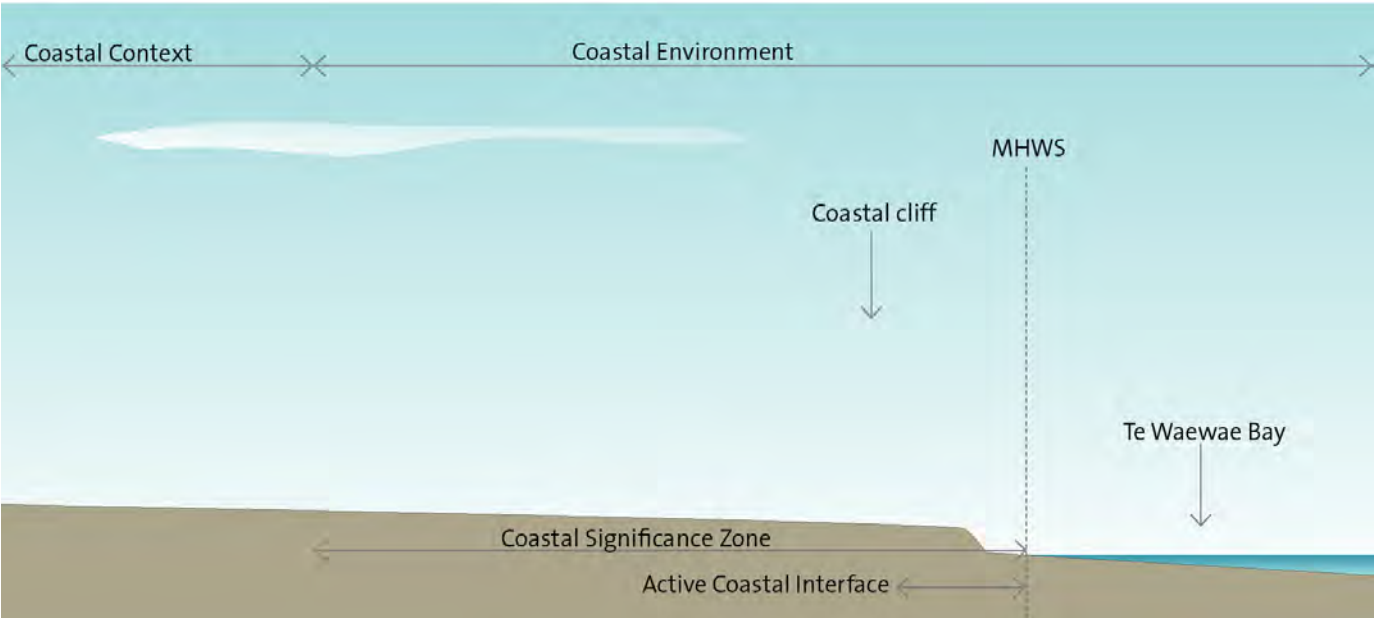


Diagram 12: Representative Coastal Environment diagram of the Te Waewae Coastal Terrestrial Area.

ABIOTIC

The Te Waewae Coastal Terrestrial Area consists of Te Waewae Bay and the broad Waiau River mouth. The shoreline of the 22 kilometre bay varies from fine grained sand to gravel, cobbles and boulders. Gemstone Beach, located just north of the settlement of Orepuki is known for its constant state of shoreline change with the storms and tides. Semi-precious gems such as garnet, jasper, quartz and nephrite can often be found on the beach (Southland NZ, 2017) .

The long sweeping bay is bound by coastal terraces and small sandstone and alluvium cliffs, which vary in height and extend in some areas up to 20m high. A narrow strip of sand and gravel is located between the sea and the cliffs. These cliffs are thought to have been formed by the combination of tectonic uplift and marine erosion (Environment Southland, 2013).

The Waiau River was Southland’s largest river before it was modified for a power scheme further upstream. Prior to the establishment of the Manapōuri Power Scheme the Waiau River had a mean annual flow of approximately 560 (in the years before the scheme), which has reduced to 135 cubic metres per second (cumecs) (for the years between 2006 and 2016) (Moran, Pearson, Couldrey, & Eyre, 2017). The river mouth fluctuated within a four-kilometre length of the coast without being fully closed off to the sea. However, more recently when low flows coincide with high seas, the mouth becomes closed to the sea.

At the Waiau mouth, the barrier beach and the lagoon it creates, are a demonstration of the interaction between coastal and river processes (Environment Southland, 2013). Longshore drift operates east to west near the river mouth resulting in more erosion along the coastline to the east of the Waiau mouth. Generally, longshore drift along the Southland Coast is west to east.

Annual rainfall is 1,000-1,100mm. Annual sunshine hours are 1,450 per year. Median temperatures range from 19° Celsius in Summer and 4° Celsius in Winter.

Elevation in Te Waewae Bay varies between 0 and 54 metres.

BIOTIC

The total land area within Te Waewae Coastal Terrestrial area is 1,362 ha, of which 1.3% is in native forest, 0.9% in native shrubland, 0% in fernland, 0.3% in wetland communities, 2.8% in exotic treeland, 5.5% in exotic scrub, 79.4% in pasture, 5.7% in bare or lightly-vegetated surfaces, 4% in water bodies and 0.2% in artificial surfaces.

The Te Waewae Coastal Terrestrial Area is a modified coastline with intensively farmed land extending to the boundary of the small coastal cliffs. Some cliffs are covered with windswept shrublands. Small remnants of flax (*Phormium tenax*), Hebe and broadleaf shrubs can be found on the western end of the bay in gullies and on the collapsed cliffs.

Where dunelands are present along this coast, they are primarily covered in marram grass.

At the Waiau River mouth, the gravel bar between the lagoon and the sea is a roost for pārekareka/spotted shags (*Stictocarbo punctatus*) and breeding site for the nationally critical black-billed gull. Other bird species include tōrea pango/variable oystercatchers (*Haematopus unicolor*), the nationally vulnerable pohowera/banded dotterel (*Charadrius bicinctus*) and tītī/mottled petrel (*Pterodroma inexpectata*). The spit is partly vegetated with flax, grass, knobby clubrush, saltmarsh herbfields and in some areas cushion vegetation supporting Raoulia spp (Environment Southland, 2013).

The coastal wetlands and lagoons of the Waiau River are very important for wildlife habitat, including four species of native fish which include the tuna kuwharuwharu/longfin eel (*Anguilla dieffenbachii*) and the nationally vulnerable kanakana/lamprey (*Geotria australis*).

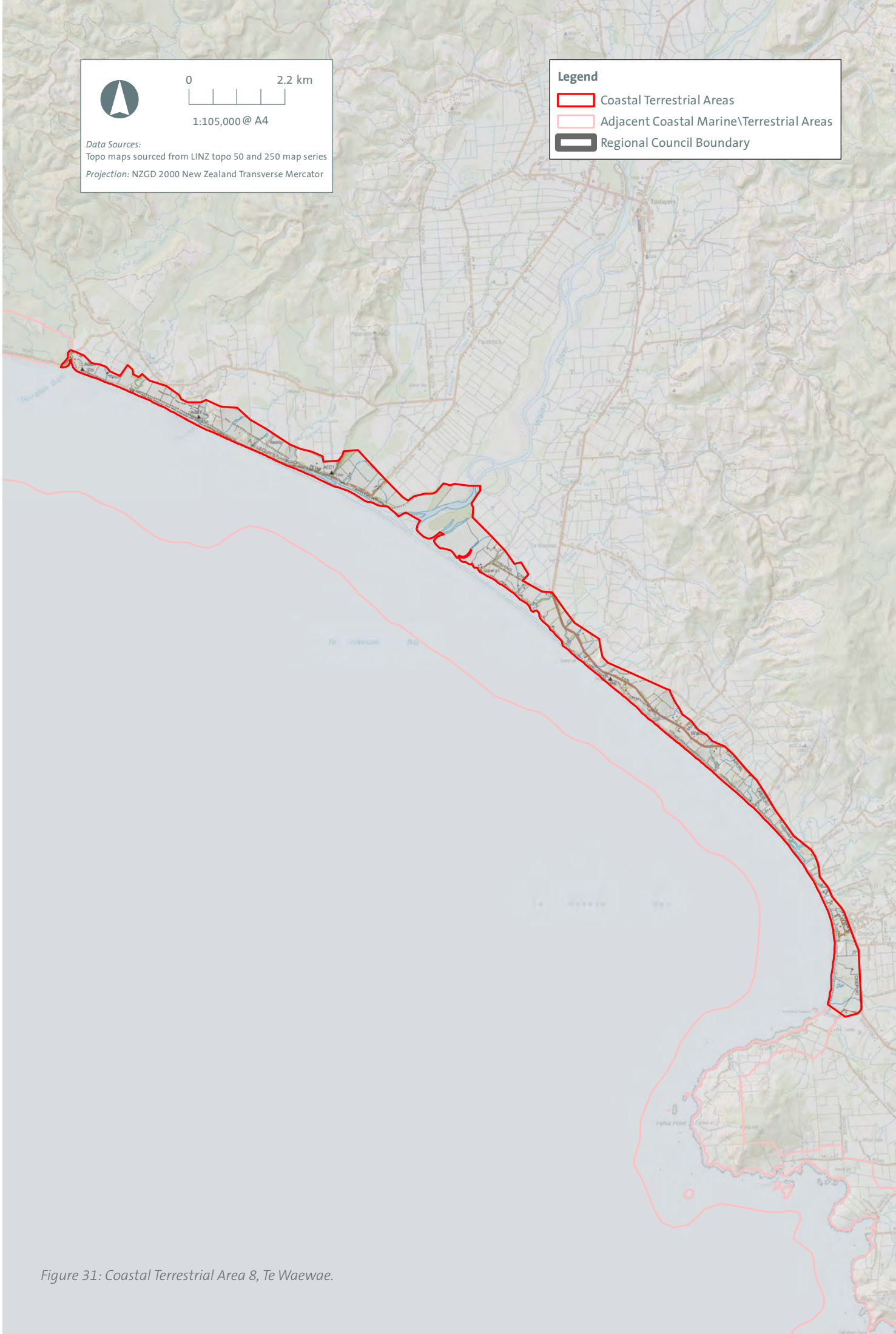


Figure 31: Coastal Terrestrial Area 8, Te Waewae.

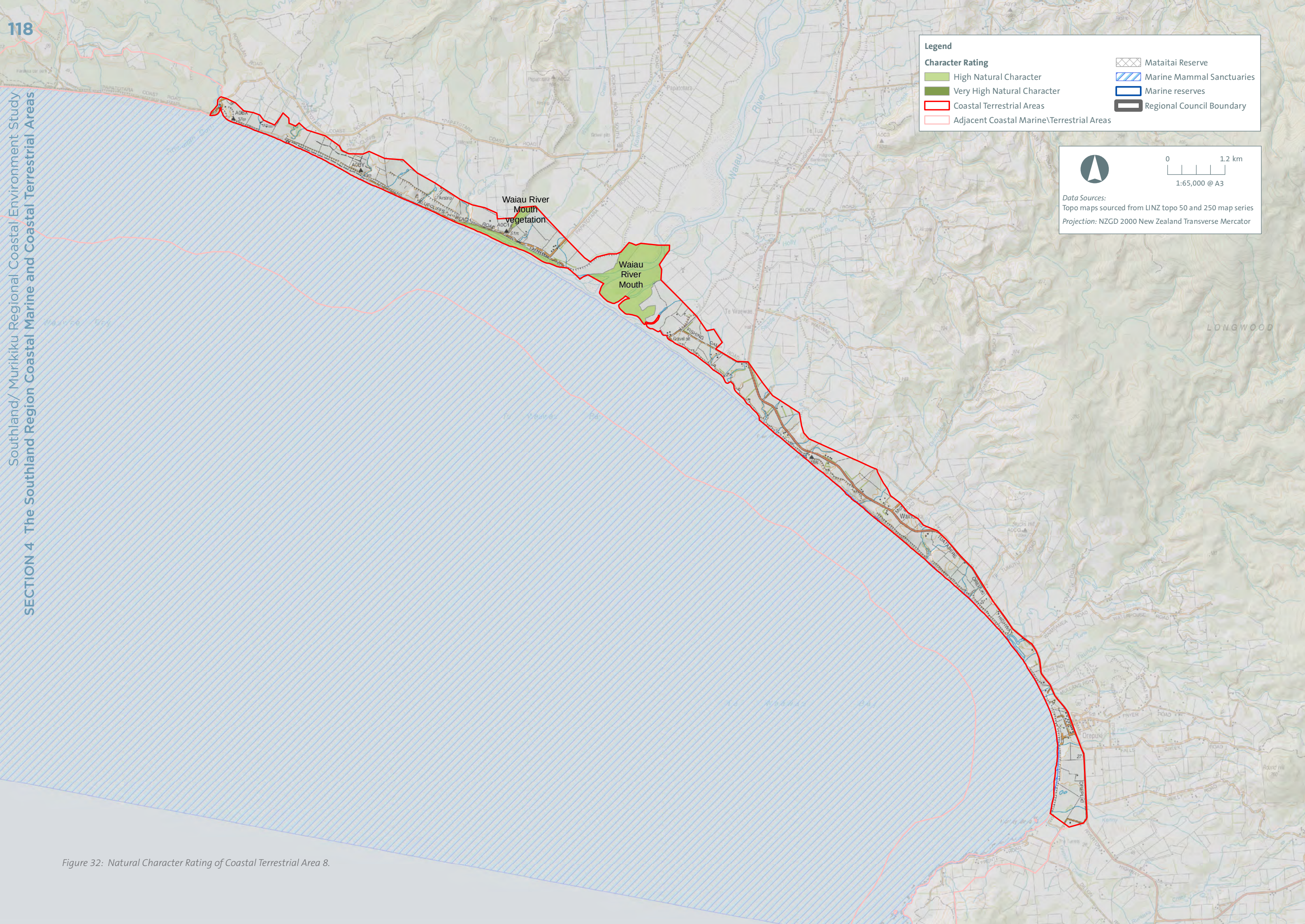


Figure 32: Natural Character Rating of Coastal Terrestrial Area 8.

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Southland/ Murikiku Regional Coastal Environment Study

SECTION 4 THE SOUTHLAND REGION COASTAL MARINE AND COASTAL TERRESTRIAL AREAS

The bay also contains small areas of toheroa (*Paphies ventricosa*) beds and surf clams can be found beyond the surf zone.

The western inshore area of Te Waewae Bay hosts a nationally significant population of nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) which is the largest south population south of Banks Peninsula. The bay also forms part of the nationally vulnerable tohorā/southern right whales (*Eubalaena australis*) ' migratory path (Environment Southland, 2013).

EXPERIENTIAL

The Te Waewae Coastal Terrestrial Area is known for its windswept trees and wild seas spraying mist high onto the cliffs. Direct access to the coastline is limited which gives the beach a feeling of remoteness and wildness. Recreational opportunities include picnicking, walking, fishing, viewing birdlife, swimming and game bird shooting.

State Highway 99, the Southern Scenic Route, provides outstanding views over Te Waewae Bay and across the rugged, snow-topped mountains of Fiordland National Park in the distance. McCrackens Rest is a viewing platform located close to the State Highway where people can take in the coastal views. There is also a sign post with arrows pointing in different directions which highlight nearby locations. The Solander Islands can be seen in the distance along with nationally endangered tūpoupou/Hector's dolphin (*Cephalorhynchus hectori*) which frequent the bay.

The Waiau River Lagoon is a mahinga kai area where inanga, pātiki/flounder, shortfin and longfin eels, trout and mullet are gathered (Environment Southland, 2013). The lower reaches of the river and the Te Waewae lagoon have white baiting huts on the banks and many have been asked to remove some of these structures as they are on conservation land. The lagoon is also used for boating. A boat ramp is located on the north-east shore of the lagoon.

Level 3 Rating: Coastal Terrestrial Area 8 - Te Waewae			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH			
HIGH	✓		
MODERATE TO HIGH			✓
MODERATE		✓	
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		MODERATE - HIGH	

Coastal Terrestrial Area 8: Te Waewae

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 32

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

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
WAIAU RIVER MOUTH	H	H	MH	MH	- At the Waiau mouth, the barrier beach and the lagoon it creates, are a demonstration of the interaction between coastal and river processes. - The gravel bar between the lagoon and the sea is a roost for pārekareka/spotted shags (<i>Stictocarbo punctatus</i>). Other bird species include tōrea pangol/ variable oyster catchers (<i>Haematopus unicolor</i>), nationally vulnerable pohowera/banded dotterel (<i>Charadrius bicinctus</i>) and tītī/mottled petrel (<i>Pterodroma inexpectata</i>). - The spit is partly vegetated with flax, grass, knobby clubrush, saltmarsh herbfields and in some areas the cushion plant <i>Raoulia</i> spp (Environment Southland, 2013). - The coastal wetlands and lagoon of the Waiau River are very important for wildlife habitat, including four species of native fish which include the tuna kuwharuwharu/longfin eel (<i>Anguilla dieffenbachii</i>) and the nationally vulnerable kanakana/lamprey (<i>Geotria australis</i>). - The Waiau River Lagoon is a mahinga kai area where Inanga, pātiki/flounder, shortfin and longfin eels, trout and mullet are gathered. The lagoon is also used for boating. A boat ramp is located on the north-east shore of the lagoon. - Windswept trees and coastal cliffs dominant features of this coast. - High recreational values. - High sense of naturalness, exposure and wildness. - Views to Solander Islands can be gained on a clear day and nationally endangered tūpoupou/Hector’s dolphin (<i>Cephalorhynchus hectori</i>) can be seen in the bay. - Nationally critical black-billed gull colony on Waiau River lagoon bar.	- Excludes more modified paddocks around Waiau River mouth - Flows of the Waiau have been modified.
WAIAU RIVER MOUTH VEGETATION	H	H	H	MH	- Remnant indigenous scrub, shrub and forest. - High levels of naturalness.	Area contained by modified paddocks.



Mouth of the Waiau River meeting Te Waewae Bay. Bofra Miskell, 2018.



View overlooking the Southern Fiordland Coastal Terrestrial Area. Boffa Miskell, 2018.

4.15 COASTAL TERRESTRIAL AREA 9: SOUTHERN FIORDLAND

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

This Coastal Terrestrial Area is located in the south-western part of Fiordland National Park and extends east to Te Waewae Bay. It consists of bush clad mountains and headlands, formed by glaciers with an indented coastline scattered with small sandy inlets, rocky platforms, outcrops and tannin stained rivers flowing into the sea. This Coastal Terrestrial Area has remained relatively unmodified due to its remote location.

Key coastal characteristics include: Undisturbed lowland forest with rimu being a dominant species, coastal cliffs clad in mixed shrublands and forest, inter-tidal platforms and rocky reefs, series of marine terraces clad in podocarp forest and smaller narrow sandy bays particularly near Preservation Inlet.

The inland extent of the coastal environment for this Coastal Terrestrial Area is closely aligned with the first seaward ridgeline of the Hump Ridge and Cameron Mountains. This also includes the islands in Chalky and Preservation Inlets.

Beyond this Coastal Terrestrial Area are the inland areas of Fiordland National Park which include Lakes Poteriteri, Hauroko and Monowai. Refer to Figure 33 for the extent of the Southern Fiordland Coastal Terrestrial Area.

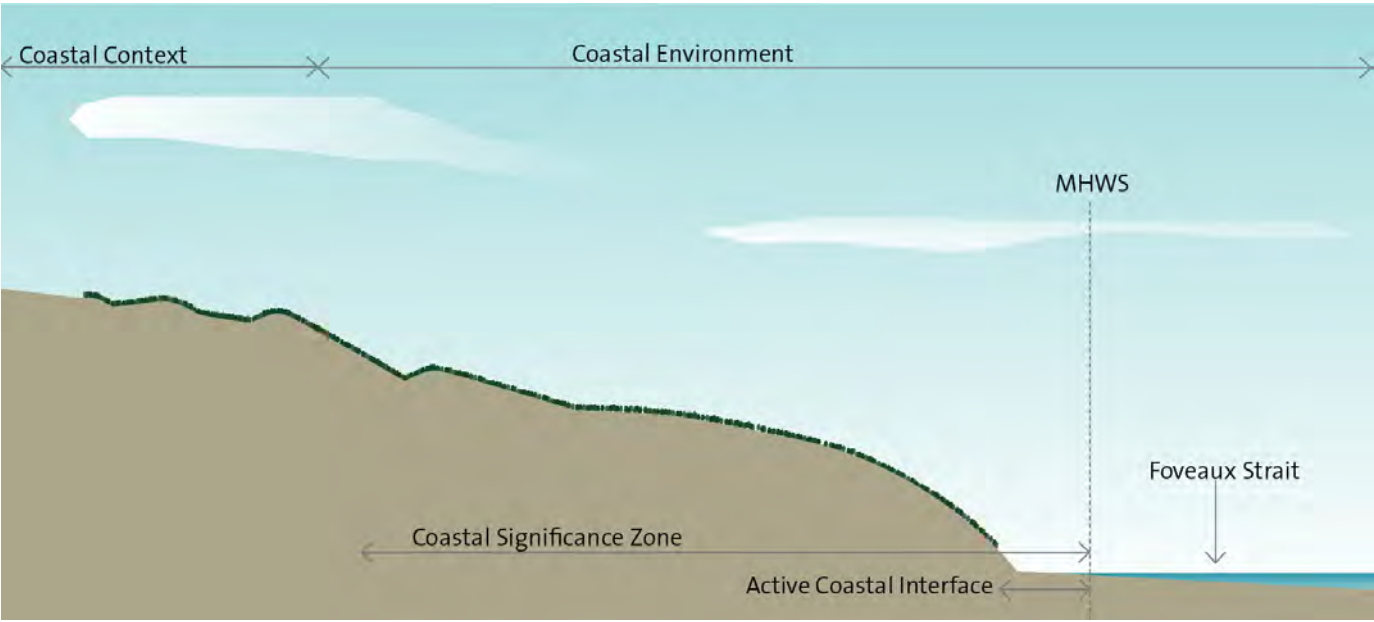


Diagram 13: Representative Coastal Environment diagram of the Southern Fiordland Coastal Terrestrial Area.

ABIOTIC

Fiordland's steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. The fiord landscape has been created by the uplift of hard plutonic rocks, which have been subsequently carved into their present shape over the last 2 million years by successive periods of heavy glaciation.

Southern Fiordland contains a series of well-preserved marine terraces cut into soft tertiary rocks which were subsequently uplifted by tectonic earth movements. These are the best-preserved sequence of uplifted marine terraces in New Zealand which document the Quaternary uplift history of Southern Fiordland. The sequence of 13 raised marine terraces vary from 3m to 1,040m and their uplift rates have been recorded at 1.1 – 1.5mm per year. The oldest terraces are thought to be near one million years old.

The landforms range from sand spits, narrow sandy beaches with creek deltas, coastal cliffs, inter-tidal platforms and rocky reefs, river mouths and lowlands, scattered gravel beaches, a series of marine terraces to u-shaped fiords with steep sea cliffs, hanging valleys with fast flowing streams and waterfalls cascading into the sounds. The coastline ranges from being irregular and indented to intricate with long narrow sounds. The outer coastline has numerous islands, stacks and offshore reefs. Chalky Island is named after its chalky cliffs that bare a resemblance to the cliffs of Dover.

The Green Islets, a spectacular arch and cave system between Puysegur Point and Big River, and nearby shore platforms are both nationally and regionally important examples of wave derived landforms. There is also a large shallow thermal spring in Anchorage Cove, which is regionally important.

The Southern Fiordland Coastal Terrestrial Area is highly exposed to coastal and climatic influences. The eastern area near Port Craig is the more sheltered section of this coastline and is protected from the south-westerly winds. The south-western portion of this area is extremely wet and gets battered by the westerly gales.

Annual rainfall is 4,000mm. Annual sunshine hours are 1,300 per year. Median temperatures range from 14° Celsius in Summer and 5° Celsius in Winter. Elevation varies between 0 and 1,436 metres.

BIOTIC

The total land area within the Southern Fiordland Coastal Terrestrial area is 170,732ha, of which 80.6% is in native forest, 0.5% in native shrubland, 0.2% in fernland, 0.2% in wetland communities, 0.2% in exotic treeland, 2.2% in sub alpine shrubland, 13% in tall tussock grassland, 0.1% in pasture, 1.7% in bare or lightly-vegetated surfaces and 1.2% in water bodies.

This Coastal Terrestrial Area contains over one-third of New Zealand's indigenous plant species with some only found in Fiordland. Southern Fiordland also forms part of the Te Wahipounamu - South West New Zealand World Heritage Area which has been described as having 'superlative natural phenomena.'

The land cover of Southern Fiordland contains predominately pristine extensive kāmahī, podocarp forest, Silver beech, southern rātā forest as well as kahikatea forest around the Waikoau River and Rimu forest around Port Craig. These lowland forests are one of the largest tracts of lowland forest in New Zealand, with the exclusion of the Port Craig area, making them significant features and of national importance. Waitutu is also a Department of Conservation Battle for the Birds site, involving long term predator control to enhance populations of the nationally vulnerable South

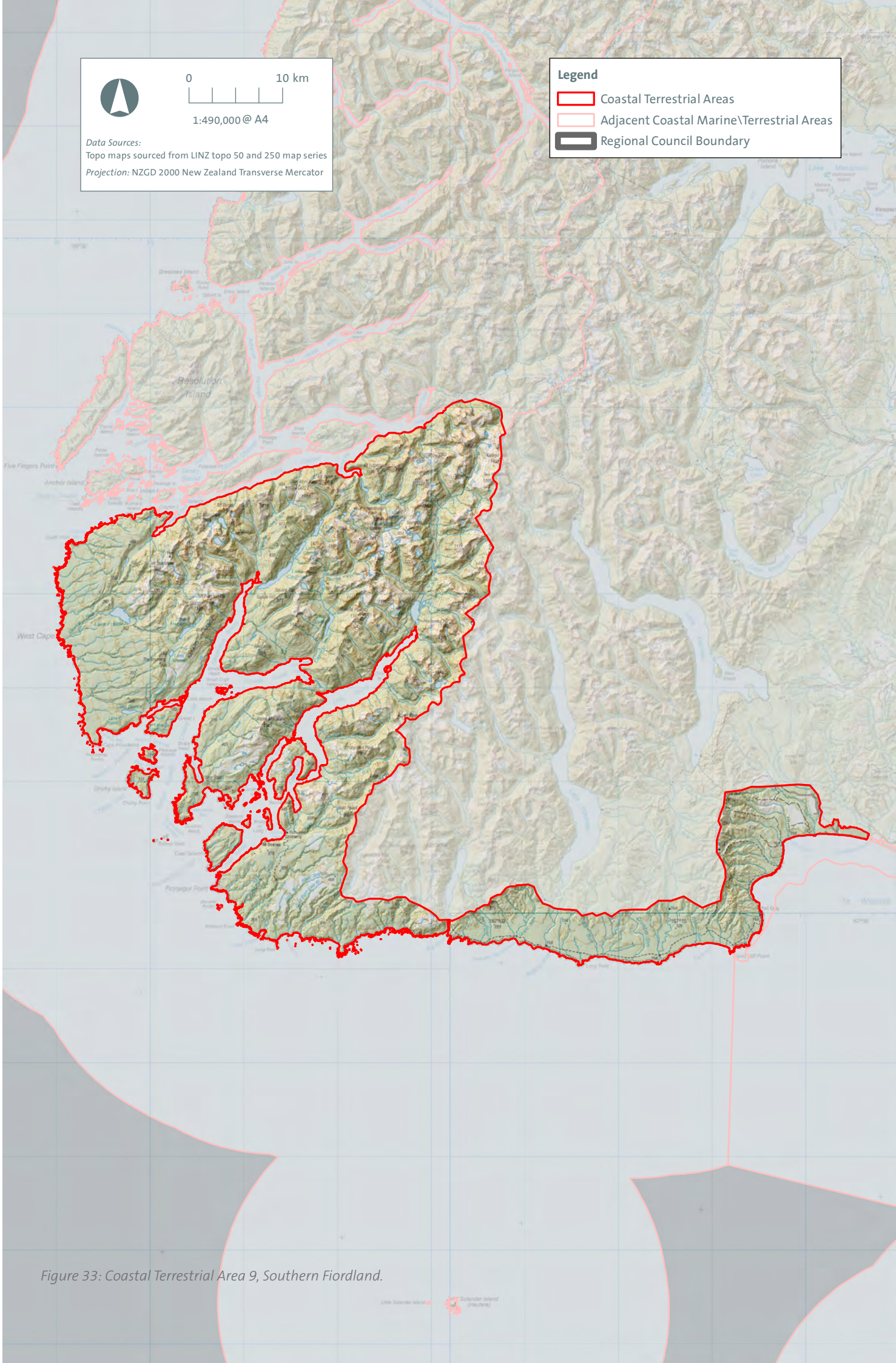


Figure 33: Coastal Terrestrial Area 9, Southern Fiordland.

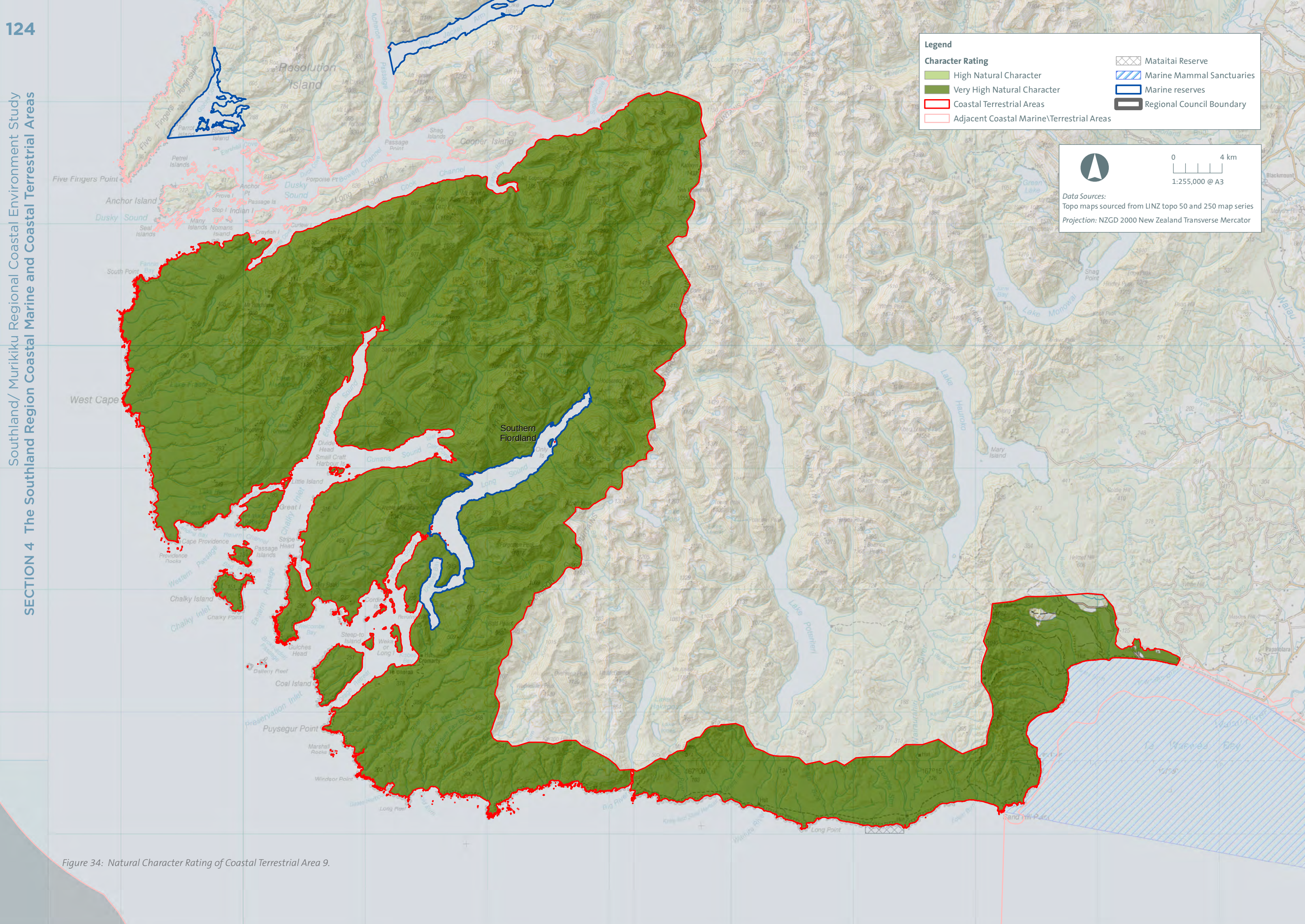


Figure 34: Natural Character Rating of Coastal Terrestrial Area 9.

Island kaka (*Nestor meridionalis*), mohua/yellowhead (*Mohoua ochrocephala*), and other vulnerable forest bird species (Rance, 2018).

Sandhill Point and Sealers beach are important dune systems for southern Fiordland and the whole coastline is maintained free from marram grass. The south-western portion of this coast forms the national stronghold for the sand spurge (Rance, 2018). The dramatic and diverse coastline includes important dune systems, herbfields and shrublands (DOC, 2016). A number of nationally declining plant species including *Euphorbia glauca*, *Austrofestuca littoralis* and *Ficinia spiralis* are found within the different coastal environments.

The altitudinal sequences of marine terraces and indigenous vegetation from the coast towards Lake Pouteri and to a lesser extent to the top of the Hump Ridge are ecologically significant and impressive, as are the nationally important coastal dunes at Sand Hill Point (DOC, 2000).

A raised coastal platform at West Cape supports distinctive needle tussock (*Chionochloa acicularis*) grassland bog on the platform surface with scrub and forest in incised gullies. Chionochloa acicularis is one of several snow tussock species that are endemic to Fiordland, but the only one that occurs down to near sea level.

An abundance of wildlife is supported by the diversity of habitats found within Southern Fiordland. The birds include the tokoeka/southern brown kiwi (*Apteryx australis*), weka such as the nationally vulnerable Stewart Island weka (*Gallirallus australis scotti*), the nationally vulnerable South Island kaka (*Nestor meridionalis*), kereru/New Zealand pigeon (*Hemiphaga novaeseelandiae*), the nationally vulnerable whio/blue duck (*Hymenolaimus malachorhynchos*), kea (*Nestor notabilis*), mohua/yellowhead (*Mohoua ochrocephala*), kakariki/yellow-crowned parakeet (*Cyanoramphus auriceps*), tōrea pango/variable oystercatcher (*Haematopus unicolor*), pohowera/banded dotterels (*Charadrius bicinctus*), the nationally vulnerable tara/ white fronted tern (*Sterna striata*), the nationally vulnerable kawau/Stewart Island shag (*Leucocorbo chalconotus*) and the nationally endangered matuku moana/ reef heron (*Egretta sacra*). The Waitutu and Wairaurahiri Rivers support significant breeding colonies of black and pied shags.

Nesting sites for the nationally vulnerable Fiordland crested penguins and the nationally endangered hoiho/ yellow-eyed penguin (*Megadyptes antipodes*) are found along the coast and located in dense coastal scrub. nationally endangered tūpoupou/Hector’s dolphin (*Cephalorhynchus hectori*) and kekeno/New Zealand fur seals (*Arctocephalus forsteri*) are also commonly seen along this stretch of coast.

The intact wetlands, lakes and rivers provide habitats for all four threatened freshwater fish species found in Southland which include the nationally vulnerable shortjaw kōkopu, taiwharu/giant kōkopu (*Galaxias argenteus*) , koaro and banded kōkopu (*Galaxias fasciatus*). As rainfall drains through the lush forest, it becomes stained with tannins until it is the colour of strong tea. This dark freshwater does not mix with the sea water of the fiords, but sits on top, limiting the amount of light that reaches into the depths and restricting almost all of the marine life to the top 40m of water depth (Teirney, 2003).

Chalky Island is a predator free island and home to re-introduced threatened populations of mohua/ yellowhead (*Mohoua ochrocephala*), little spotted kiwi and the nationally critical orange-fronted parakeet, this island also supports the only known population of native Chalky Island skink (nationally critical).

EXPERIENTIAL

The Southern Fiordland Coastal Terrestrial Area is overwhelming with its natural beauty and remoteness. The peace and quiet, isolation and water clarity further enhance the experience of this part of Fiordland. Recreational opportunities include hunting, fishing, walking, and jet boating. Commercial jet boat tours also operate along the Southern Fiordland coastline to experience the high degree of naturalness and remoteness the area offers. The most popular way to experience this part of Southland is by tramping along the Tuatapere Hump Ridge or South Coast Track. The Waitutu Lodge is located on the west bank of the Wairaurahiri River and a five-minute walk from the beach along the southern coastline.

Port Craig is an important historic settlement established for milling timber in 1916 and is located along the South Coast Track. Logs were transported from the Wairaurahiri river to Port Craig via a tramway, and in its lifetime the mill exported approximately one-thousand four-hundred hectares of forest. Now much of the area has regenerated into native bush.

Access is fairly limited to this part of Fiordland with only one road, Papatotara Coast Road located on the south coast.



Established Podocarp Forest.
Alistair Marshall, 2007.

Level 3 Rating: Coastal Terrestrial Area 9 – Southern Fiordland			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	✓	✓	✓
HIGH			
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

Coastal Terrestrial Area 9: Southern Fiordland

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 34
REFER TO COASTAL MARINE AREA F FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.

AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
SOUTHERN FIORDLAND	 VH	 VH	 VH	 VH	- Fiordland’s steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. - Southern Fiordland contains a series of well-preserved marine terraces cut into soft tertiary rocks which were subsequently uplifted by tectonic earth movements. - The Green Islets, a spectacular arch and cave system between Puysegur Point and Big River, and nearby shore platforms are both nationally and regionally important examples of wave derived landforms. - Important collection of islands around Preservation and Chalky Inlets, including Chalky Island. - There is also a large shallow thermal spring in Anchorage Cove, which is regionally important. - The Southern Fiordland Coastal Terrestrial Area is highly exposed to coastal and climatic influences. - This outstanding Coastal Terrestrial Area contains over one-third of New Zealand’s indigenous plant species with some only found in Fiordland. - Southern Fiordland also forms part of the Te Wahipounamu - South West New Zealand World Heritage Area which has been described as having ‘superlative natural phenomena’. - An abundance of wildlife is supported by the diversity of habitats found within Southern Fiordland. - As rainfall drains through the lush forest, it becomes stained with tannins until it is the colour of strong tea. - Nesting sites for Fiordland crested penguins and the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>) are found along the coast and located in dense coastal scrub. - Nationally endangered tūpoupou/Hector’s dolphin (<i>Cephalorhynchus hectori</i>) and kekeno/New Zealand fur seals (<i>Arctocephalus forsteri</i>) are also commonly seen along this stretch of coast. - Remote and isolated experiences. - High levels of recreation and wildness.	Excludes small areas of modified land to the north-east.



View looking south from Kaipo Bay over the Western Fjordland Coastal Terrestrial Area. Boffa Miskell, 2018.

4.16 COASTAL TERRESTRIAL AREA 10: WESTERN FIORDLAND

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND COASTAL CONTEXT AREA

The Western Fjordland Coastal Terrestrial Area forms a significant and important part of the Te Wahipounamu - South West New Zealand World Heritage Area and extends from Dusky Sound in the south to Big Bay in the north where it borders the Westland Region. Western Fjordland differs from Southern Fjordland in terms of elevation as the fiords are much steeper and higher but are still subject to erosion along the outer coastline. Due to this Coastal Terrestrial Area’s remote location it has remained relatively undisturbed by human development, however tourism has become popular in places such as Milford Sound and tramping tracks have gained popularity.

Key coastal characteristics include: a significant part of Te Wāhipounamu - South West New Zealand World Heritage Area, U-shaped fiords with steep sea cliffs, hanging valleys with fast flowing streams, intricate coastline with long narrow sounds, inhospitable outer coast with stacks and reefs, internationally known Milford Sound with spectacular waterfalls cascading into the sounds and long curving beaches of Martins Bay and Big Bay.

The inland extent of the coastal environment has been identified along the ridgelines of Skippers Range, Darran Mountains, Stuart Mountains, Matterhorn Mountains and the Merrie Range. It effectively follows the watershed of the main divide.

Beyond the Coastal Terrestrial Area, the Coastal Context Area further extends into the alpine zones of Fjordland National Park, which extend beyond the main divide to the east. This area shares similar mountainous landforms of Western Fjordland; however, parts of it appear less remote in terms of access with large mountain ranges framing glacial lakes such as Lake Te Anau and Lake Manapouri. Refer to Figure 35 for the extent of the Western Fjordland Coastal Terrestrial Area.

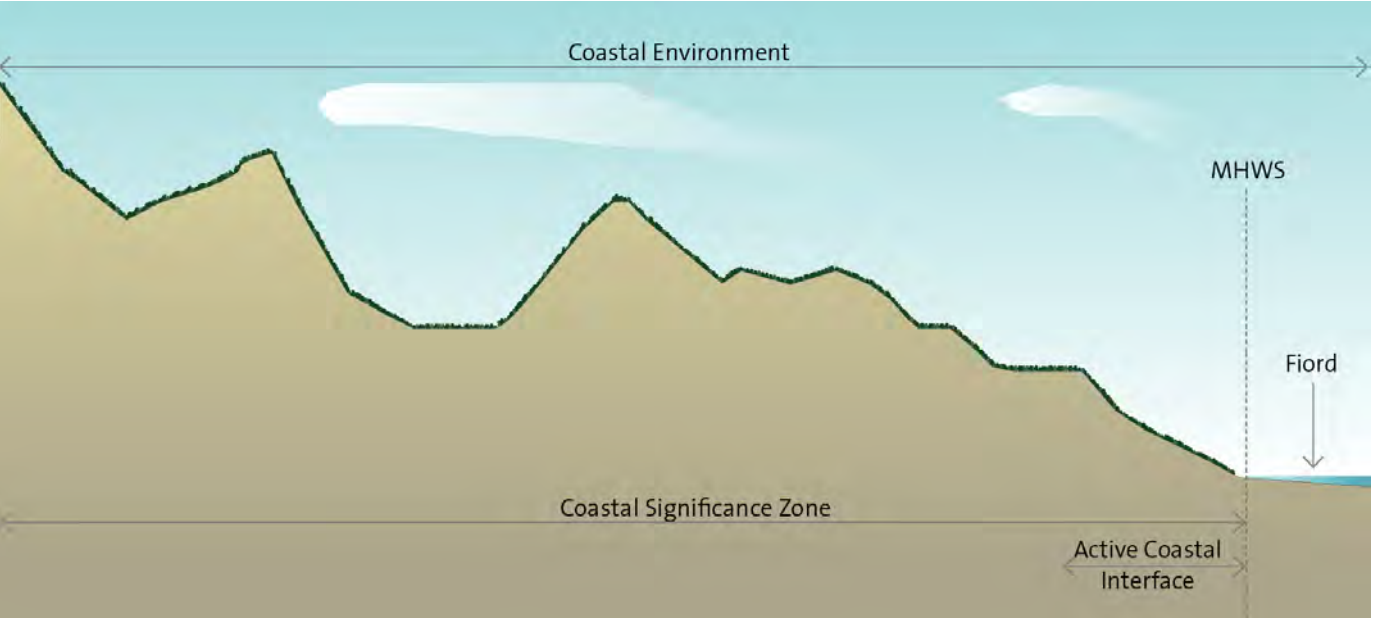


Diagram 14: Representative Coastal Environment diagram of the Western Fjordland Coastal Terrestrial Area.

ABIOTIC

This Coastal Terrestrial Area contains some of New Zealand’s most rugged coastline with deep fiords and lakes. Western Fjordland has high, steep mountains and deep fiords, which contrast with the more subdued topography of Southern Fjordland.

Fiordland’s steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. The fiord landscape has been created by the uplift of hard plutonic rocks, which have been subsequently carved into their present shape over the last 2 million years by successive periods of heavy glaciation.

The landforms within Western Fjordland range from classic U-shaped fiords with steep sea cliffs, hanging valleys with fast flowing streams, spectacular waterfalls cascading into the sounds, to long curving beaches with sand bars and tidal inlets and lagoons. The coastal margin of hills further north near Martin’s Bay and Big Bay are lined with reefs and rocky points. There is also a primary and secondary dune sequence located at Big Bay backed by Waiuna Lagoon. This lagoon is the largest dune-dammed lake and wetland in Fjordland.

Another distinctive and regular landform feature are tree avalanches which have resulted in filling valley floors, damming rivers and formed lakes. Many of the river mouths are located at the head of fiords and have developed deltas which have been built up by gravels and shaped by continuous wave action. Old glacial valleys or troughs now contain the larger lakes of Fjordland.

The most iconic coastal landforms within this stretch of coast are Mitre Peak, a spectacular glacially-carved mountain peak within Milford Sound and Doubtful Sound, the deepest (421m) and second longest (40km) fiord in New Zealand. Sutherland Sound is unique in having an estuarine character as a result of the outer fiord being constricted by a sandspit. Tidal sand and mudflats are crossed by sinuous channels. Behind the flats is a deep inner basin (Environment Southland, 2013).

The influence of ocean waves on Fjordland’s hard-rock geology is reflected along the shoreline with boulder beaches and some sandy stretches. Valley glaciation has also had a dramatic effect on the inner fiord shores.

Western Fjordland contains hundreds of islands ranging in size from small rock stacks to the likes of Resolution Island which is twenty-thousand, eight-hundred and sixty hectares in size. Many of the islands provide a sanctuary for endangered fauna in Fjordland and therefore biodiversity management schemes are much more successful (DOC, 2007).

Rockfalls and slips have been the cause of most erosion since the last glaciation period. The topography of Western Fjordland protects the inner fiords from extreme winds. The north-westerly is the main wind that reaches within the fiords.

Annual rainfall is 7,000mm. Annual sunshine hours are 1,500-1,600 per year. Median temperatures range from 15° Celsius in Summer and 3° Celsius in Winter. Generally Western Fjordland has a wetter but warmer climate in summer and a dryer, colder climate in winter. Elevation varies between 0 and 1,900 metres.

BIOTIC

The total land area within the Western Fjordland Coastal Terrestrial area is 479,077ha, of which 72.6% is in native forest, 1.6% in native shrubland, 0.2% in wetland communities, 2.9% in sub alpine shrubland, 15.5% in tall tussock grassland, 0.1% in pasture, 5.6% in bare or lightly-vegetated surfaces and 1.6% in water bodies.

This Coastal Terrestrial Area contains a significant number of New Zealand’s indigenous plant species with some species only found in Fjordland. Western Fjordland also forms part of the Te Wahipounamu - South West New Zealand World Heritage Area which has been described as having ‘superlative natural phenomena.’ The outstanding examples of temperate rainforest and the alpine plant communities found in Fjordland are important internationally and nationally for their diversity and pristine condition.

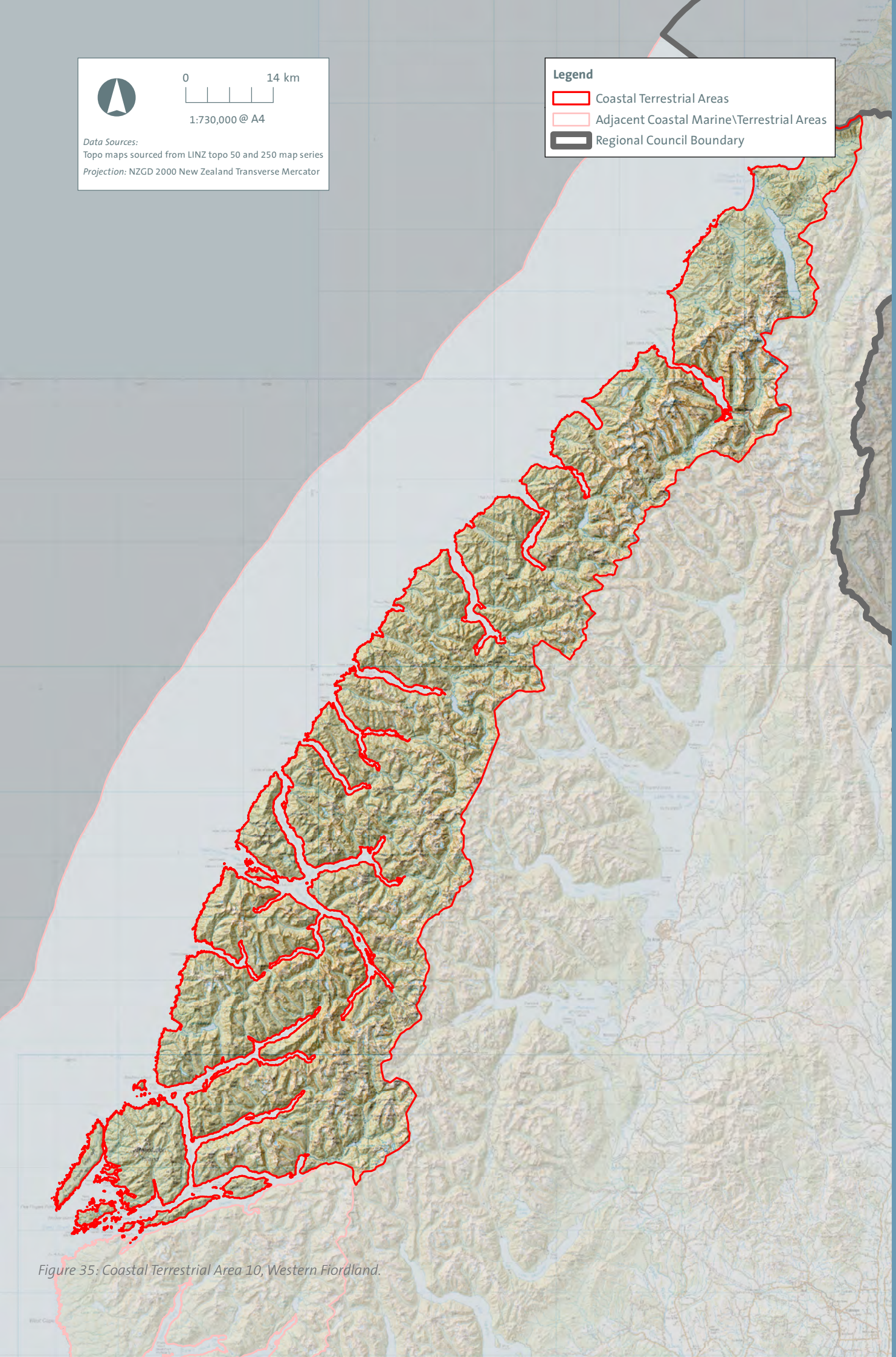


Figure 35: Coastal Terrestrial Area 10, Western Fjordland.

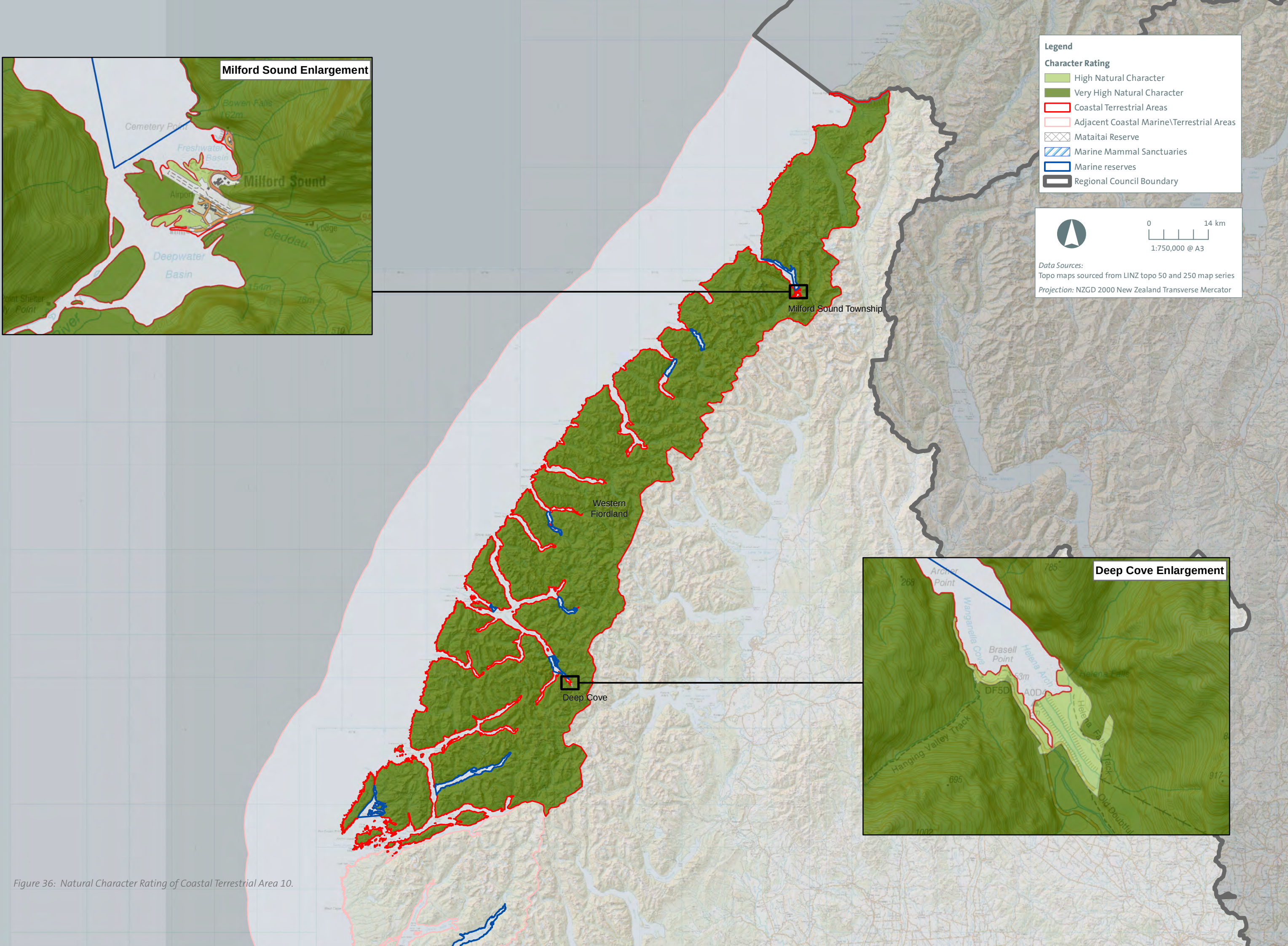


Figure 36: Natural Character Rating of Coastal Terrestrial Area 10.

The stunning native forests of Western Fiordland primarily consist of podocarps and southern beeches, specifically silver and mountain beech. The largest but least hardy is the red beech which is rarely found above 400m. Stands of rimu are found near lakes and fiords with rimu, miro and totara prominent on the alluvial flats. Other podocarp species include snow totara, pink pine, yellow-silver pine and mountain totara. Martin’s Bay contains one of the most important stands of podocarp forest, wetland, and dune systems on the southern coast. Southern rātā, kāmahī and broadleaf are also significant in Fiordland forests. These species adapt to the extreme climate and soil conditions.

Although the predominant flora can generally be found elsewhere in New Zealand, Fiordland’s vast area supports a number of rare and regionally endemic species. These include the nationally vulnerable scarlet rātā (*Meterosideros fulgens*), the at risk lyallas carrot (*Anisotome lyallii*), and the naturally uncommon teteaweke (*Olearia oporina*).

Coastal vegetation is influenced by a milder climate than most inland areas of Fiordland. Coastal forest contains a number of species not found elsewhere in Fiordland. These include: puka, pigeonwood, and two species of climbing rātā. Scrub and herbs fringe the windswept shores of open coastline (DOC, 2007). The Fiordland skink is also endemic to the Fiordland coastline. There are scattered dunes about the coastline, the most important being Coal River, Martins Bay, and Big Bay. The entire Fiordland coastline has no presence of marram grass or gorse and is maintained this way.

A number of islands in this Coastal Terrestrial Area are maintained predator free and are immensely valuable for conservation. These island support species such as the kākāpō, South Island saddleback, mohua/yellowhead (*Mohoua ochrocephala*), and other species (Rance, 2018). These islands are also important for invertebrates such as the large native weevil, flax weevil, and knobbed weevil. Resolution, and Secretary Islands along with others have ongoing pest control programmes (Rance, 2018).

Kekeno/New Zealand fur seals (*Arctocephalus forsteri*) also have strong populations along the Fiordland coast, rocky shorelines and on islands within fiord entrances. Nesting sites for the nationally vulnerable Fiordland crested penguins (*Eudyptes pachyrhynchus*), thought to be the world’s rarest penguin, are located in dense coastal scrub along the coast and throughout the fiord systems.

While Fiordland has many different bird species, depending on the climatic conditions of areas and vegetation diversity the location of forest birds differ from place to place. The nationally endangered southern brown kiwi (*Apteryx australis*) and weka (*Gallirallus australis*) can be found in the high rainfall area from sea level to alpine grassland. Other threatened and endangered bird species include the New Zealand falcon (*Falco novaeseelandiae*) and native pigeon (*Hemiphaga novaeseelandiae*), the nationally vulnerable whio/blue duck (*Hymenolaimus malachorhynchus*), the nationally vulnerable South Island kaka (*Nestor meridionalis*) and South Island robin (*Petroica australis*), kea (*Nestor notabilis*), mohua/yellowhead (*Mohoua ochrocephala*), and the kakariki/yellow-crowned parakeet (*Cyanoramphus auriceps*). Coastal birds include tara/white fronted tern (*Sterna striata*) and tōrea pango/variable oystercatcher (*Haematopus unicolor*).

Fiordland also holds an important population of the indigenous nationally critical grey duck. The threatened, long-tailed bat is also found in the forests of Big Bay. The Waiuna Lagoon provides a habitat for threatened fish the taiwharu (giant kōkopu, *Galaxias argenteus*) and the water trefoil, *Myriophyllum robustum*.

EXPERIENTIAL

The Western Fiordland Coastal Terrestrial Area is New Zealand’s most natural, awe-inspiring place to visit and experience. The only road access points are located through the world-renowned Milford Sound Road as well as a separate road leading to Doubtful Sound (from West Arm, Manapouri).

The small settlement of Milford Sound is the only populated place within this Coastal Terrestrial Area. This area includes a small commercial boat marina and breakwater, airstrip, car parking and accommodation venues. Commercialisation and boating activity are apparent, and these activities, along with others, including bus excursions, trampers and aircraft movements affects the sense of naturalness of the area to varying degrees.

Doubtful Sound/Patea is known as ‘the place of silence’ and access is not easy. The road over Wilmot Pass is the only way in by vehicle. This road was created as part of the Manapouri Hydro-Electric Power Station which uses a 230m drop between Lake Manapouri and Deep Cove (within Doubtful Sound) to create electricity. Major modification in this area is the Manapouri Tailrace Tunnel, which takes the water that flows out of the Manapouri hydro station to Deep Cove. Other minor developments include wharfs and moorings in Deep Cove and buildings such as Deep Cove School Hostel.

Commercial boat cruises through Milford Sound and Doubtful Sound provide a remote, wilderness experience and a chance to get up close to nature, specifically cascading waterfalls, seals and dolphins.

Recreational opportunities include diving, kayaking, camping, hunting and tramping. Popular walking tracks include the Dusky and Hollyford tracks in addition to the Milford Track which is a Great Walk. The Department of Conservation has an extensive network of huts and facilities to enable a remote, and isolated backcountry experience.

Although white baiting is prohibited in Fiordland National Park between Puysegur Point and Yates Point, it is undertaken commercially in Big Bay and Martins Bay. The fishery is small financially however many choose to live there due to the lifestyle (Environment Southland, 2013).

Below: Mouth of the Hollyford River. Boffa Miskell, 2018.

Level 3 Rating: Coastal Terrestrial Area 10 – Western Fiordland			
Degree of Natural Character	Natural Character Attributes		
	Abiotic	Biotic	Experiential
Very High	✓	✓	✓
High			
Moderate to High			
Moderate			
Moderate to Low			
Low			
Very Low			
Overall Natural Character Rating		Very High	



Coastal Terrestrial Area 10: Western Fiordland

SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)

THESE ARE MAPPED WITH REFERENCE TO FIGURE 36

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

Area	Overall Rating	Abiotic	Biotic	Experiential	Key Characteristics	Additional Comments
WESTERN FIORDLAND	VH	VH	VH	VH	- Contains some of New Zealand’s most rugged coastline with deep fiords and lakes. - Fiordland’s steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. - The most iconic coastal landforms within this stretch of coast are Mitre Peak, a spectacular glacially-carved mountain peak within Milford Sound and Doubtful Sound, the deepest (421m) and second largest (40m) fiord in New Zealand. - Important islands around Dusky Sound (Anchor and Resolution Island) and Doubtful Sound (Bauza Island). - This Coastal Terrestrial Area contains over one-third of New Zealand’s indigenous plant species with some species only found in Fiordland. - Western Fiordland also forms part of the Te Wāhipounamu - South West New Zealand World Heritage Area which has been described as having ‘superlative natural phenomena.’ - The outstanding examples of temperate rainforest and the alpine plant communities found in Fiordland are important internationally and nationally for their diversity and pristine condition. - Although the predominant flora can generally be found elsewhere in New Zealand, Fiordland’s vast area supports a number of rare and regionally endemic species. - Populations of kekeno/New Zealand fur seals (<i>Arctocephalus forsteri</i>), the nationally vulnerable Fiordland crested penguin, nationally endangered bottlenose, common and dusky dolphins are known to frequent the fiords throughout the year in addition to the coast. - While Fiordland has many different bird species, depending on the climatic conditions of areas and vegetation diversity the location of forest birds differ from place to place. - New Zealand’s most natural, awe-inspiring place to visit and experience. - Remote and isolated experiences. - High levels of recreation and wildness.	This area excludes the more modified area of Milford Sound.

Continued from previous page

Coastal Terrestrial Area 10: Western Fiordland						
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)						
THESE ARE MAPPED WITH REFERENCE TO FIGURE 36						
REFER TO COASTAL MARINE AREA F FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.						
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
MILFORD SOUND TOWNSHIP	H	H	H	H	- Extensive indigenous forest which has been modified due to close to the township. - Remote and isolated experiences. - High levels of recreation and wildness. - Open views to Mitre Peak and the glacial mountain ranges of Milford Sound. - Sense of enclosure within Milford Sound.	Excludes township and airport/ runway. Includes foreshore areas.
DEEP COVE	H	H	H	VH	- Indigenous forest, landform and water course which has been locally modified as part of the Manapouri underwater power scheme. - High level of naturalness with open views out towards Dusky Sound. - Sense of enclosure and calmness due to the glacial mountain ranges and fiords which frame Deep Cove. - Remote and isolated experiences. - High levels of recreation and wildness.	Includes modified foreshore areas.

Right: Waterfall in Milford Sound. Boffa Miskell, 2018.





View overlooking Ruapuke Island. Boffa Miskell, 2018.

4.17 COASTAL TERRESTRIAL AREA 11:
OUTER ISLANDS

COASTAL CHARACTERISTICS, COASTAL ENVIRONMENT EXTENT, AND
COASTAL CONTEXT AREA

This Coastal Terrestrial Area comprises of a series of outer Islands located at some distance off the Southland coast and situated predominantly within the waters of Foveaux Strait. The islands within this Coastal Terrestrial Area include the isolated and very steep Solander Islands, Raratoka Island (Centre Island) off of Oraka Point, Ruapuke Island and a number of very small islands and rocks. The largest island, Ruapuke island, located south of Toetoes Bay retains a number of smaller islands, islets and rocks around its coast, including Green Island and Bird Island. Ruapuke Island comprises a series of small sandy bays and lagoons, which provide safe habitat for a number of endangered wader species, rock lobsters, and pāua (*Haliotis iris*) (Environment Southland, 2013). The Solander Islands are located approximately 38km south of Fiordland and forms part of the Fiordland National Park and contain New Zealand's largest fur seal colony outside of the Antarctic Islands. Raratoka Island (Centre Island) is an island sanctuary). All of these islands are important for their landforms, vegetation and fauna. They also provide important nesting and roosting sites for many sea birds.

Key coastal characteristics include: Rocky outcrops, limited scrubby vegetation except for Ruapuke Island which contains some indigenous wetland vegetation, sandy bays and a dominance of the Southern Ocean. Refer to Figure 37 for the extent of the Outer Islands Coastal Terrestrial Area.

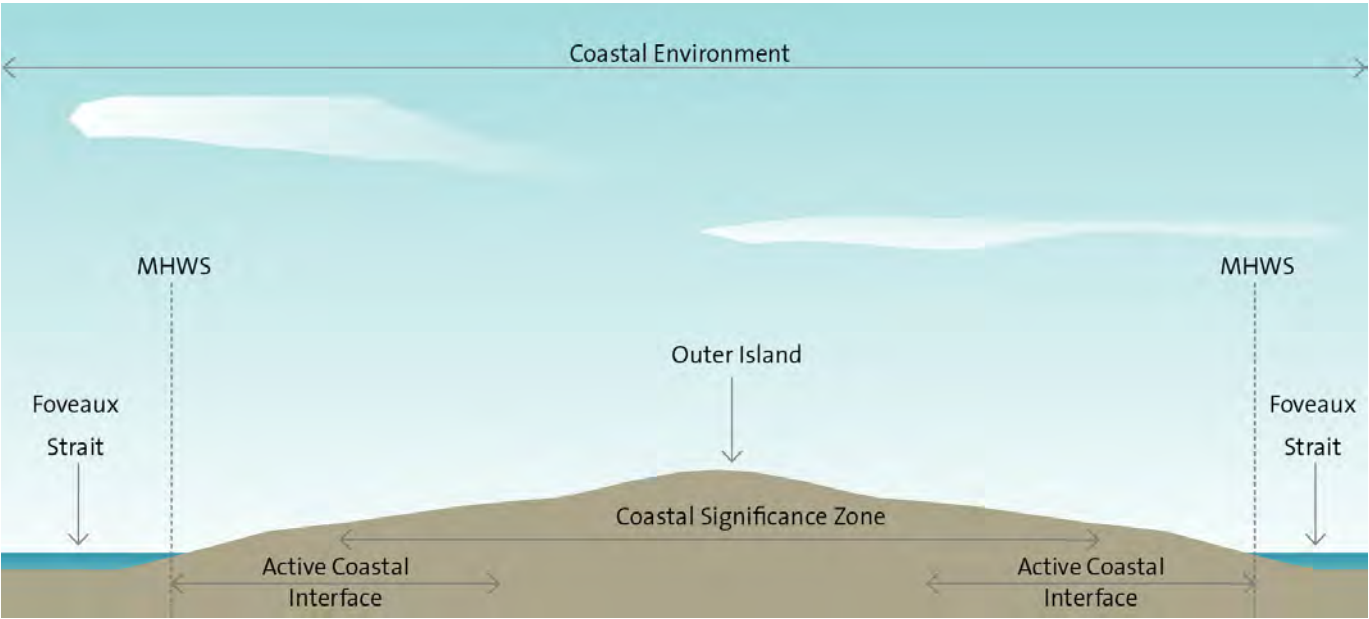


Diagram 15: Representative Coastal Environment diagram of the Outer Islands Coastal Terrestrial Area.

ABIOTIC

Comprising two islands, the Solander Islands (which are part of Fiordland National Park) are the least modified of the Outer Island group. Solander Island, the main island is approximately 65ha of steeply rising land, rising to a peak of 330m above sea level. Being remnants of an andesitic volcano, the islands display amongst its rocky shore, hornblende andesite flows. The smaller island (Little Solander Island) is located 1.9km to the west of the main island and is approximately 4ha in size. This smaller island which rises in elevation to 148m is almost devoid of vegetation and covered by guano. A third island, or rock (Pierced Rock) is located 250m south of the main island. Due to the volcanic terrain, deep caves are evident, including Sealers Cave on the eastern side of the main island. These islands are amongst some of the most exposed in New Zealand.

Ruapuke Island, the largest island in this coastal group, includes the main island, including numerous rocks, small islands and islets around its entire coastline. This island group are relatively low-lying, and generally flat, however, two rocky high points on the western side of the island rise to 62m at North Head and 64m at West Point. Due to the low-lying terrain, much of Ruapuke Island comprises marshland, especially on its eastern and southern sides, the largest of which is Waitokariro Lagoon. Different from other islands in this Coastal Terrestrial Area, is that Ruapuke Island supports a number of broad, open sand embayment's and small coves. A small tombolo separates Lagoon Bay from Caroline Bay on the west coast.

Raratoka Island (Centre Island), which covers approximately 86ha is the closest of the Outer Islands to the Southland mainland. It is a low-lying island, comprised of gabbro igneous rock and reaching a height of 77m. The island supports extensive rocky reefs around its shoreline and offshore from this island, including those to the east called Escape Reefs. Some buildings and an airstrip is noted on this island.

In terms of climate, all islands receive similar amounts of rain (i.e. between 1,500mm-4,000mm annually), with a median summer temperature of 16 degrees Celsius and a median winter temperature of 3 degrees.

BIOTIC

The total land area within the Outer Islands Coastal Terrestrial area is 1,803 ha, of which 6.5% is in native forest, 23.5% in native shrubland, 3.9% in wetland communities, 50.3% in pasture, 12.1% in bare or lightly-vegetated surfaces and 3.7% in water bodies.

Refer also to the descriptions outlined within Coastal Marine Area B and F for further information relating to the near-shore environments of these islands.

These island ecosystems are important with the broader Southland coast as they provide important refuges for a number of indigenous flora and fauna due to the lack of predators.

The Solander Island group are free of introduced mammals (such as possums and rats) and most weeds and contain a number of at risk or threatened birds and plants. Of the plant species, approximately one-third of the identified species is considered rare (Johnson, 1975), which relate predominantly to ferns and orchids. Some of these include the nationally critical Snares Island anisotome (*Anisotome acutifolia*), the at risk Punui (*Azorella lyallii*) on Solander Island, and the at risk Azorella robusta on Little Solander Island. The main island is covered is dense indigenous scrub, whilst the smaller island is virtually devoid of vegetation through its naturally rocky habit. Solander Island itself forms the national stronghold for the local endemic tree daisy (*Brachyglottis stewartiae*). This group of Islands also contain New Zealand's largest fur seal colony outside of the Subantarctic Islands. nationally critical New Zealand sea lions are also present on the islands. Several species of oceanic birds inhabit the Solander Island group. Two of these, the at risk titi/sooty shearwater (*Puffinus griseus*) and mottled petrel also breed on the small islands of southern

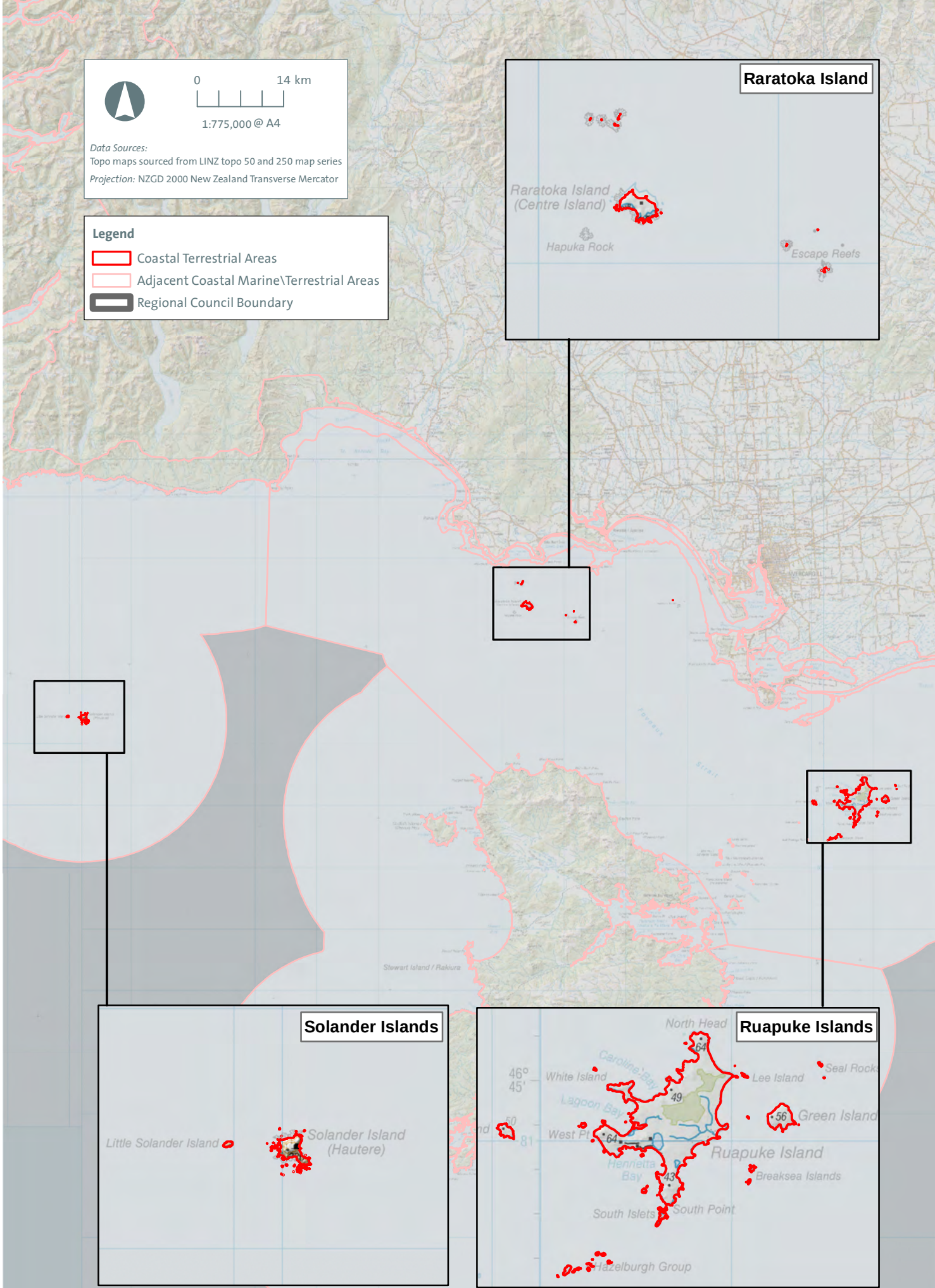
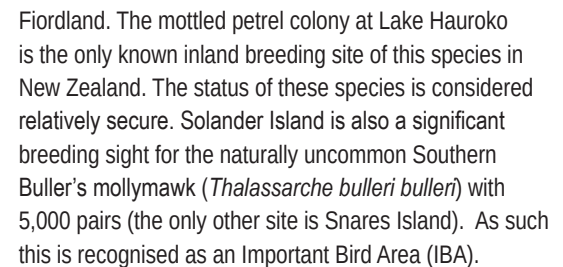


Figure 37: Coastal Terrestrial Area 11, Outer Islands.



Figure 38: Natural Character Rating of Coastal Terrestrial Area 11.



The nationally vulnerable Fiordland crested penguin is also found along the coast and on the Solander Islands. Nest sites are located in dense coastal scrub. The parāoa/sperm whale (*Physeter macrocephalus*) and nationally vulnerable tohōa/southern right whales (*Eubalaena australis*) also occur around these islands. Very little, if any modification is apparent on these islands.

Ruapuke Island comprises predominantly marshland and supporting flora and fauna. The large lagoon and wetland/estuary complexes on Ruapuke and the dunes and intertidal areas of the Old Neck, provide feeding habitat for various endangered waders as well as trans-equatorial migrant waders.

Raratoka Island (Centre Island), is a protected island and currently being restored by local iwi. It reportedly supports three species of penguin, the Fiordland crested penguin (*Eudyptes pachyrhynchus*), the hioho/yellow-eyed penguin (*Megadyptes antipodes*), and the kororā / blue penguin (*Eudyptula minor*).

EXPERIENTIAL

Due to the restricted ability to access many of these island, they retain a dominant sense of wildness. Those islands that retains greater levels of modification, such as Ruapuke Island and Raratoka Island still retains a sense of wildness and isolation, due in part by the low terrain and the low-levels of modifications apparent. The Solander Island Group retain the greatest levels of naturalness, through their isolated located and lack of modification.

The islands are also a part of the Titi (muttonbird/sooty shearwater) Island group which have strong cultural associations for Maori, particularly Ngai Tahu. The islands are seasonally occupied for the harvest of muttonbirds. Since the Ngai Tahu Claims Settlement Act, 1998 these islands have been renamed the Rakiura Titi Islands (Te Rūnanga o Ngāi Tahu, 2018).

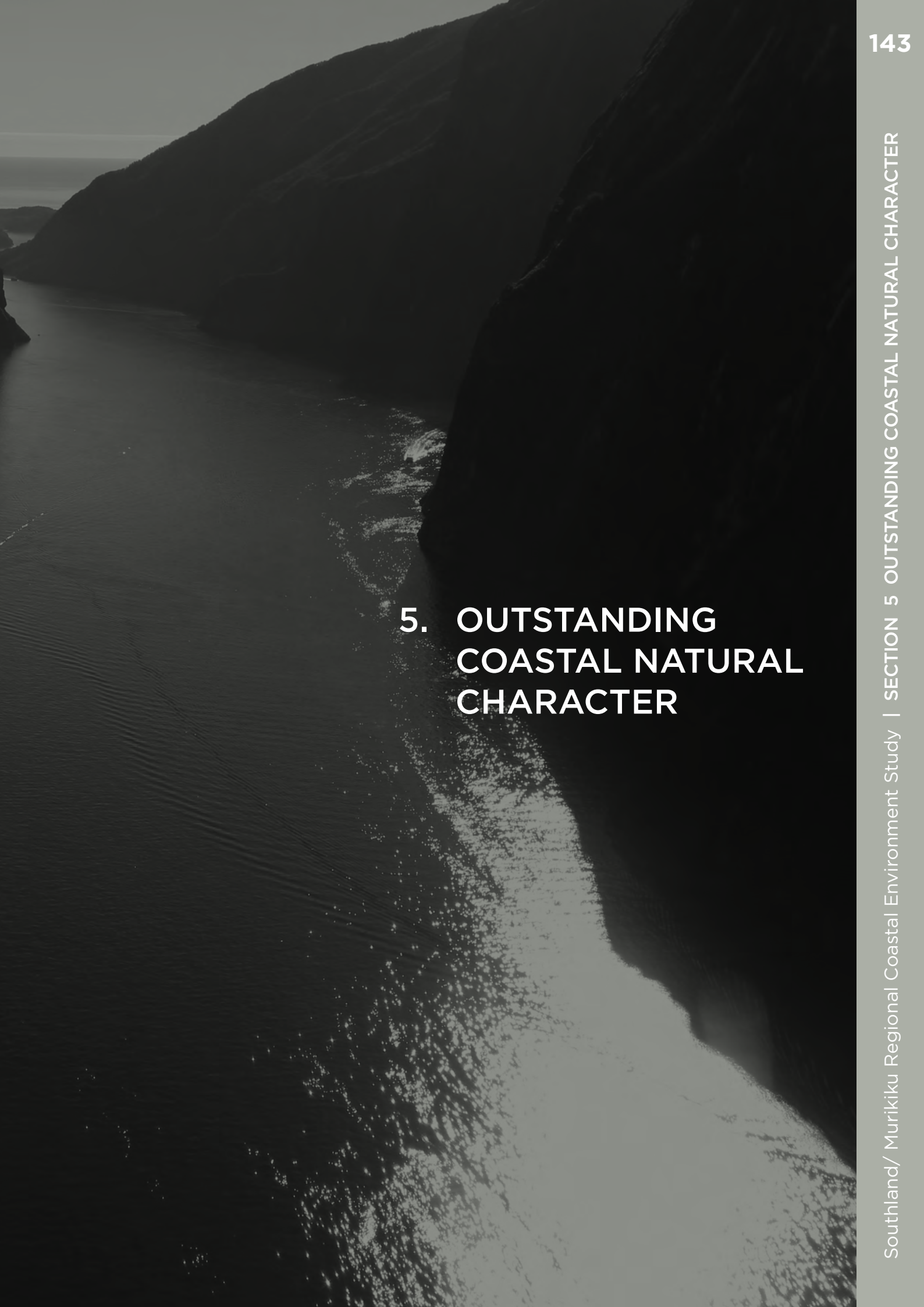
Left: Figure 39: Outer Islands enlargement.

Level 3 Rating: Coastal Terrestrial Area 11 – Outer Islands			
DEGREE OF NATURAL CHARACTER	NATURAL CHARACTER ATTRIBUTES		
	ABIOTIC	BIOTIC	EXPERIENTIAL
VERY HIGH	⊘		✓
HIGH		✓	
MODERATE TO HIGH			
MODERATE			
MODERATE TO LOW			
LOW			
VERY LOW			
OVERALL NATURAL CHARACTER RATING		VERY HIGH	

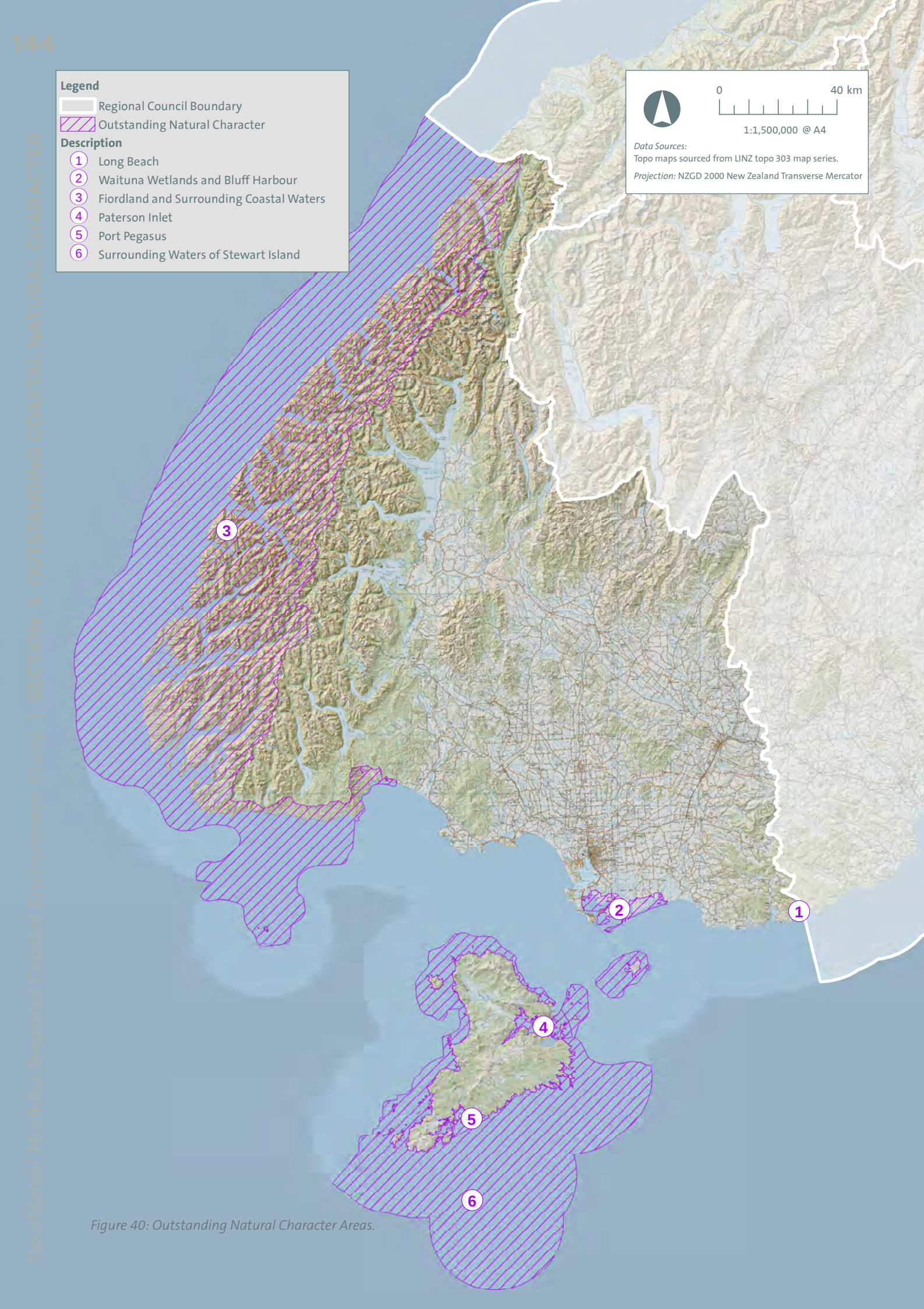
Coastal Terrestrial Area 11: Outer Islands						
SPECIFIC CHARACTERISTICS AT THE LOCAL SCALE (LEVEL 4)						
THESE ARE MAPPED WITH REFERENCE TO FIGURES 38 & 39						
REFER TO COASTAL MARINE AREA B AND F FOR FURTHER INFORMATION RELATING TO THE MARINE COMPONENT ASSOCIATED WITH THIS AREA.						
AREA	OVERALL RATING	ABIOTIC	BIOTIC	EXPERIENTIAL	KEY CHARACTERISTICS	ADDITIONAL COMMENTS
SOLANDER ISLANDS	VH	VH	VH	VH	- Unmodified volcanic islands. - Part of Fiordland National Park and dominated by untouched indigenous vegetation. - Predator Free islands. - Rare orchids and ferns. 53 vascular plants of which one third are rare. - Fur Seal colony and presence of nationally critical New Zealand sea lions. - Numerous sea birds. - Significant breeding site of the naturally uncommon Southern Buller’s mollymawk. - Overwhelming sense of isolation, wildness, naturalness and exposure.	Includes both islands
RUAPUKE ISLANDS	H	H	H	VH	- Rugged and windswept island. - Extensive wetlands and marshlands. - High level of exposure, remoteness, wildness, and isolation.	Includes, Ruapuke Island, Green Island, Breaksea Island, South Islets, Kelly Rock, Hazelburgh Group, Half Passage Rock, Fife Rock, Bird Island, Topi Island, White Island, Seal Rocks.
RARATOKA ISLAND (CENTRE ISLAND)	H	H	H	VH	- Sanctuary for birds. - High sense of wildness and exposure to the climatic conditions of Foveaux Strait.	Includes modified foreshore areas.

Right: Stream outlet on the eastern side of Ruapuke Island. Boffa Miskell, 2018.





5. OUTSTANDING
COASTAL NATURAL
CHARACTER



As outlined within Section 2 of this Study, areas of Outstanding Natural Character (ONC) have been assessed as a separate step in the assessment process. This exercise is focussed at the more refined scale (Level 4) for each Coastal Terrestrial and Coastal Marine area. Only areas with a high or very high rating at the Level 4 scale were considered under this outstanding assessment.

The following pages outline the results of this separate assessment. In total, six separate Outstanding Natural Character Areas have been identified and mapped. They include both terrestrial and marine areas and are typically larger in extent than the individually mapped areas at the high and very high scale. These ONC areas are considered by the study team to meet the threshold statement outlined within Section 2 of this Study. They represent the most unmodified and most natural parts of the Southland coastal environment. Over the next few pages, each ONC area will be introduced accompanied by their associated values. Commentary about their mapped extent and any exclusions will also be outlined. Like any mapping project, there were some areas that enabled considerable discussion amongst the Study Team, as to whether or not the area under review met the 'outstanding' threshold. A review by terrestrial and marine ecologists also confirmed these mapped areas.

As mentioned, all areas of ONC hold at least high or very high abiotic, biotic and experiential attributes at the more refined, Level 4 scale. Figure 40 provides an overview of the ONCs for the marine and terrestrial coastal environment for Southland Region. The area was mapped at a scale of 1:2,500.

IDENTIFIED OUTSTANDING NATURAL CHARACTER AREAS FOR THE COASTAL ENVIRONMENT IN SOUTHLAND (REFER TO FIGURE 40)	
1	Long Beach
2	Waituna Wetlands and Bluff Harbour
3	Fiordland and surrounding coastal waters
4	Coastal Waters of Paterson Inlet
5	Coastal Waters of Port Pegasus
6	Surrounding Coastal Waters of Stewart Island

Figure 40: Outstanding Natural Character Areas.



Cover page: View of Milford Sound looking towards the Tasman Sea. Boffa Miskell, 2018.
Right: View looking towards the Llawrenny peaks. The edge of Lake Ada can be seen on the right on the image. Boffa Miskell, 2018.

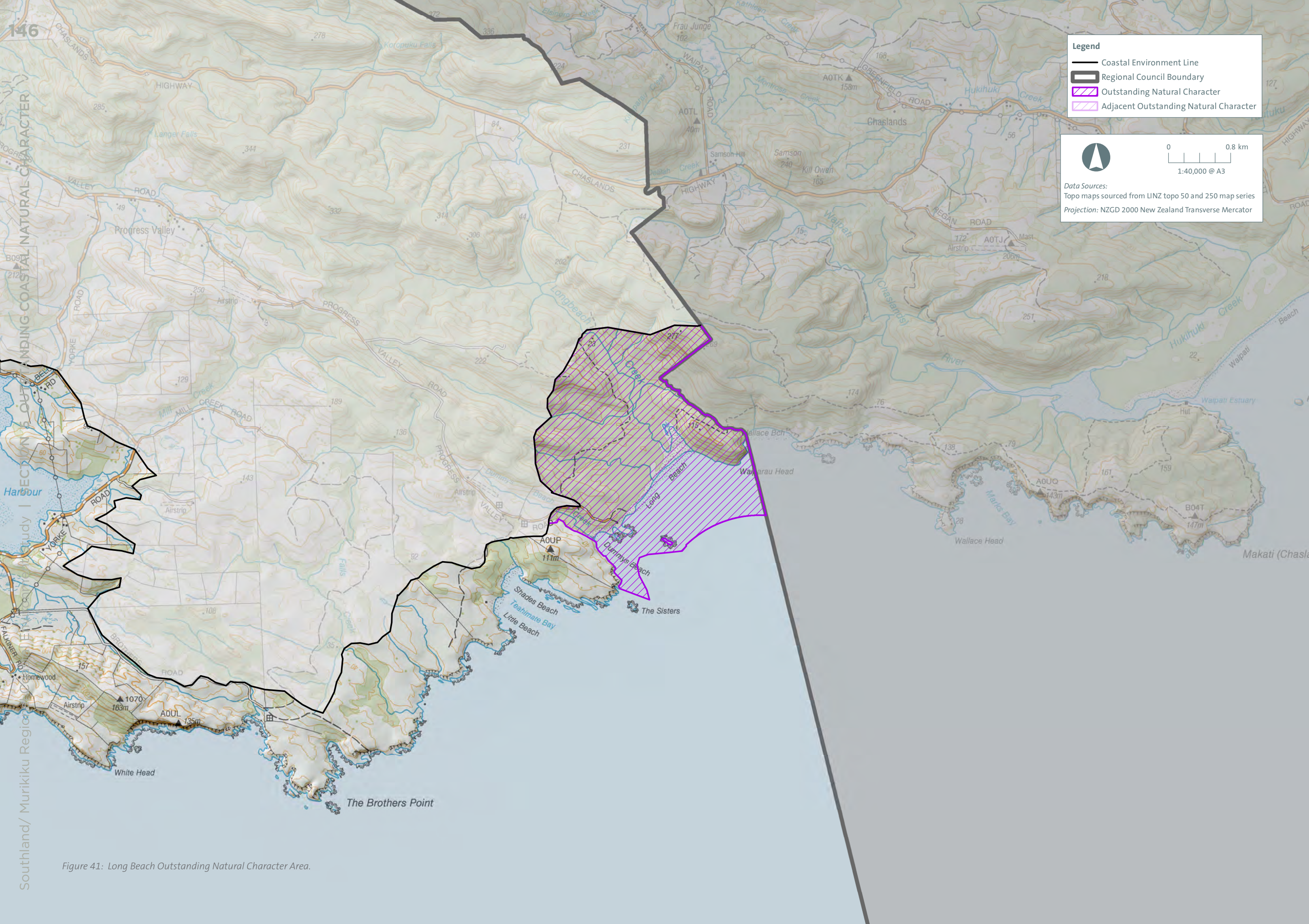


Figure 41: Long Beach Outstanding Natural Character Area.

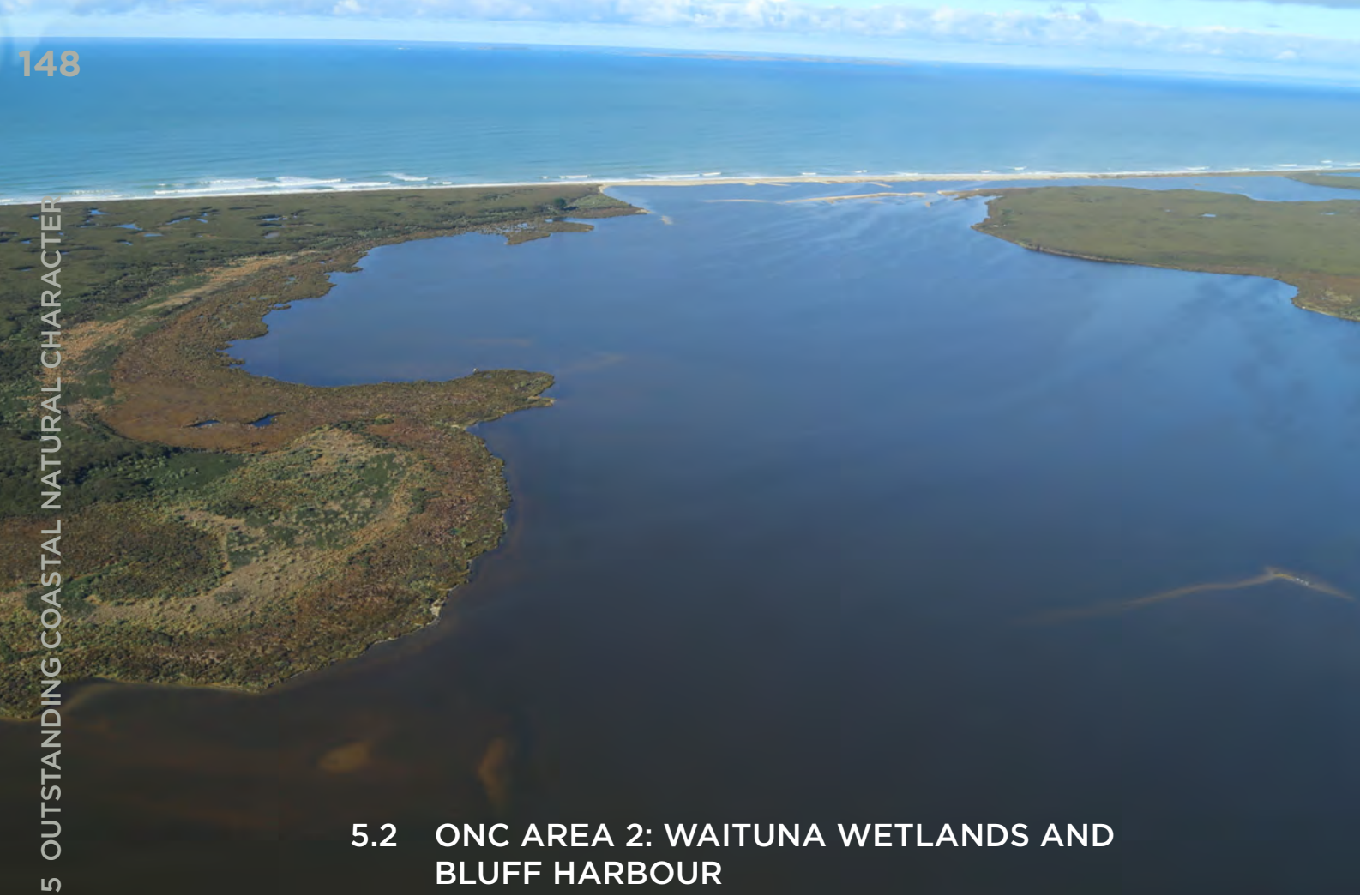


View overlooking the bush clad hills and sandy shores of Long Beach. Boffa Miskell, 2018.

5.1 ONC AREA 1: LONG BEACH

This area of Outstanding Natural Character includes the remote and unmodified part of the easternmost part of the Region. Steep, extensive bush clad hills extend from the sandy beach to enclose this local catchment, with Longbeach Creek sinuously extending through this area, draining into the sea. This area also includes the unmodified coastal waters, and rocky islets. The continuity of unmodified ecological processes from ridge to sea is rare in this part of eastern Southland.

LONG BEACH OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURE 41	
VALUES	
ABIOTIC	- Rocky headlands and reefs protruding into the sea. - Very limited modification, apart from access track.
BIOTIC	- Extensive indigenous forest cover from sea to ridge. - Kelp forests cover the rocky reefs within the marine environment.
EXPERIENTIAL	- High level of intactness and sense of wildness. - Isolated, remote and high sense of naturalness.
MAPPED EXTENT: The mapped extent of this Outstanding Natural Character Area is defined by the extent of very high levels of natural character mapped at the level 4 scale. The terrestrial extent follows the regional boundary and the broader extent of indigenous bush. The marine extent follows the coastline which includes the rocky islets. Areas of adjacent modification have been excluded.	
RATING	OUTSTANDING

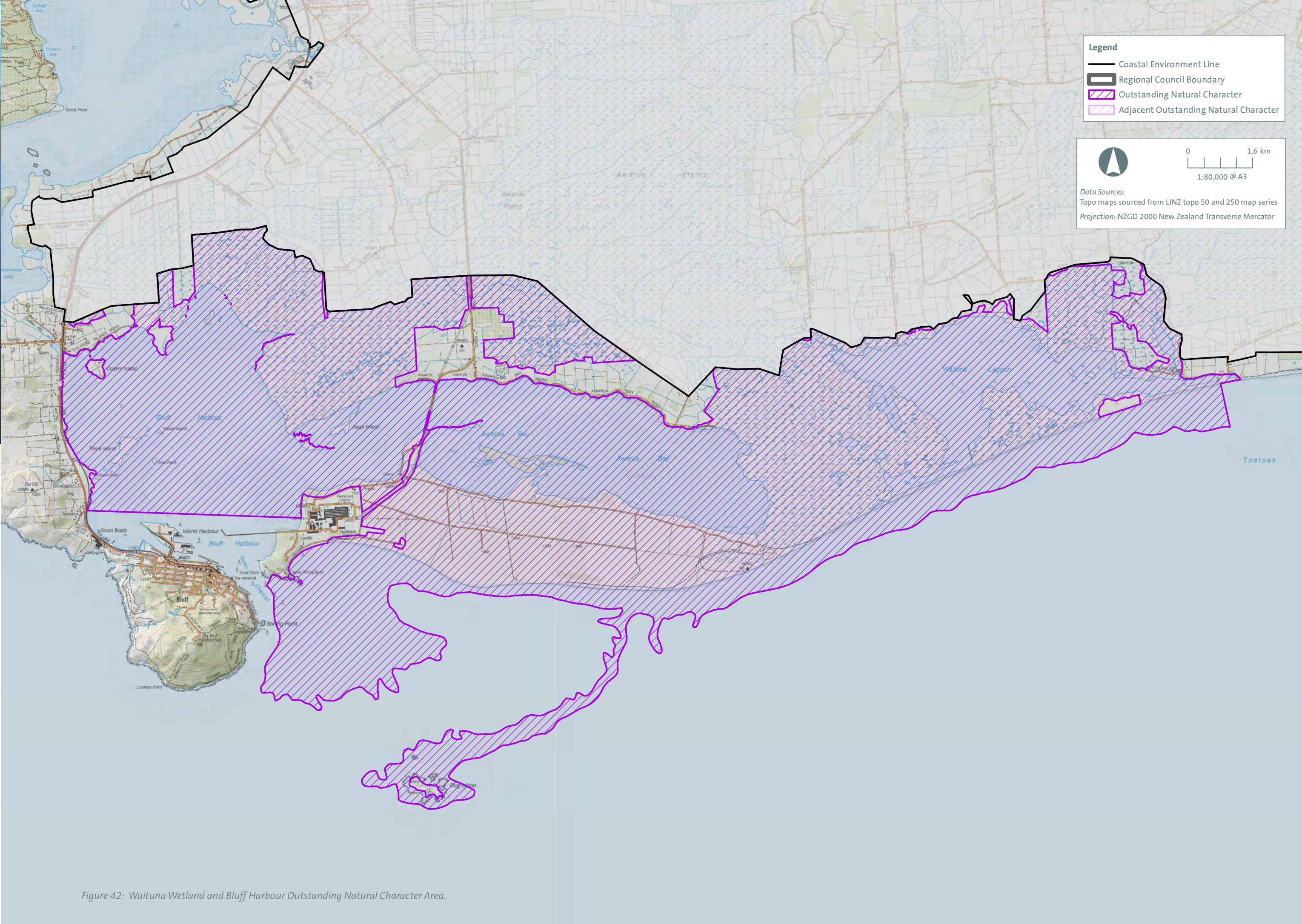


5.2 ONC AREA 2: WAITUNA WETLANDS AND BLUFF HARBOUR

View overlooking the Waituna lagoon. Boffa Miskell, 2018.

This extensive area of Outstanding Natural Character includes the lowland wetlands, coastal lagoons and estuaries of Waituna Lagoon, Awarua Bay and the Awarua plains, as well as northern parts of Bluff Harbour. This area retains exceptional sequences of unmodified coastal wetland landforms supporting an extensive range of habitat communities and holds international recognition for its intactness. The wildness and remoteness experienced in these lowland plains and lagoons is amongst the highest in the region.

WAITUNA WETLAND AND BLUFF HARBOUR OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURE 42	
VALUES	
ABIOTIC	Awaura Bay has excellent examples of coastal features including flood-tidal deltas, tomboles, wetlands and one of the most extensive series of beach ridges in the country.
BIOTIC	- The Waituna Wetland Scientific Reserve was listed as part of New Zealand's obligations when signing the Ramsar Wetland Convention (DOC). - The 3,500-hectare Waituna Wetlands and Lagoon is one of the first to be recognised as a wetland of international importance in New Zealand. - The Waituna coastal lake and lagoon are also identified in the Geopreservation Index as nationally important as they are a classic example in New Zealand of a largely unmodified coastal lake-type lagoon within an intact coastal wetland system trapped behind a barrier beach. - Indigenous scrub and shrub land cover occupy much of the Tiwai peninsula. - Highly productive and intact waters are found within Bluff Harbour and Awarua Bay. - Continuity of vegetation sequences between marine and terrestrial area. - Important habitat for wading birds.
EXPERIENTIAL	- Strong levels of naturalness apparent due to lack of modification. - Barren and wild experiential values. - Near shore waters are isolated, remote and exposed to Foveaux Strait.
MAPPED EXTENT: The mapped extent of this Outstanding Natural Character Area is defined by the mapped very high levels of mapping of this part of the region at the more refined, level 4 scale. It encompasses broad and extensive areas, due in part to the lack of modification. This area excludes the more modified adjacent areas, including the aluminium smelter at Tiwai Point.	
RATING	OUTSTANDING



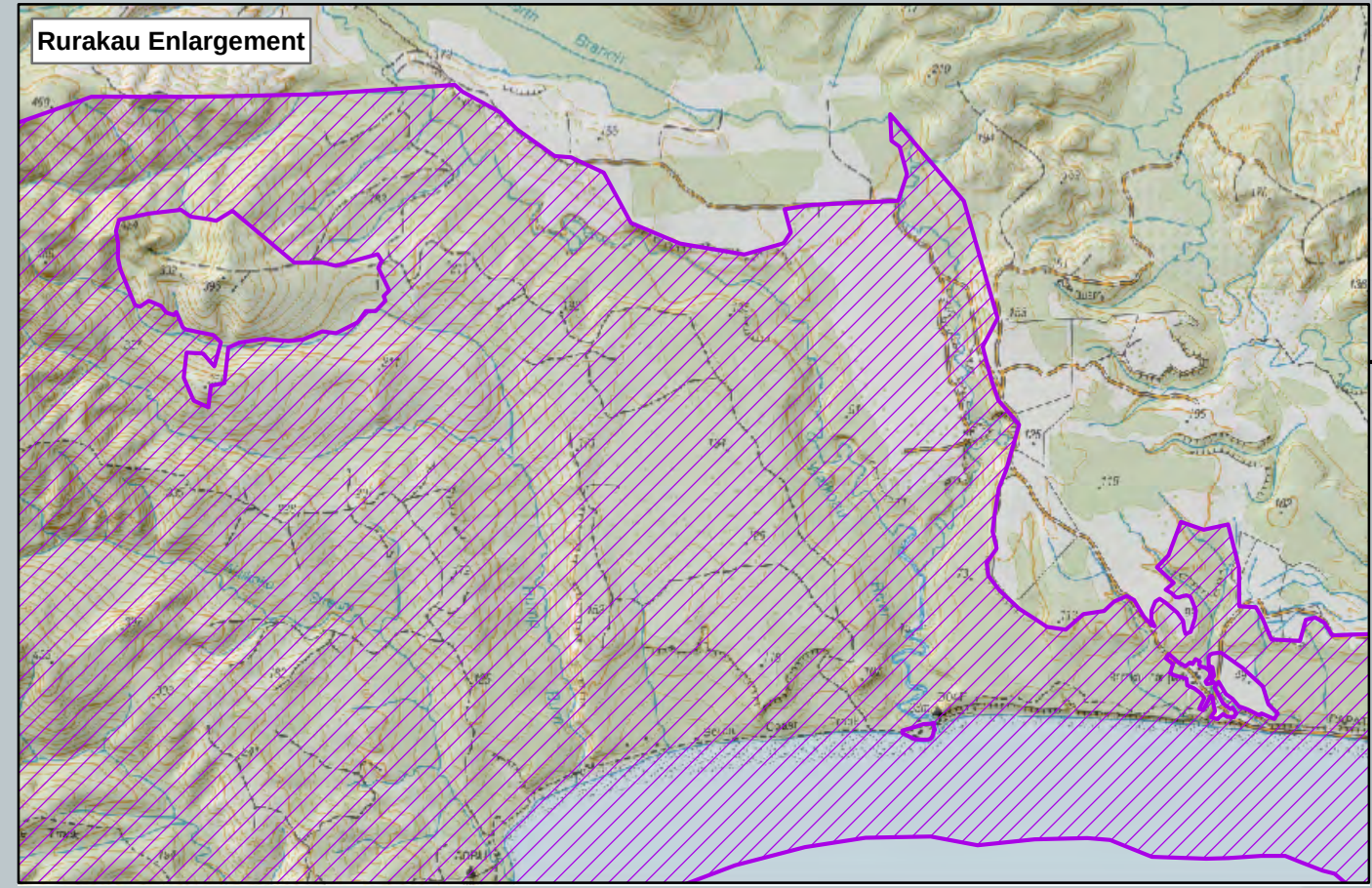
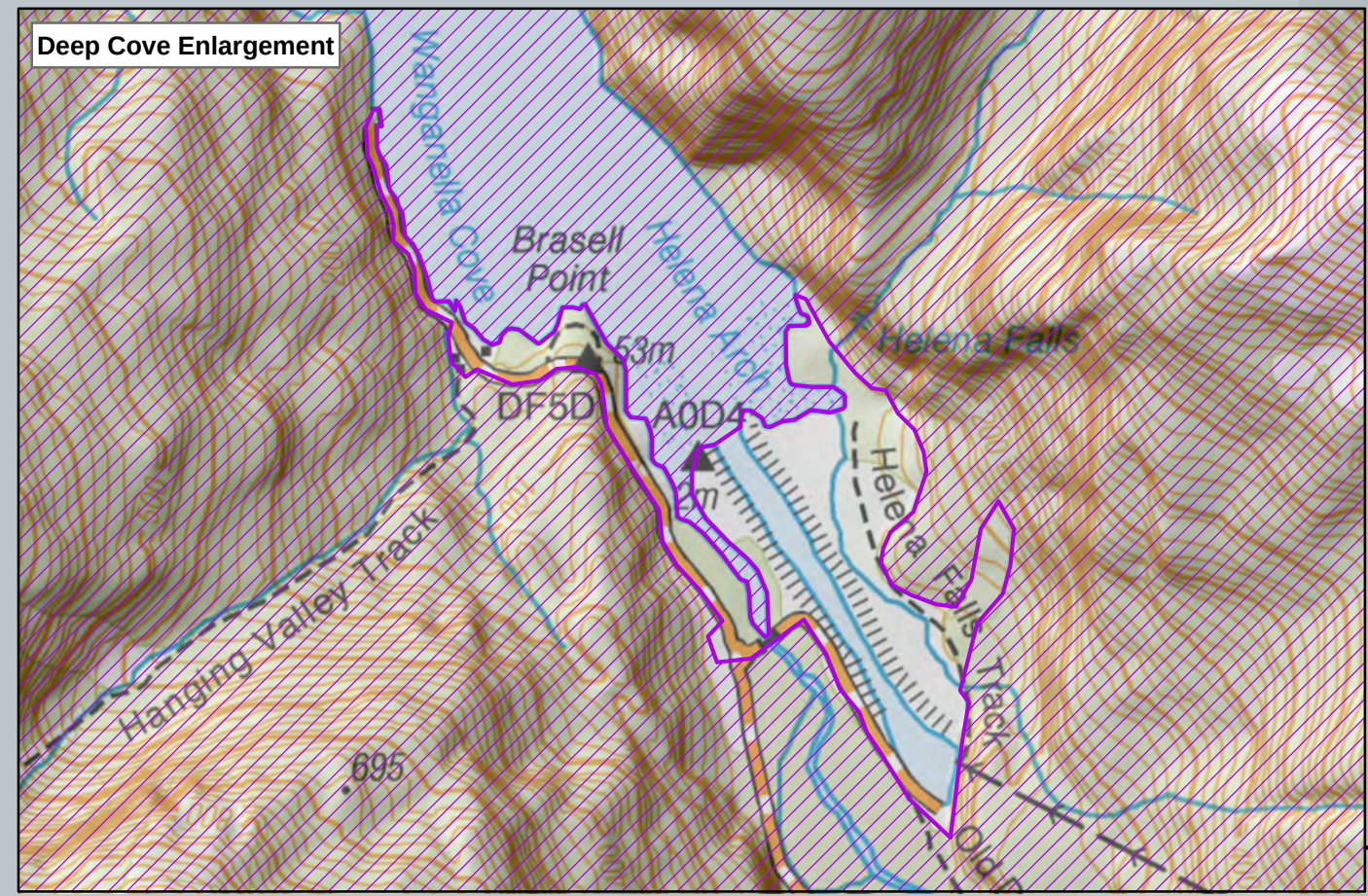
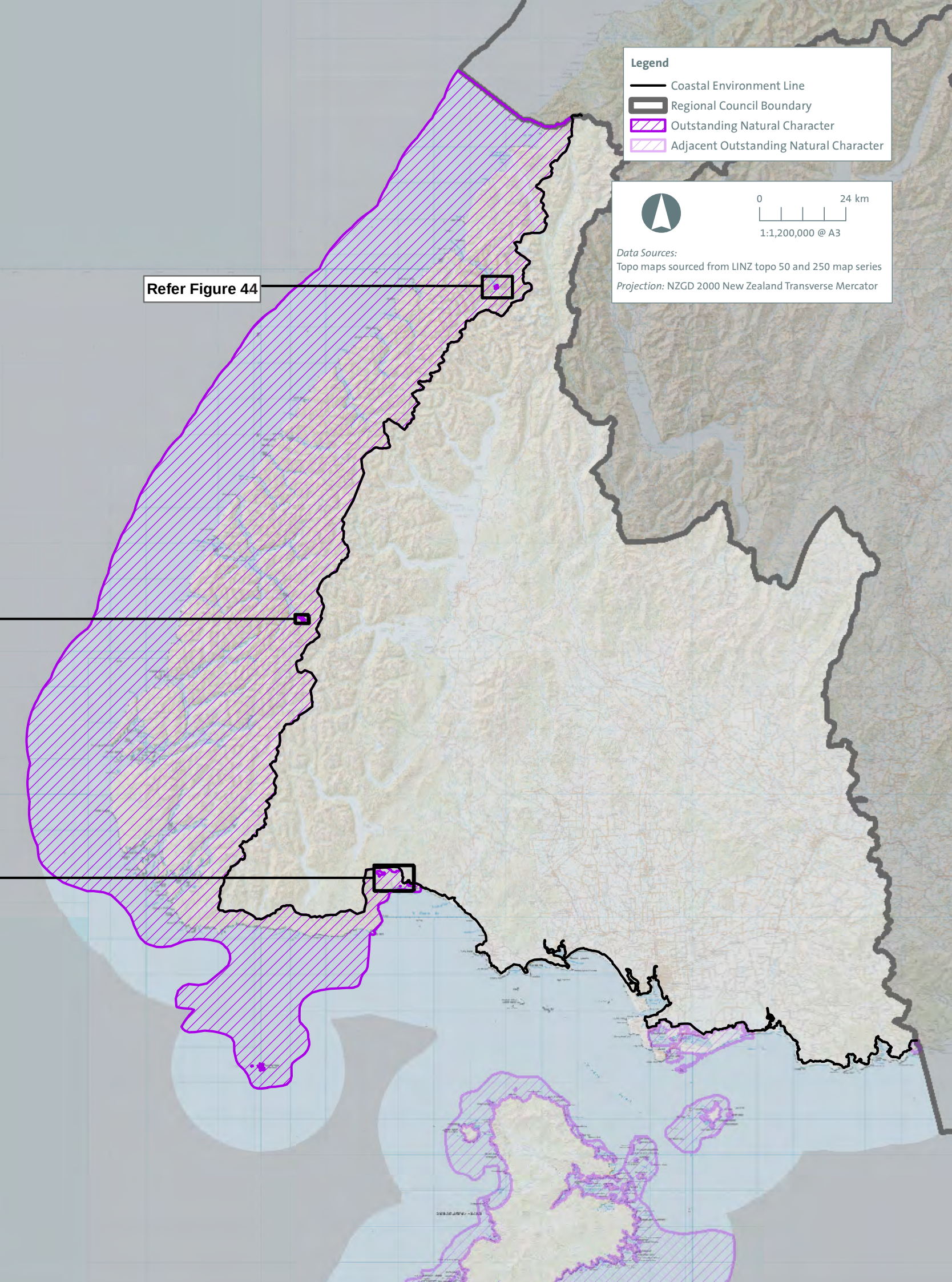


Figure 43: Fiordland and Surrounding Coastal Waters Outstanding Natural Character Area.



5.3 ONC AREA 3: FIORDLAND AND SURROUNDING COASTAL WATERS

This area of Outstanding Natural Character encompasses the ecologically rich coastal waters and land of Fiordland, the largest intact and unmodified coastal landscape in New Zealand. This extensive area includes spectacular and remote landforms, fiords and seascapes that retain outstanding examples of the earth's evolutionary natural history. This Outstanding Natural Character harbours some of the country's most threatened and endangered endemic species, as well as providing some of the world's most remote experiences, in areas of true coastal wilderness.

View overlooking Preservation Inlet. Boffa Miskell, 2018.

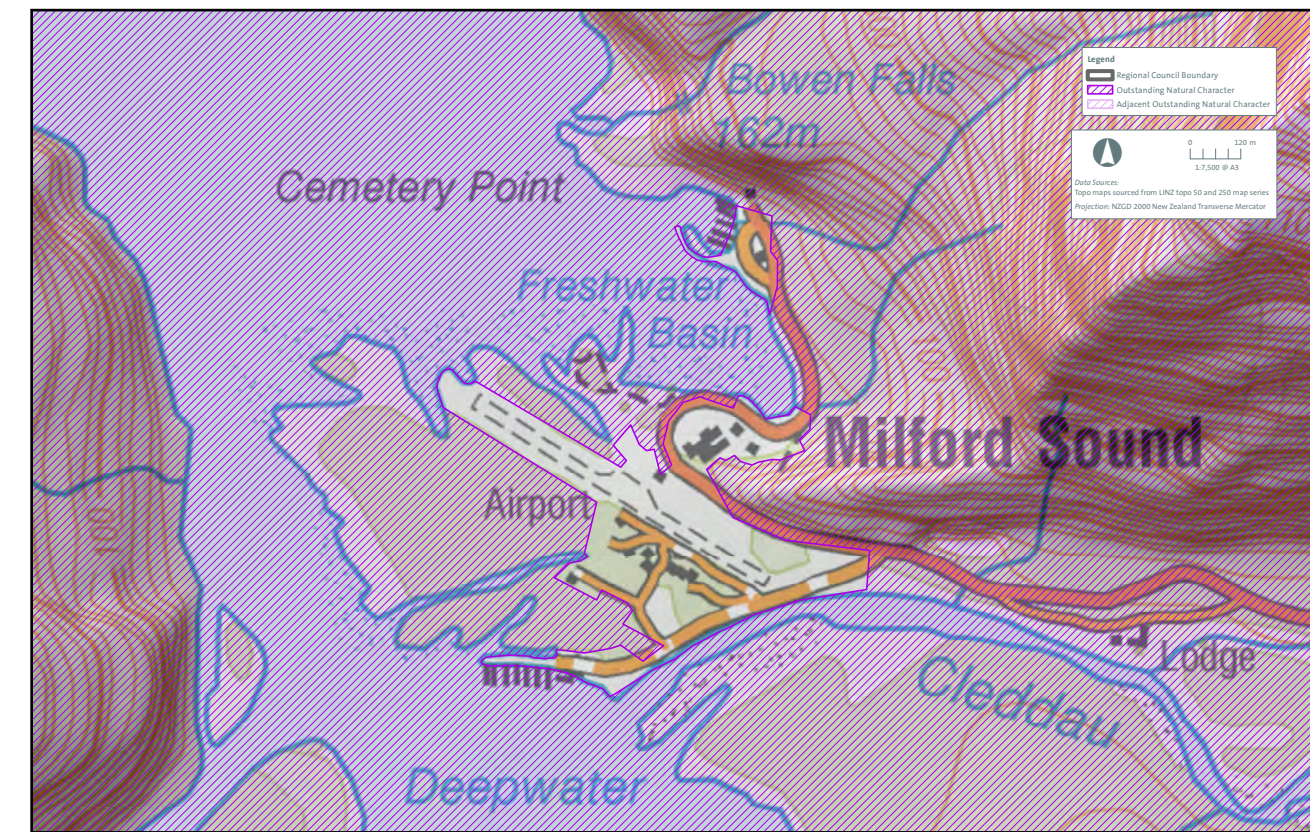


Figure 44: Milford Sound enlargement. Boffa Miskell, 2018.

FIORDLAND AND SURROUNDING COASTAL WATERS OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURES 43 & 44.	
VALUES	
ABIOTIC	• Fiordland's steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. • Southern Fiordland contains a series of well-preserved marine terraces cut into soft tertiary rocks which were subsequently uplifted by tectonic earth movements. • The Green Islets, a spectacular arch and cave system between Puysegur Point and Big River, and nearby shore platforms are both nationally and regionally important examples of wave derived landforms. • Important collection of islands around Preservation and Chalky Inlets, including Chalky Island. • There is also a large shallow thermal spring in Anchorage Cove, which is regionally important. • Contains some of New Zealand's most rugged coastline with deep fiords and lakes. • Fiordland's steep and crenulated coastline, with fiords running from U-shaped glaciated valleys carved out of the Southern Alps, is unique in New Zealand and rare globally. • The most iconic coastal landforms within this stretch of coast are Mitre Peak, a spectacular glacially-carved mountain peak within Milford Sound and Doubtful Sound, the deepest (421m) and second largest (40m) fiord in New Zealand. • Important islands around Dusky Sound (Anchor and Resolution Island) and Doubtful Sound (Bauza Island).
BIOTIC	• The Southern Fiordland Coastal Terrestrial Area is highly exposed to coastal and climatic influences. • This outstanding Coastal Terrestrial Area contains over one-third of New Zealand's indigenous plant species with some only found in Fiordland. • An abundance of wildlife is supported by the diversity of habitats found within Southern Fiordland. • As rainfall drains through the lush forest, it becomes stained with tannins until it is the colour of strong tea. • Nesting sites for the nationally vulnerable Fiordland crested penguins and the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>) are found along the coast and located in dense coastal scrub. • Nationally endangered tūpoupou/Hector's dolphin (<i>Cephalorhynchus hectori</i>) and kekeno/New Zealand fur seals (<i>Arctocephalus forsteri</i>) are also commonly seen along this stretch of coast. • This outstanding Coastal Terrestrial Area contains over one-third of New Zealand's indigenous plant species with some species only found in Fiordland. • The outstanding examples of temperate rainforest and the alpine plant communities found in Fiordland are important internationally and nationally for their diversity and pristine condition. • Although the predominant flora can generally be found elsewhere in New Zealand, Fiordland's vast area supports a number of rare and regionally endemic species. • Populations of kekeno/New Zealand fur seals (<i>Arctocephalus forsteri</i>), the nationally vulnerable Fiordland crested penguin, the nationally endangered bottlenose, common and dusky dolphins are known to frequent the fiords throughout the year in addition to the coast. • While Fiordland has many different bird species, depending on the climatic conditions of areas and vegetation diversity the location of forest birds differ from place to place.
EXPERIENTIAL	• New Zealand's most natural, awe-inspiring place to visit and experience. • High levels of naturalness, isolation, wildness and remoteness. • Popular for recreation and exploration for a variety of different people e.g. day trips, day walks, tour buses frequently coming in and out of Fiordland, Milford Track, Hollyford Track, Dusky Tacks, and isolated back country experiences.
MAPPED EXTENT: The mapped extent of this Outstanding Natural Character Area is defined by the very high levels of mapping of this part of the region at the more refined, level 4 scale. All Marine Reserves are included within the ONC mapping. It encompasses broad and extensive areas, due in part to the lack of modification. It excludes the settlement of Milford Sound and the development in Doubtful Sound at Deep Cove. Other exclusions include waters to the south of Fiordland and the Solander Islands which have been subjected to bottom trawling activity.	
RATING	OUTSTANDING

Rocky outcrop on Puysegur Point. Boffa Miskell, 2017

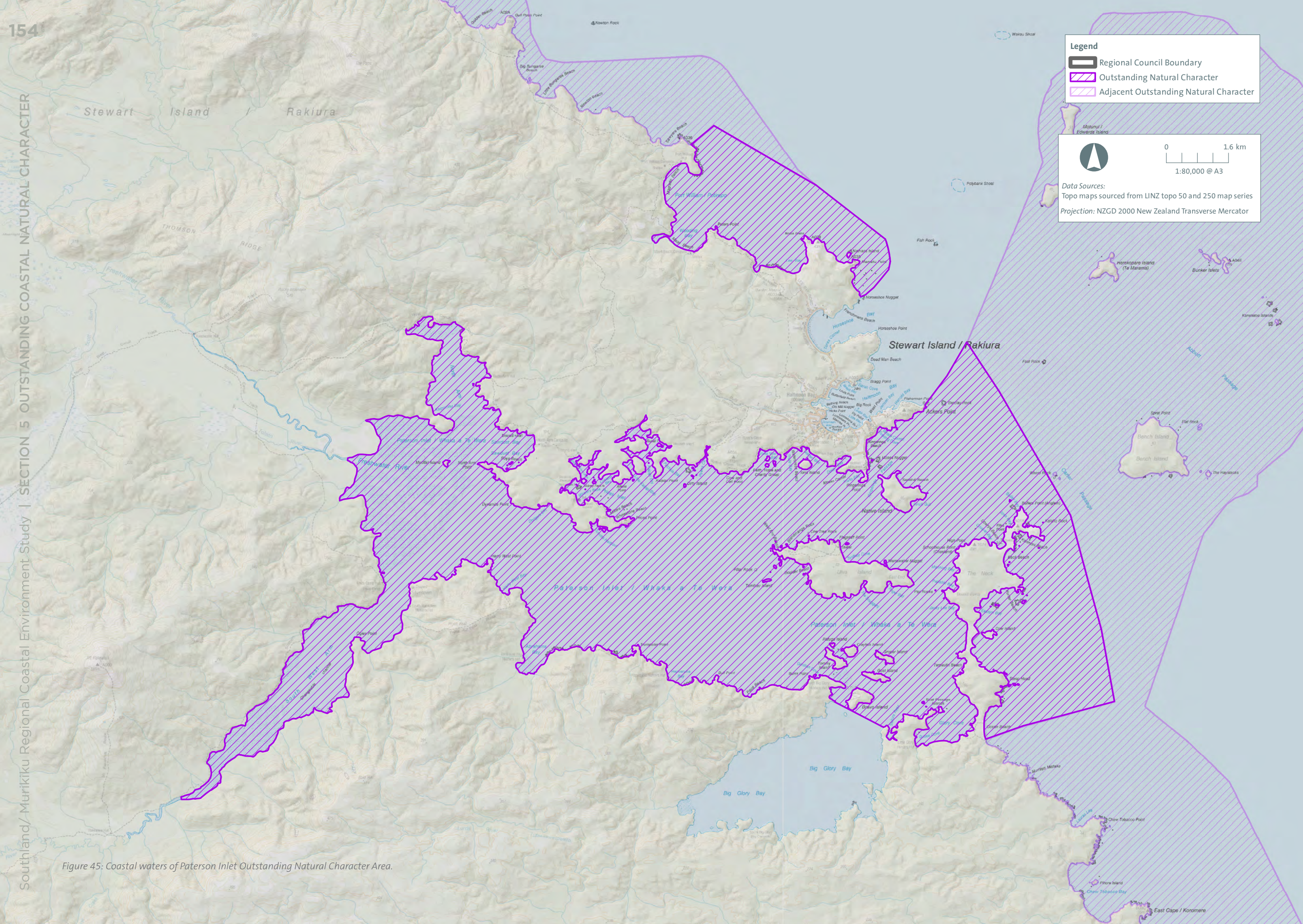


Figure 45: Coastal waters of Paterson Inlet Outstanding Natural Character Area.



View overlooking the Coastal Waters of Paterson Inlet. Boffa Miskell, 2017.

5.4 ONC AREA 4: COASTAL WATERS OF PATERSON INLET

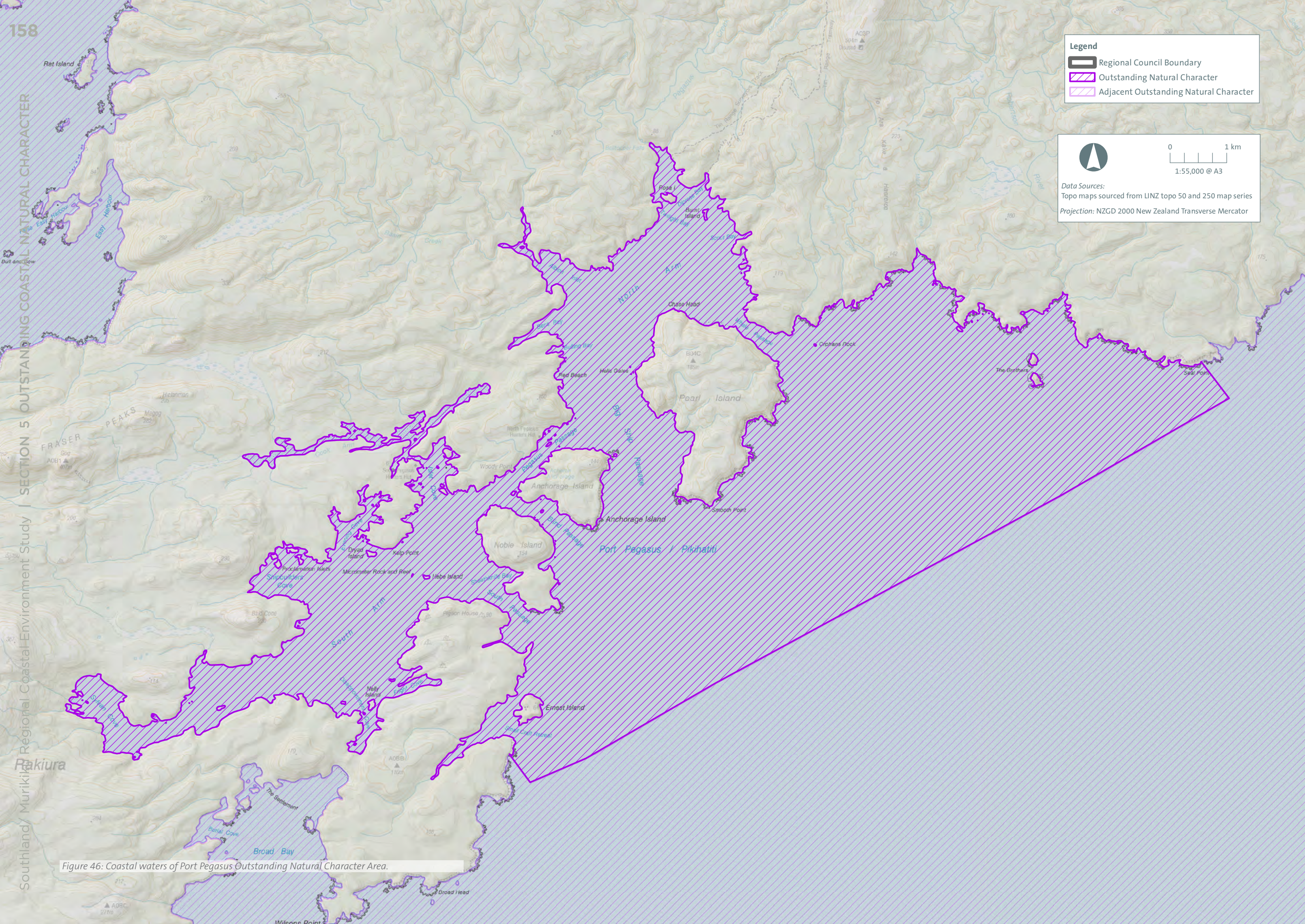
This area of Outstanding Natural Character within the coastal environment includes the coastal waters of Paterson Inlet. With very little areas of modification apparent, including a marine reserve, the inner parts of Paterson Inlet and the waters around outer islands retain exceptional abiotic, biotic and experiential characteristics. The lack of modification collectively is overwhelming and positively contributes to the outstanding levels of naturalness present. This area should be considered along with the terrestrial environment which is considered separately.

COASTAL WATERS OF PATERSON INLET OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURE 45	
VALUES	
ABIOTIC	- Within Paterson Inlet there is an intricate coastline and estuarine environment containing numerous islands and intertidal flats with shell banks surrounded by forest that often overhang the water. - Large inlet containing a wide diversity of habitats e.g. exposed and sheltered waters, coasts and beaches, tidal flats and estuaries and associated diversity of species and communities. - Benthic sediments ranging from sand to mud. - Rocky reef and moderately steep walls. - Low sediment inputs. - Apart from isolated areas in channel between Ulva Island and The Neck, all of Paterson Inlet is <25 m depth.

Continued from previous page

COASTAL WATERS OF PATERSON INLET OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURE 45	
VALUES	
BIOTIC	• Marine reserve within Paterson Inlet between the Mainland and Ulva Island. • Richest shallow water brachiopod habitats in the world. • Unique biogenic reefs (for example, serpulid tubeworm reefs, bryozoan reefs). • Extensive beds of red algae and the highest diversity of algal species in New Zealand (inlets and adjacent Stewart Island). • Extensive kelp forests (e.g. giant kelp <i>Macrocystis pyrifera</i>). • Extensive saltmarsh and seagrass beds on tidal flats. • Used by the nationally endangered mangō-taniwha/great white shark (<i>Carcharodon carcharias</i>). • Used by nationally critical whakahao/New Zealand sea lion (<i>Phocarcos hookeri</i>) and kekeno/ New Zealand fur seals (<i>Arctocephalus forsteri</i>), aihe/common dolphin (<i>Delphinus delphis</i>) and the nationally endangered bottlenose dolphin. • Intertidal area is a significant habitat for wading birds, in particular the nationally critical New Zealand dotterel (<i>Charadrius obscurus</i>). • Nesting and foraging area for many seabirds, including tītī/sooty shearwater (<i>Ardenna grisea</i>), Stewart Island shag, variable and pied oystercatcher, nationally vulnerable pohowera/banded dotterels (<i>Charadrius bicinctus</i>), kuaka/eastern bar-tailed godwit (<i>Limosa lapponica</i>), nationally vulnerable black-fronted tern. • Southern-most feeding areas reached by northern hemisphere migrant waders e.g. godwit, golden plover, turnstone. • Freshwater fish, including Inanga, shortfin and longfin eels, and bullies migrate through the inlet and/or utilize tidal habitats. • Important nesting and foraging habitat for the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>).
EXPERIENTIAL	• First impressions of visitors are of “an island swathed in naturalness, with forest descending to the shoreline”.
MAPPED EXTENT: The mapped extent of this Outstanding Natural Character Area is defined by extent of the MWHs mark and the very high level of natural character at the level 4 scale. There are a number of areas where the natural elements, patterns and processes have been modified. These are principally around the settlement of Oban, and within the eastern parts of Paterson Inlet. There are other settlements to the south along Ringaringa Point, Thule and Golden Bays and to the north within Horseshoe Bay area. There are also huts on The Neck. These areas have been therefore excluded as part of the Outstanding Natural Character boundary for Paterson Inlet. There are occasional moorings and jetties/Wharfs in many of the bays of Paterson Inlet, which have broadly been excluded. Other small areas of modifications are also noted, especially, • Golden and Thule bays are peppered with boat houses, jetties and slipways associated with fishing and recreation boating activities. • Mutton birders huts and sheds among shrublands of Tītī/Muttonbird Islands This area of ONC should be considered alongside the mapped extent of the terrestrial environment of Stewart Island, which is contained within Stewart Island / Rakiura: Landscape and Coastal Natural Character Study; December 2019, Boffa Miskell Limited.	
RATING	OUTSTANDING

View of South Island at the opening of the Paterson Inlet. Boffa Miskell, 2017



5.5 ONC AREA 5: COASTAL WATERS OF PORT PEGASUS

This area of Outstanding Natural Character within the coastal environment includes the unmodified waters of Port Pegasus. Holding very little areas of modification apparent, this entire area retains exceptional abiotic, biotic and experiential characteristics. The richness of the ecological systems and the presence of threatened and endangered species is collectively overwhelming and positively contributes to the outstanding levels of naturalness present.

View overlooking the Coastal Waters of Port Pegasus. Boffa Miskell, 2017.

COASTAL WATERS OF PATERSON INLET OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)	
REFER TO FIGURE 46	
VALUES	
ABIOTIC	• The clarity of water in the sandy bays. • High freshwater input and the naturally vegetated catchment leads to tannin-laden water in the harbour creating a unique environment, akin to some parts of Fiordland, evidenced by the presence of shallow-water black coral in both places. • Contains some of the largest areas of near pristine marine habitat surrounded by catchments of native vegetation in New Zealand. • Large inlet of two 'arms' containing a wide diversity of habitats e.g. exposed and sheltered waters, coasts and beaches, wetlands and associated diversity of species and communities. • Has an intact ecosystem extending from the tops of the granite peaks to the floor of the sea bed. • Brackish waterways e.g. tidal influence extends in rivers. • The tidal reaches entering the Inlet form part of a near pristine freshwater system now rare in New Zealand. • Low sediment inputs.
BIOTIC	• Important foraging habitat for the nationally endangered hoiho/yellow-eyed penguin (<i>Megadyptes antipodes</i>). • Nesting and foraging habitat for Declining kororā/blue penguin (<i>Eudyptula minor</i>). • High natural state and functional integrity of benthic communities. • Very high and stable seaweed diversity with limited presence of opportunistic species. • Black coral (<i>Antipathes sp</i>) colonies Thought to be free of invasive marine pests. • High abundance of small fish, including juveniles that may be indicative of high quality nursery habitat. • Nationally critical Whakahao/New Zealand sea lion (<i>Phocarcetos hookeri</i>) creche and adult haul-out site. • Presence of brachiopod. • Aggregations of upright colonial ascidians, some of which may be unique to Port Pegasus. • Freshwater fish, including Inanga, shortfin and longfin eels, smelts, bullies migrate through the inlet and/or utilize tidal habitats.
EXPERIENTIAL	• Port Pegasus provides a strong feeling of containment and enclosure due to the sheltered bays and coves.
MAPPED EXTENT:	
The mapped extent of this Outstanding Natural Character Area is defined by is defined by extent of the MWHS mark and the very high level of natural character at the level 4 scale.	
In terms of modification, all are associated with early signs of European occupation, e.g. fish processing plant.	
There are two hunter's huts present, one at North Arm (North Pegasus Hunters Hut) and the other at Cook Arm/South Pegasus. Recreational hunters therefore a user of the area. Often hunters have dinghies for transport within Port Pegasus. There are also remnants of freezing works West Port Pegasus and remnants of historic tin mining and a railway around the Tin Range.	
Some areas surrounding the coast have been modified by activities associated with human settlement, such as fire.	
This area of ONC should be considered alongside the mapped extent of the terrestrial environment of Stewart Island, which is contained within Stewart Island / Rakiura: Landscape and Coastal Natural Character Study; December 2019, Boffa Miskell Limited.	
RATING	OUTSTANDING

View of Port Pegasus Bay looking towards Anchorage Island. Boffa Miskell, 2017



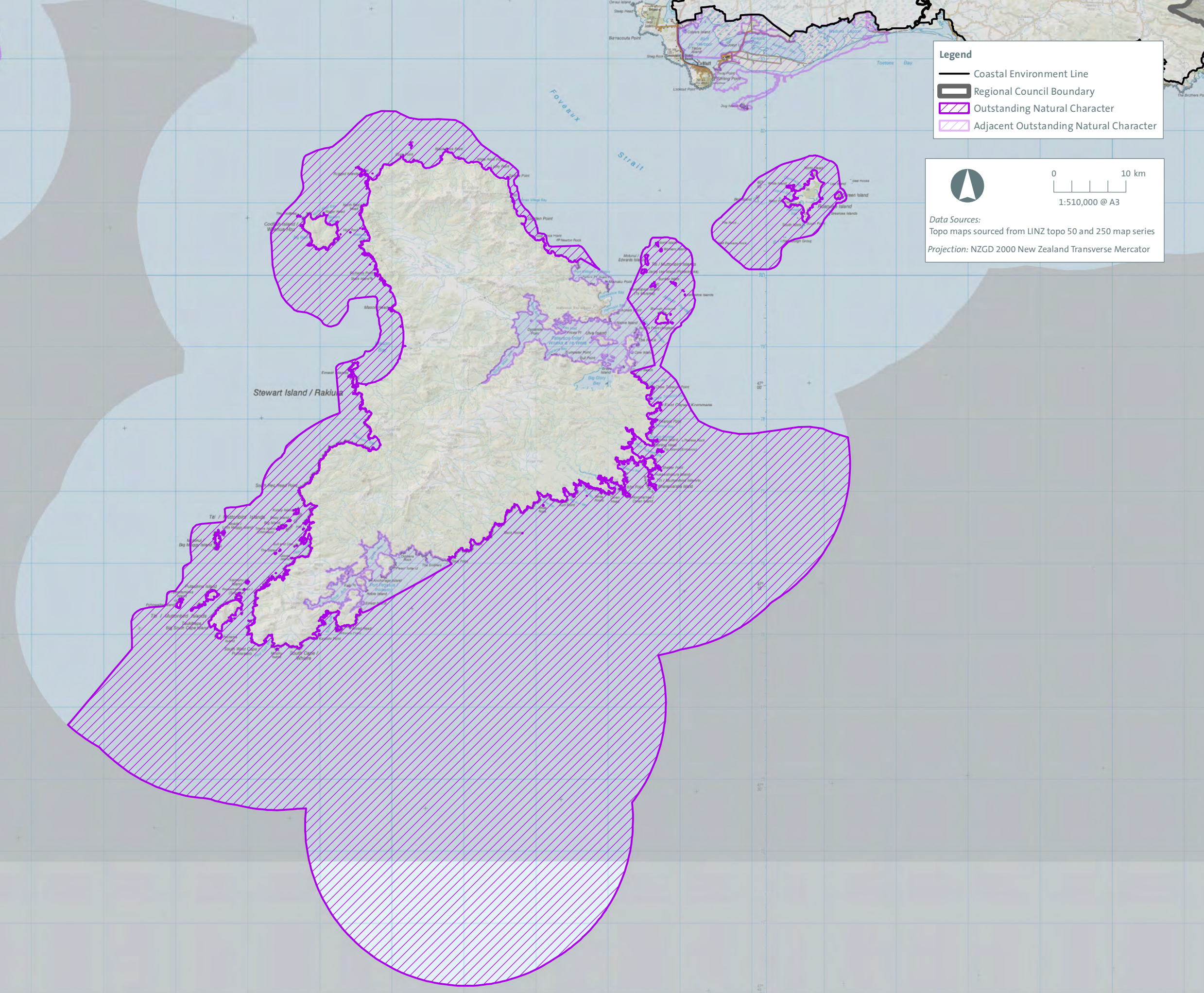


Figure 47: Coastal waters of Stewart Island Outstanding Natural Character Area.



5.6 ONC AREA 6: SURROUNDING COASTAL WATERS OF STEWART ISLAND

View overlooking the coastal waters surrounding Stewart Island. Boffa Miskell, 2017.

This area of Outstanding Natural Character within the coastal environment includes much of the open coastal waters surrounding Stewart Island. With very little areas of modification apparent, the ecologically rich open waters surrounding Stewart Island express exceptional abiotic, biotic and experiential. The lack of modification collectively is overwhelming and positively contributes to the outstanding levels of naturalness present.

SURROUNDING COASTAL WATERS OF STEWART ISLAND OUTSTANDING NATURAL CHARACTER ATTRIBUTES AND VALUES (LEVEL 4)

REFER TO FIGURE 47

VALUES	
ABIOTIC	• A series of short headlands with jagged margins extend into the open ocean. • North facing unmodified coast is unique in southern New Zealand (closest is Banks Peninsula). • Numerous offshore islets and exposed reefs, surrounded by surging white water. • High and strong currents and big waves dominate the character of this marine area.
BIOTIC	• Bounds the Subtropical Convergence. The Tasman Sea water masses moderate the climate and protect it from the cooler Sub-Antarctic water from the south. • Known as an active area for the nationally endangered mangō-taniwha/great white shark (<i>Carcharodon carcharias</i>). • Extremely high (globally) diversity of rocky reef species. • High diversity of macroalgal species.
EXPERIENTIAL	• Remote, open and rugged character. • Wild and scenic, open seascape presenting sunrise/sunset opportunities. • Rugged and treacherous environment due to exposure to prevailing currents. • Dominant forces of the waves tides and winds, contribute to wildness and isolation. • Very high degree of naturalness due to no or very limited human activity.

MAPPED EXTENT:

The mapped extent of this Outstanding Natural Character Area is defined by is defined by extent of the MWHS mark and the very high level of natural character at the level 4 scale. Bottom trawling, boat traffic and dredging maps have also been used to inform this extent, as well as main anchorage points.

The rocky outer shore and near-shore reef environments have been commercially fished, especially for pāua (*Haliotis iris*), crayfish and rawaru/blue cod (*Parapercis colias*).

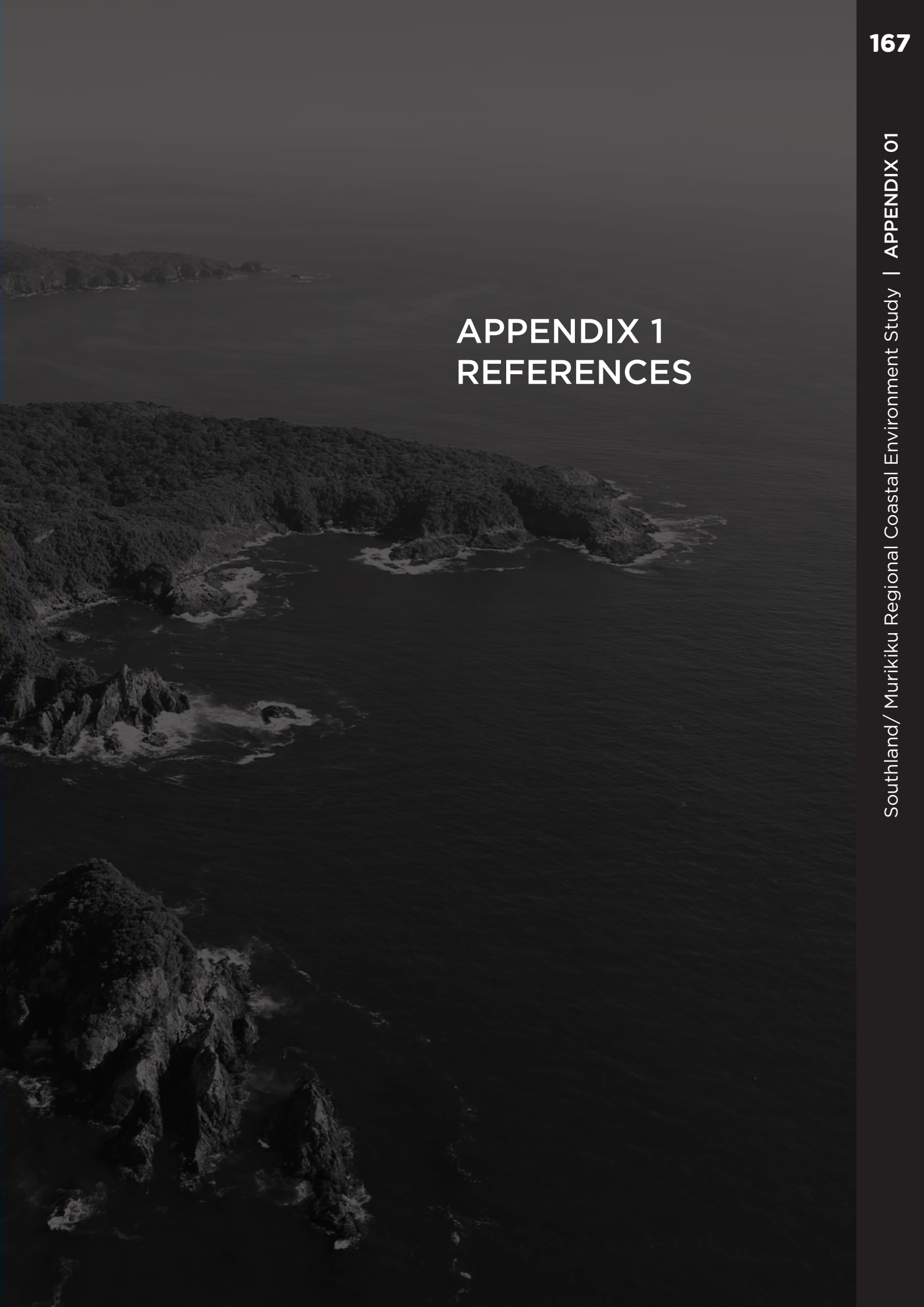
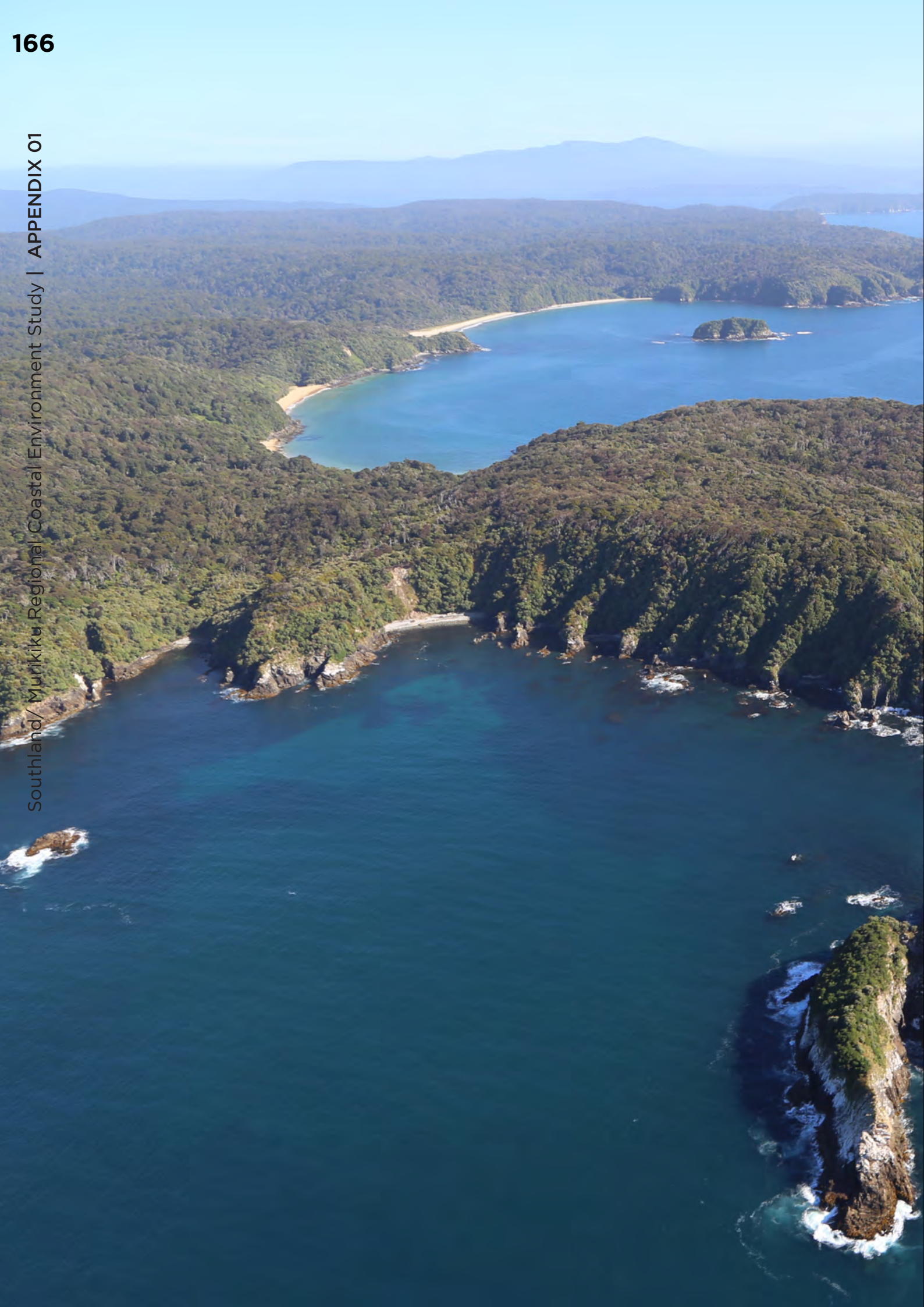
The soft outer shore (sand and mud) and shelf environments to the north have been affected by oyster dredging and changes to the composition of the seabed biota will have occurred, particularly regarding the diverse biogenic reef communities once reported to have occurred in Foveaux Strait.

This area of ONC should be considered alongside the mapped extent of the terrestrial environment of Stewart Island, which is contained within Stewart Island / Rakiura: Landscape and Coastal Natural Character Study; December 2019, Boffa Miskell Limited.

RATING	OUTSTANDING
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Rocky outcrop near Surveyors Bay, Stewart Island. Boffa Miskell, 2017.



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- Figure 30: Natural Character Rating of Coastal Terrestrial Area 7
- Figure 31: Coastal Terrestrial Area 8, Te Waewae
- Figure 32: Natural Character Rating of Coastal Terrestrial Area 8
- Figure 33: Coastal Terrestrial Area 9, Southern Fiordland.

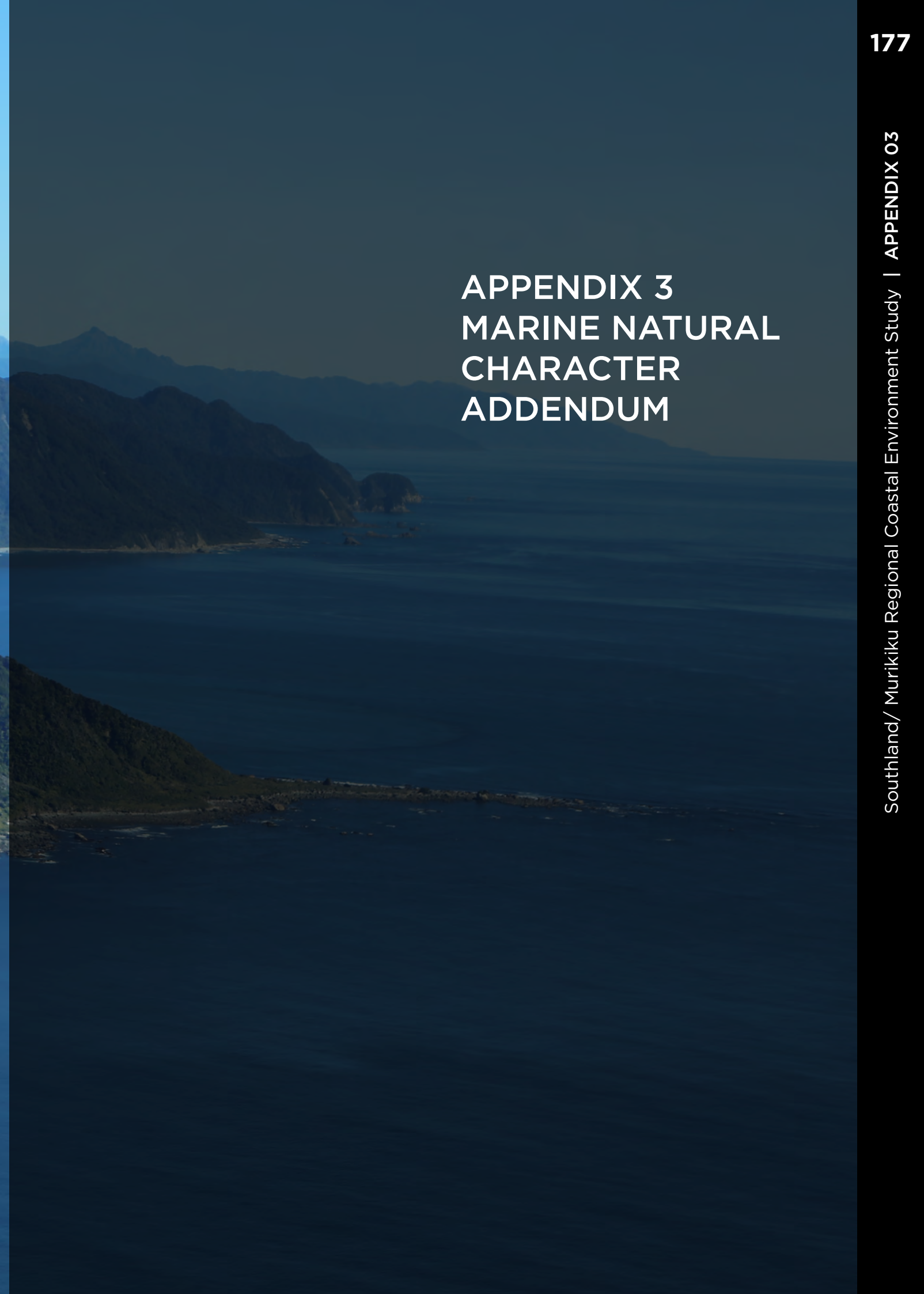
- Figure 34: Natural Character Rating of Coastal Terrestrial Area 9
- Figure 35: Coastal Terrestrial Area 10, Western Fiordland
- Figure 36: Natural Character Rating of Coastal Terrestrial Area 10
- Figure 37: Coastal Terrestrial Area 11, Outer Islands.
- Figure 38: Natural Character Rating of Coastal Terrestrial Area 11
- Figure 39: Outer Islands enlargement

OUTSTANDING NATURAL CHARACTER AREAS

- Figure 40: Outstanding Natural Character Areas
- Figure 41: Long Beach Outstanding Natural Character Area
- Figure 42: Waituna Wetland and Bluff Harbour Outstanding Natural Character Area
- Figure 43: Fiordland and surrounding coastal waters Outstanding Natural Character Area
- Figure 44: Milford Sound enlargement
- Figure 45: Coastal waters of Paterson Inlet Outstanding Natural Character Area
- Figure 46: Coastal waters of Port Pegasus Outstanding Natural Character Area
- Figure 47: Coastal waters of Stewart Island Outstanding Natural Character Area



Coastline of Southern Fiordland and Gates Harbour. Boffa Miskell, 2018.



APPENDIX 3
MARINE NATURAL
CHARACTER
ADDENDUM



Left: Ruapuke Island, part of Coastal Marine Area B: Foveaux. Stewart Island can be seen in the background. Boffa Miskell, 2018.

6. REFINEMENT OF DETERMINING MARINE NATURAL CHARACTER AREAS AND VALUES

6.6.1 INTRODUCTION

To assist in the defining the degree of natural character within the marine environment, specific information from the Ministry for Primary Industries (MPI) was utilised. Specifically, this information was in regard to the modification which has been carried out within in Foveaux Strait and within the waters off Stewart Island and Fiordland. Data provided by MPI includes the bottom trawl effort from 1990-2018, dredge effort from 1990-2018, mid-water trawl effort from 1990-2018, potting effort from 1990-2018, and set net effort from 1990-2018.

All of this modification affects the rating of marine natural character to various degrees, and based on this, Boffa Miskell Limited was asked to incorporate this information and use it to reconcile (as best as possible) the High, Very High and Outstanding Natural Character boundaries, to reflect the level of modification associated with fishing efforts within the Southland Region. This information was used alongside other information to assist in determining the degree of natural character of an area.

6.6.2 METHODOLOGY

Using this data (which was scanned in and overlayed on the existing natural character maps), Boffa Miskell Limited was able to deduce areas of High, Very High and Outstanding Natural Character boundaries throughout Southland's coastal marine area. Due to the variety of scales of the data, this required a level of interpretation (see images overleaf), which also has an effect on the experiential aspects of natural character. The data did vary, and any decisions made were made in light of the information we had to hand. Whilst some information was quite detailed in its mapping, other data was very broad and made decision making more tricky. Duration of an activity, where possible has also been taken into account.

Each image was georeferenced in GIS and overlayed to assist in forming the Natural Character boundaries for both the Southland / Murihiku and Stewart Island / Rakihura studies. For consistency, each set of data was applied to each of Southland's Coastal Marine Areas and these new boundaries were drawn at 1:10,000 scale.

6.1 TYPES OF MODIFICATION TO THE COASTAL MARINE AREA

There are numerous human-induced modifications that can affect an area's level of natural character. Within the marine environment, an area's natural character includes all the abiotic aspects (including the seabed, the water column, the water surface, the air above the water) as well as biotic (including fish, sea mammals and habitats) and experiential aspects. Modification can occur to any part of coastal marine area. The material provided by MPI focussed predominantly on fishing efforts, and these and other types of modification in the coastal marine area are listed below:

6.1.1 SEABED MODIFICATION

Within Southland's Coastal Marine areas there are four main fishing activities which occur, impacting the abiotic and biotic values of benthic habitats on the sea floor. The following information provided by the MPI explains each of these activities:

Bottom trawling: Bottom trawling involves the use of a large net which is towed by one (single) or two (pair) vessels. The net is contolled by steel trawl doors which can weigh up to five tonnes each and guided by ground rollers/bobbins which are approximately one metre in diameter and two-hundred kilograms in weight. The net is then dragged along the sea bed to catch bottom dwelling fish species. Over the past five years the top three species caught include hoki (approximately 25 million caught), arrow squid (approximately 24 million caught) and ling (approximately 17 million caught).

Set netting: Set netting is the anchoring of a large net to the sea floor and held up with a series of floats to prevent the net from sinking. Nets cannot be larger than sixty metres wide or set within sixty metres of another net. Depending on the target species, these nets can be set at the surface, midwater or on the sea bed with restrictions in place to prevent the catch of protect species such as Hector's and Maui dolphins. Over the past five years the top three species caught include school shark (approximately 2.5 million caught), rig (approximately 400,000 caught) and spiny dogfish (approximately 370,000 caught).

Potting: Potting involves dropping a pot-like trap attached to a long rope onto the sea floor. This method is specifically targeted at catching rock lobster and cod species, with nets being left for one to three days. Pots are held up with floats to signify their location and to make their retrieval easier.

Dredging: Dredging is specifically used to catch benthic species such as oysters and scallops from shallow waters. Much like bottom trawling, a boat tows the steel nets along the sea floor to catch these species before hauling the nets back up to the surface.

Other seabed modifications include, reclamation, anchorage points (for a range of activities), drilling and fracking, piers, wharves, groynes and seawalls, sedimentation (from land use activities), ship wrecks and dredging for the maintenance of shipping channels.

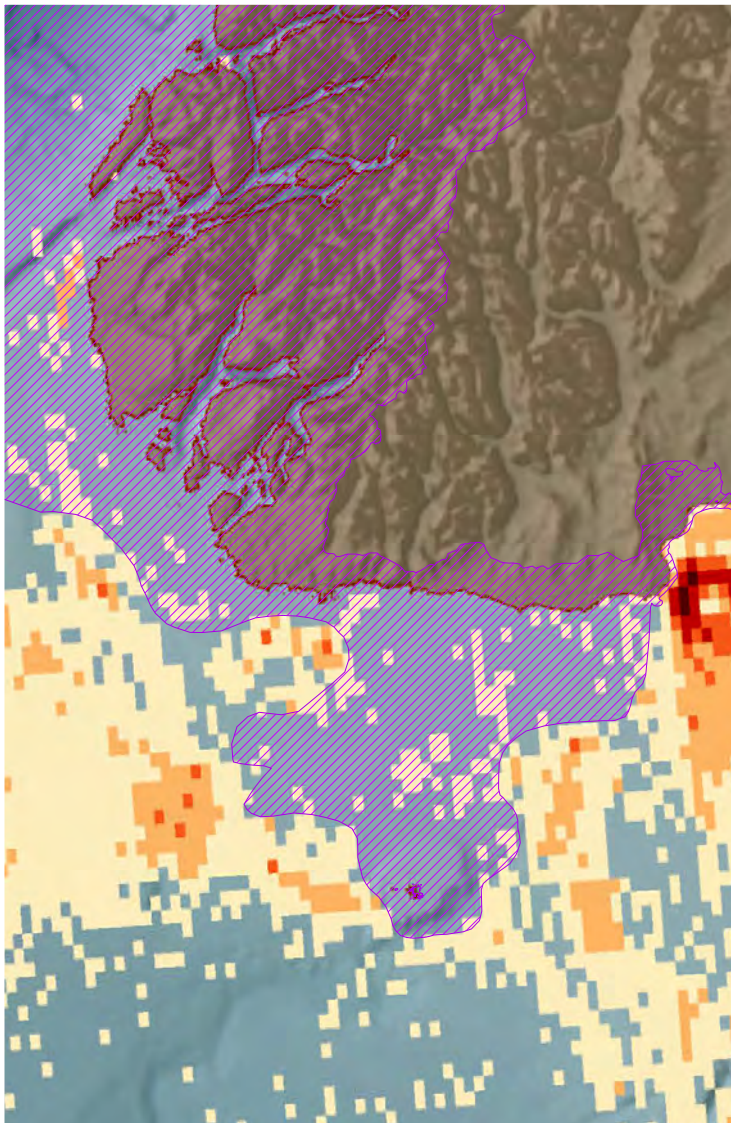
Each of these methods cause varying degrees of modification to the abiotic and biotic values of marine habitats. In the context of this review, major anchorage points have also been considered, particularly to the north east of Stewart Island.

6.1.2 OTHER TYPES OF MODIFICATION IN THE MARINE ENVIRONMENT

Other types of modification that can affect the marine natural character of an area can include the following:

- Fishing (which does not affect the seabed)
- Boating traffic and vessel activity (including berthing areas)
- Floating activities, such as aquaculture and marinas

Much of this data is available at a variety of scales and has been used to inform the extent of natural character mapping.



Right: Examples of information provided by MPI used to define areas of High, Very High and Outstanding Natural Character boundaries for Southland.

