Council Meeting

24 June 2021

Separately Circulated Attachment

(as indicated this is circulated separately to the Agenda)

This attachment relates to Item 6
in your Agenda

Attachment 6.3 –
Technical Report (Version 4, June 2021)

MARLBOROUGH DISTRICT COUNCIL

PROPOSED

East Coast Beach Vehicle Bylaw

Technical Report
June 2021

Document Control				
Version	**Date of Report**	**Environment Committee Meeting**	**Planning Finance Community Committee Meeting**	**Council Meeting**
Version 1	22 March 2019	30 April 2019		16 May 2019
Version 2	28 June 2019	18 July 2019		8 August 2019
Version 3	1 November 2019		29 November 2019	12 December 2019
Version 4	June 2021			24 June 2021

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Contents

1. Introduction

Marlborough's East Coast between the confluence of the Awatere River mouth in the north and the Marlborough District Council (Council) boundary south of the confluence of the Waima (Ure) River is described as isolated, ruggedly beautiful and home to a diverse range of plant and animal life. It is also a place where people enjoy walking, bird-watching, cray-potting, fishing, horse trekking, researching, camping, driving 4WDs, riding motorbikes and earning a living from fishing and farming.

The 7.8 magnitude Kaikōura earthquake on 14 November 2016 changed the area by raising 110km of Marlborough's East Coast up to 6.5 metres, with 0.5 -2.5 metres uplift in the area between the mouths of the Awatere and Waima (Ure) Rivers. The high tide mark shifted as much as 200 metres, leaving more exposed beach. In places where access was previously restricted by tides, it is now possible to walk or drive at any time.

Following the earthquake, a group of long-term beach users and people living in the community raised their concerns to Council about potential impacts from the increase in public use of the beach and particularly the use of vehicles on the beach, reef and dune systems.

They formed the East Coast Protection Group (ECPG) which seeks to foster understanding of the biological diversity and cultural heritage of this outstanding natural landscape (ONL) while promoting appropriate use. Council and Department of Conservation (DOC) have attended ECPG meetings to provide technical information.

A second community group of beach users was formed in October 2020 known as Recreational Access with Education (RAwE) whose aim is to promote sustainable and low impact recreational access and use of Marlborough's East Coast beaches and coastline.

The area is valued by a wide range of users for a variety of reasons, some of which are in conflict with each other. In order to establish the values associated with the area and identify potential measures to reduce environmental impacts, a Technical Advice Workshop was held on 23 July 2018. The workshop participants included technical experts from a wide range of disciplines and focused on science, conservation and legal knowledge. The information from the workshop was compiled by Council into a Technical Report first released in May 2019.

The Council has engaged in ongoing data collection since the Technical Advice Workshop along with other organisations including DOC and University of Canterbury (UC). This Technical Report has been updated to include new information. The intention is for this report to be reviewed regularly and updated as new information becomes available.

1.1. Purpose

The purpose of this report is to collate the information from the Technical Advice Workshop as well as additional information complied since to inform the community and Council about the effects of the 2016 earthquake on the East Coast environment.

1.2. Scope

This report investigates Marlborough's East Coast between the Awatere River mouth and the southern boundary of the Marlborough District south of the confluence of the Waima (Ure) River.

Map 1: Marlborough's East Coast Area between the Awatere River and Waima (Ure) River mouths Source: Council Smart Maps.

The content of this report has been limited to the following topics; cultural, heritage, landscape, natural habitats & ecosystems and recreational & commercial use of Marlborough's East Coast. The earlier versions of this report contained some gaps in the information for some topics. The third version incorporated additional information to fill gaps that were highlighted in the previous versions. This fourth version adds additional information about cultural and heritage values as well as findings from research and surveys that have been undertaken by UC, DOC and others following the Technical Advice Workshop.

1.3. Structure

The next section of this report sets the scene before the earthquake to be able to understand what the coast is comprised of, the processes that affected it and the different species and range of habitats of the East Coast. These are considered to be characteristic values of the East Coast.

Then there is a section that describes the effects of the earthquake on the environment that was observed immediately following the earthquake. This includes details of the earthquake and the scientific evidence from research undertaken by UC and other technical experts that presented at the Technical Advice Workshop. The focus is on the known observations and potential threats to recovery and continued presence for each of the values that were discussed at the workshop. This section has been updated to include information gathered from research and observations of work undertaken since the Technical Advice Workshop. This includes more information on the impacts on the values identified and the progress of natural recovery over the last four years.

1.4. Coastline photos

Marlborough's East Coast is a diverse, exposed coastline. The following series of photos show some of the key landmarks and features of this coastline between the Awatere River in the north to the District Boundary south of Wharanui.

Figure 1: Cape Campbell/Te Karaka before the earthquake.

Figure 2: Cape Campbell/Te Karaka after the earthquake. Photo Mark Davies Jan 2017.

Clifford Bay

Towards the Awatere River

Blind River

Lake Grassmere/Kapara Te Hau

Marfells Beach

Mussel Point

Cape Campbell/Te Karaka

Canterbury Gully

Long Point

Chancet Rocks

Ward Beach

Needles Point

Mirza Creek

Waima (Ure) River

Wharanui

Tirohanga Stream

2. The values of Marlborough's East Coast environment present before the 2016 Kaikōura earthquake

2.1. Cultural Values

[*The following information has been provided by Te Rūnanga o Kaikōura]*

Ngāti Kurī are the tangata whenua who have manawhenua and manamoana in the area covered by the East Coast Beach Vehicle Bylaw. Manawhenua and manamoana are determined by whakapapa, and confer customary authority. The manawhenua and manamoana status of Ngāti Kuri comes from continuous land use and occupation.

Te Rūnanga o Kaikōura is the modern assemblage and representative of the hapū, Ngāti Kurī, one of the 18 Papatipu Rūnanga of Ngāitahu who are statutorily acknowledged under the Te Rūnanga o Ngāi Tahu act 1996.

The takiwā of Te Rūnanga o Kaikōura is decribed as centering on "...Takahanga and extends from Te Parinui o Whiti / White cliffs, to the Hurunui river and inland to the Main Divide...". This takiwa extent is backed up by Kaikoura Whakatau takiwā definition conveyed to W.J.W Hamilton in 1857, and the ousting of northern iwi from the Ngāi Tahu takiwā after their defeat at Kapara te hau / Lake Grassmere in the 1830's.

Te Waipounamu / The South island was formed by the unsuccessful return to the sky of Aoraki, and his brothers; Rakiroa, Rakirua, Rarakiroa in their waka. After faltering in their karakia the waka fell back to the ocean and listed sideways, with Aoraki and his brothers turning to rock and forming the mountains of the Southern Alps / Ka Tiritiri o te Moana.

After this the atua Tuterakawhanoa shaped the land and prepared the land for habitation for humans, animals and plants etc. The land was then populated by the actions of Kahukura and Marokura, the latter responsible for the forging of the deep underwater trenches in Kaikōura and the beautification and populating of Seaward mountain ranges in the region.

Significant episodes of ancestral activity and passage are known to have occurred during Waitaha, Ngāti Mamoe, Ngāti Kurī/Ngāi Tahu times, in and around the area for the bylaw. Marfell, Mussel Point, the Awatere, Wairau as some examples, have all offered recorded evidence of Ancestral nohoanga and mahinga kai activity.

`Purakau korero / Historical narrative and written account, whakapapa knowledge alongside archealogical evidence indicate Ngāti Kurī enduring relationship, connection and stewardship to the whenua, awa and moana across their territory. Kaitiakitanga / Stewardship extends to ensure the mauri of each entity within the natural world whether it be an animate or inanimate object be, preserved, conserved and managed to enhance the mauri dynamic.

2.2. Archaeological sites

The archaeological sites shown in the maps in Appendix 1 represent those recorded by the New Zealand Archaeological Association (NZAA). They are not a comprehensive representation of all archaeological sites as iwi retain specific information and knowledge concerning known and unrecorded locations. While Heritage New Zealand is the statutory authority for the protection of archaeological sites, many Māori sites are not recorded with the Crown entity.

2.3. Te Tau Ihu Iwi

Te Rūnanga a Rangitāne o Wairau, Te Rūnanga o Toa Rangatira and Te Rūnanga o Ngāti Rārua have interests in the area.

2.4. Coastal settlement history

[*The following information has been provided by the Flaxbourne Heritage Trust. The information describes the history of the coast, it's characteristics and a description of European settlement.*]

From the early 1800's, European whalers and sealers knew the east coast from the White Bluffs/ Te Parinui o Whiti south as an area to shelter in Clifford Bay on their way past or through to Kaikōura Whaling and into Port Underwood and the Sounds.

In September 1846 Sir Charles Clifford and Sir Frederick Weld held meetings with whalers resulting in a 6 month visit to Cape Campbell/Te Karaka, to view the 'Tussocky grasslands' in hope of securing for a large pastoral operation. A description by Weld; "*The land was owned by Ngāti Toa whose paramount chief was Te Puaha having succeeded Te Rauparaha. Clifford arranged to lease the land for 24 gold sovereigns or 30 pounds.' This land was from the White Bluff to Kekerengu, from the coast extending back to the snow topped mountain range, exceeding 70,000 hectares."*

Here began the first European settlement. Flaxbourne Station buildings were situated not far inland from the mouth of the Flaxbourne River. Entering firstly the estuary where there was six to seven feet of water at low tide and then the river itself following it up to where the first homestead was built. A description of the land by Weld: "*River flats with tolerably rich soil, large open country of plains and gently undulating hills, all covered solely with grass and anise, and well-watered. The hills available are rich in grass, milk thistle and wild cabbage with not a bush except flax to be seen. We overlooked the Kaiparaatehau lagoon (Kai Para Te Hau) known now as Lake Grassmere, a large sheet of fresh water stretched out before us, we surprised a great quantity of ducks."*

The Flaxbourne River was used up until the 1855 earthquake, (estimated at 8.2Mw) as an access way, a sheltered haven and a means to deliver stores from Wellington and also to take out wool to awaiting ships. The quake lifted the coastline dramatically and made the harbour inaccessible. There is no mention in any of the history about using the beach as an accessway. The nearest trading town was Wellington using coastal shipping and then Blenheim, reached by inland roads.

Quote 1860: from William Maskell a shepherd at Flaxbourne Station. Five years after the uplift": *"Whilst mustering the 'Cape' a boy had brought our grub on a mule to an appointed spot on the beach and lighting a huge fire, and collecting no end of shell fish of all kinds, some like English ones, others entirely different, we made a capital supper."*

The next significant permanent European settlement on the coast line was the Cape Campbell lighthouse which was first lit in 1870, along with a keeper's house, and several small buildings. The access from this place to collect stores and send messages was to ride to Flaxbourne Station following a pack track over the limestone ridge into the Flaxbourne River valley. This journey continued for 27 years as the way to collect stores and mail. As well as the 3 monthly visits by sea conducted by the Maritime Department. The landing for this was in front of the station buildings and because the flat rocks where the stores were unloaded were only visible during low tide it was a fast job unloading and loading, surf boats were used whilst the larger vessel anchored a mile off shore.

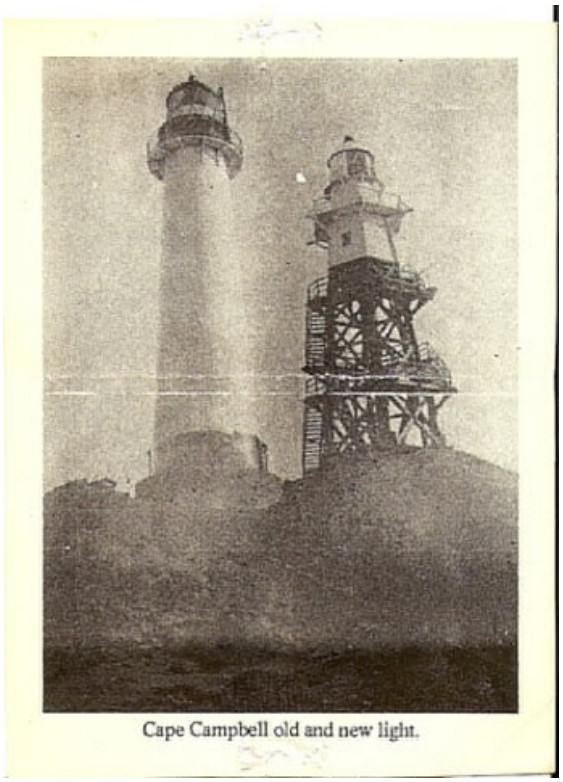


Figure 3: Cape Campbell lighthouse - old and new light.

When the new tower was built in 1905, this method was considered too slow when landing material so a concrete block rising high above the high-water mark was built on the edge of a gut at low water mark. A narrow jetty with trolley rails connected the block with the shore end. The storms eventually wiped-out traces of this jetty, but the block still remain.

In 1897 a Post Office was opened at Blind River. A track was blown in the rocky cliffs toward Mussel Point wide enough for wheeled traffic, 'The Passage'as it was called. This enabled a horse and trap to drive to Blind River for mail and messages for 40 years. This was only able to be

done at low tide. Quote: "T*he horse and trap was successful as anything could be in the circumstances. An axle broke on average every third trip but soon a spare one was secured and this kept us mobile while its broken companion was undergoing repairs. Also a riding-mare was obtained, so that it was not always necessary to use the trap*." Supplies were still delivered every 3 months by ship to the lighthouse keepers. There are no records or photos of anyone else except the Keepers using this track with a horse and trap.

In 1940 a road was extended over the hill from the Marfells Beach Road to join onto the private road now used by Maritime NZ to service the lighthouse. Mail and Stores were delivered this way until the automation of the lighthouse.

Fishing was always a great pastime along this coastline. From the earliest accounts of the lighthouse keepers, paua, crayfish and flounders were eaten regularly and wet fish caught off their dinghy if they had one. Locals caught grouper from small boats launching from Ward Beach and Marfells Beach. Cod pots and crayfish pots were common but paua was not considered a delicacy but was used for crayfish bait for many decades.

The road that was put in to service the Cape Campbell lighthouse in the 1940s came from the Marfells Beach Road over the 'Cape Hill' and through a locked gate onto what was 'John McConway's Property' then it crossed over onto John Peter's property at Canterbury Gully and onward to the lighthouse. Lighthouse service, Airways Corporation, Marlborough Lines, Met Service, Telecom, Scientists, Paua and Crayfish research, Geotech, DOC, MDC, Canterbury University, Otago University and Archaeologists had access to use the road. This access is now across the Peter family property.

When the lighthouse was automated in the late 1980s, John Peter purchased the remaining buildings after the two homes were removed, along with the land. These buildings have been maintained over the years for historic reasons. After the movie "The Light Between Oceans' in 2014, the Peter family placed a QEII covenant over a large section of the peninsula. The QEII area adds to the others that have been in place for some years, one at Mussel Point protecting an ancient Maori settlement and another inland from the coast.

Historically the coast was not fenced from the cliffs to the lighthouse and south. This is now fenced to prevent wandering stock.

The small tourist venture at the lighthouse remains.

In 2020 the Peter family built a Kiosk on the flat land beneath the lighthouse installing information boards telling the story of the history and biodiversity of the area.

Figure 4: Kiosk containing information boards erected by the Peter family on land beneath the lighthouse. Photo: Peter family.

The following quotes provide a description of the coastal history and past activities along the coast:

Quotes from 1909 lighthouse family member: "*Along with other lighthouse children we engaged friendly battles using the 'nice speckled pullet-size eggs gathered for ammunition down on the flat gravel where millions of sea birds laid their eggs'. The countryside was like a 'Marine Garden of Eden' the smells of seaweed and rockpools large platform rocks full of knee-deep pools when the tide went out spending hours peering at sea slugs and various prickly affairs, catching flounder hiding in the pools. The foreshore was a gallery of unusual shells."*

Quotes from 1915 lighthouse family member: *"When we were allowed to go to the low water mark, at the edge of the papa rock flats, it was a seen that paua abounded in countless numbers. These shellfish, never found above low water mark, were here packed close together in water a few inches deep. Rowing out from the shore one could see acres of them peering down through the bull kelp which had the appearance of small trees growing in the clear water. They were very large too. The beach from end to end was strewn with paua and crayfish shells. The crayfish shells indicated the large quantities of these creatures abounding the rocky shore. The tidal rock flats were a never-ending source of pleasure to us, pools provided a wealth of marine life in investigate, the beauty of the seaweeds, with delicate pastel shades or deep rich reds, awed us at times. note* crayfish shed their shells every year."*

Quotes from 1923 lighthouse family member*: "Crayfish abounded every pool, we had a canoe and used to go fishing for blue cod and grouper and spearing stingrays. The great open flat spaces of Lake Grassmere/Kapara Te Hau and other places in the Cape Campbell area were the home of nesting seabirds in season I have several*

photos of terns and blackcaps in great flocks wheeling and screaming at the intruder. Thousands of the white fronted terns nested on the gravel below the light."

Quotes from 1924 lighthouse family member: "*The ride to Hauwai had to coincide with the tides, as there were two sets of rocks which could not be negotiated unless the tide was low. Many times, my parents waited anxiously, watching the time and tide and hoping their son and daughter were well on the way and not running the risk of being caught in the incoming tide. My brother and I often went crayfishing to get a sack of crayfish to give to the Davis family as a thank you for collecting our mailbag from the train."*

Quotes from 1939 lighthouse family member: *The spring cart was driven around to either collect mail or stores from Hauwai or even Blind River. The nearest doctor was Seddon, many a mercy dash was done . A light cart was used as access was only at low tide. The area around the bluff of Snapper Point is rocky and very slippery for a horse underfoot.*

Quotes from 1947 lighthouse family member: *The sea was to the right of the road, the grey papa clay hills the left, native vegetation, stunted trees and flaxes through which we saw the lighthouse. As we rounded the Cape we were amazed to see huge flocks of terns nesting on the point. What a noise! What a smell! The seagulls were squawking and swooping on stray, unguarded eggs and chicks.*

2.5. Landscape

The limestone bluffs and wave cut platforms of Needles Point and Chancet Rocks are unique to this coastline. Sites recording the boundary between the Cretaceous and Tertiary geological eras have been identified at Needles Point and at Chancet Rocks, a Scientific Reserve administered by DOC.

Figure 5: Chancet Rocks Scientific Reserve.

Chancet Rocks Scientific Reserve

This reserve is located about 1.5km north of the carpark at Ward Beach.

The principle purpose of the reserve is the protection and preservation in perpetuity of areas for scientific study, research, education and the benefit of the country.

Chancet Rocks reserve has two main limestone ridges, separated by a low area. The once horizontal rock layers here were laid down on the sea floor, and have been tilted up almost vertically by deformation of the crust. The outcrop has long been known for its vase-shaped "fossil sponges", which are now recognised as a trace fossil, or burrow, called Paramoudra, created by an unknown animal. More recently, a very complete section through the Cretaceous-Paleogene boundary was identified and confirmed by the presence of the 'iridium anomaly' with 10's of times the normal concentration of iridium (a very rare metal) in a thin clay layer. This layer has been recognised worldwide and marks the end of the Age of the Dinosaurs, caused by a devastating asteroid impact that struck part of where Mexico's Yucatan Peninsula is today. In these marine sediments Cretaceous microfossils become extinct at this layer, and earliest Paleogene ones occur immediately above it. [GNS Science]

Figure 6: Waipawa Formation. Photo: Chris Hollis.

Outstanding Natural Landscape (ONL)

The Limestone Coastline has been identified as an ONL due to the exceptional biophysical and associative landscape values and very high sensory landscape values.

The Limestone Coastline provides the greatest visual drama in the south Marlborough landscape. The spectacular rocky outcrops of the Needles and Chancet Rocks along the Limestone Coastline south of Cape Campbell are extremely memorable and display very high levels of naturalness. The State Highway 1 coastal road from the Waima Bridge to the southern point of the district contains high scenic values.

The coastline of this ONL is largely unmodified and very exposed. The area has remote values and access is limited to a few locations, including Ward Beach and a small number of points south of the Waima River. Walks along the sandy shoreline to the impressive limestone outcrops of the Needles and Chancet Rocks are backed by steep terrain where views towards the open ocean are gained. Views from Cape Campbell lighthouse are spectacular, where panoramic vistas of the sweeping curve of Clifford Bay and the southern shores of the North Island are evident. Other than farm-related activity on the land, this coastline is unmodified, with no aquaculture or jetties/ wharves. The area, once visited, is extremely memorable.

Prominent reef areas in the north (including Cape Campbell) give way to extensive sand/gravel shores in the south and large offshore Macrocystis (kelp) beds are also present off this coastline. The coastal cliffs and escarpments have small low indigenous forest remnants and unusual, highly distinctive herbfields with nationally threatened species. The dunes and coastal flats also contain nationally threatened species. The Canterbury Gully dunefield, located just south of Cape Campbell, contains nationally threatened ecosystem types and plant species. The coastal scarps and flats have nationally significant ecosystems, including dunes and salt turfs, and good sequences of native coastal vegetation. Several areas are set aside for conservation of natural values through QEII National Trust covenants [Boffa Miskell Landscape Report].

Map 2: The ONL following the coast from Marfell's Beach to the Waima (Ure) River. Source: Marlborough Environment Plan, Volume 4, Overlays, Landscapes Map 9.

As a result of Boffa Miskell's assessment, the ONL has been refined and extended to include the coast in the Proposed Marlborough Environment Plan notified on 9 June 2016.

2.5.1. Physical processes

The coast is shaped by ocean currents and gale force winds. Ventifact stones in the area are evidence of the long term effects of high winds. Winds also help create high dunes by moving large volumes of sand inland.

Figure 7: Needles Point. Photo: Jan Clayton-Greene, DOC.

2.5.2. Natural hazards

The potential natural hazards for Marlborough's coastline are seismic activity and resulting tsunami and extreme storms which are increasing in frequency due to climate change.

Figure 8: Marlborough's east coast is influenced by storms, September 2018. Photos: Rob Peter.

2.6. The natural habitats and ecosystems

The extensive sweep of gravel beach dividing steep cliffs and ocean along Marlborough's East Coast gives the area a rugged and remote feeling and is home to many species of terrestrial and marine indigenous vegetation and fauna.

Over half of the coast (28.5km of the total 48.5km) from the Awatere to the Waima (Ure) River mouths is recognised as ecologically significant. Significant Natural Areas (SNA) and Recommended Areas for Protection (RAP's) have been identified on private land under the Resource Management Act 1991 and the Reserves Act. Some of these sites have been fenced off, formally protected and restoration has occurred by replanting native species.

2.6.1. Terrestrial ecosystems

Much of the original indigenous coastal forest is long-gone, eliminated by fires, land clearance for farming, introduced browsing animals and invasive weeds, however, tenacious plant communities, including many nationally uncommon and nationally threatened and at risk communities persist. These include ecosystems such as active sand dunes, shingle beaches and calcareous cliffs. The presence of native and often intact plant communities and their associated fauna makes many sites along this coastline special.

2.6.1.1. Dunes

Dunes are recognised in New Zealand as Naturally Uncommon Ecosystems as many have been lost, or modified due to development and cultivation.

Dune ecosystems are one of the significant indigenous vegetation hosts on Marlborough's east coast. These ecosystems contain many specialist dune species that are declining or threatened. The east coast of Marlborough because of its remoteness is less modified than many other areas of dune habitats nationally and still contains areas and or elements of original native dune vegetation.

The Cape Campbell/Te Karaka dunes (which includes active dunes, stable dunes, dune deflation hollows and beaches), have escaped development other than for farming, by reason of their remoteness, and as a result, they still hold important populations of indigenous species.

The loss of native dunes has been exacerbated in the last 40 years by the spread of an introduced sand binding plant, marram grass, which aggressively takes over the dunes, out competing and smothering indigenous sand plants.

Figure 9: Kowhangatara/spinifex. The tumble weeds are on a female plant, the male flowers are the "fans" on the right hand plant.

Figure 10: Runners of kowhangatara/spinifex on dunes.

Figure 11: Marram grass. Photo: Jan Clayton-Greene, DOC.

One of New Zealand's best populations of coastal mat daisy (At Risk-Declining*)* survives at Cape Campbell/Te Karaka and elsewhere on dunes. Native dune species pīngao, sand tussock and

kowhangatara/spinifex compete with the exotic marram grass.

Marram grass now dominates the dunes, with only about seven pockets of indigenous dune vegetation remaining where you can find areas of native species, such as, pīngao, sand tussock (At Risk-Declining) coastal mat daisy (At Risk-Declining) and some special shrubs such as sand coprosma (At Risk-Declining) and New Zealand native daphne and kowhangatara/spinifex. All of these dune and beach plants support endemic bird, invertebrate and reptile populations, such as pimelea looper moths (Threatened-Nationally Endangered), banded dotterels(Threatened-Nationally Vulnerable), mat daisy jumpers (Threatened-Nationally Critical), katipo (At Risk-Declining), and Waiharakeke grass skinks (At Risk-Declining). Many of these animals are at risk of injury or death by habitat loss or being driven over.

Figure 12: Vehicle tracks in dunes north of Marfells Beach.

The use of the east coast by ATV's has slowly increased over time. Prior to November 2016, access was restricted to up to two hours either side of low tide. More recently, following the uplift caused by the 2016 Kaikōura earthquake, ATV's are now joined by larger 4WD vehicles in increasing numbers and at virtually all tide levels. The impact of unrestricted access to Cape Campbell is threatening the ecological integrity of dunes, by crushing and killing plants. Continual disturbance of the new raised areas will impede or halt natural colonisation processes. There is obvious sign of vehicles damaging kowhangatara/spinifex runners and New Zealand native daphne on Marlborough's east coast.

2.6.1.2. Other indigenous vegetation

Shrublands and forest remnants host a range of species which once would have been widespread along the coastline. The harsh conditions on the coast mean that many of these shrublands are low growing, battered by the wind and spray. Species such as matagouri which inland grow as large shrubs, on the coast grow as prostrate mats on the shingle beach terraces. New Zealand native daphne and the Nationally Vulnerable *Muehlenbeckia ephedroides* and other low growing shrubs intersperse with this low matagouri. Much of the woody indigenous vegetation of the eastern coastal area has been modified extensively since settlement. Most of the coastal forest cover has now been lost due to many centuries of burning, and more recently cultivation and grazing. Occasional lone species or small groups of shrubby tororaro (Threatened – Nationally Endangered) occur along the coastline behind the dunes and in tow slopes. The pockets of remnant vegetation are significant in that they are all that is left, and can act as important seed sources and refugia.

Figure 13: Coastal mat daisy growing with pimelea mats and sand tussock.

Coastal tree broom, a South Marlborough endemic and Threatened-Nationally Endangered, is found only at White Bluffs/Te Parinui o Whiti, Clifford Bay and in shingle fans south of Kekerengu. Another South Marlborough endemic, the Marfells groundsel is only found on the mudstone coastal cliffs in Clifford Bay and is Threatened–Nationally Endangered. There are many more threatened and at risk species found along the coast. See Appendix 2 for factsheets for many of these species.

Figure 14: Vehicle tracks through New Zealand native daphne (*Pimelea prostrata)* at Needles Point. Photo: DOC.

2.6.1.3. Fauna

In this section information is provided on birds, reptiles and invertebrates. A map of all the fauna locations and fact sheets for some species is provided in Appendix 3.

Birds

Marlborough's east coast is very important for coastal waders, terns and gulls. Thousands of gulls and terns congregate along the coast to roost and feed all year round. Fiordland crested penguins (Threatened-Nationally Vulnerable) and yellow-eyed penguins (Threatened-Nationally Endangered) sometimes visit. Thousands of Hutton's shearwaters (Threatened-Nationally Vulnerable) feed in the breakers along the coast. This species breeds only in the seaward Kaikoura Ranges.

Sites for large numbers of breeding and roosting gulls and terns are the Awatere River mouth, the Waima (Ure) River mouth and Lake Grassmere/Kapara Te Hau where large flocks roost over night after foraging out at sea. Cape Campbell/Te Karaka is also highlighted as birds will stop off and roost there on their journey back to Lake Grassmere/Kapara Te Hau, but large congregations can occur anywhere along the coast. Lake Grassmere/Kapara Te Hau is a key site for birds both summer and winter and there are several links between all of the sites along the coastline. Lake Grassmere/Kapara Te Hau is integral to it all as the whole stretch of coast is one ecosystem for birds as they move around so much to feed.

There are three areas with particularly high numbers of banded dotterel (Threatened-Nationally Vulnerable) and the variable oystercatcher (At Risk-Recovering); south of Cape Campbell/Te Karaka (at the Airstrip), Long Point, and north of the Waima (Ure) River all the way toward Ward Beach. These birds nest in the pea gravels and feed their chicks on the beach.

Figure 15: Can you spot the dotterel nest in the pea gravels? See Figure 40.

At Ward Beach, southern blue penguins, banded dotterels (Threatened-Nationally Vulnerable) and variable oystercatchers (At Risk-Recovering) nest in the area and there are shags, gulls, terns all roosting. Many birds also use the Flaxbourne lagoon river mouth and beaches to the north and south.

Birds present on the beach could be there for a number of reasons; feeding, resting or drying out after feeding (for offshore feeders like shags) or waiting for bad weather to improve so they can feed, roost or nest.

Figure 16: Pied shags roosting at Mussel Point.

Flocks of banded dotterels (Threatened-Nationally Vulnerable) and variable oystercatchers (At Risk-Recovering) are present on the shore, feeding and or resting during the winter. Feeding sites are mainly below the high tide mark, often on sand hoppers or shellfish in beach cast seaweed or in the recently wet sand and reef. Breeding occurs between August to January when they are present in breeding pairs on the shore. Nesting sites in the shingle are often difficult to spot. You will mostly find their nests in the pea gravels between Cape Campbell/Te Karaka and the Waima (Ure) River.

Other species nest away from the coast and feed and rest on the shore, for example shags nest in trees, feed offshore and then rest on the beach, Gulls prefer to nest on rocky headlands and reefs, feed onshore, and then rest on the beach afterwards.

Migration

There is a migration route up the coastline used by wrybills (Threatened-Nationally Vulnerable) that travel through from their breeding grounds in South Island river beds in late summer and winter, stopping off to rest and feed before migrating to Thames in the North Island to over winter. They return the following spring, using the east coast as a stop off point.

Waders including Caspian terns (Threatened-Nationally Vulnerable) and black fronted terns (Threatened-Nationally Endangered) and South Island pied oystercatchers (At Risk-Declining) migrate along this coast, roosting or congregating on coastal platforms and exposed reefs outside of the breeding season.

International migrating birds use the coastline between spring and autumn for resting and feeding. Bar-tailed godwits and ruddy turnstones arrive in flocks of 1000's from the arctic circle (Siberia and Canada) flying non-stop to New Zealand. They leave Siberia in autumn and arrive in our spring. They rest and feed on Marlborough's East Coast before leaving for the northern hemisphere in January/February to breed and return the following spring.

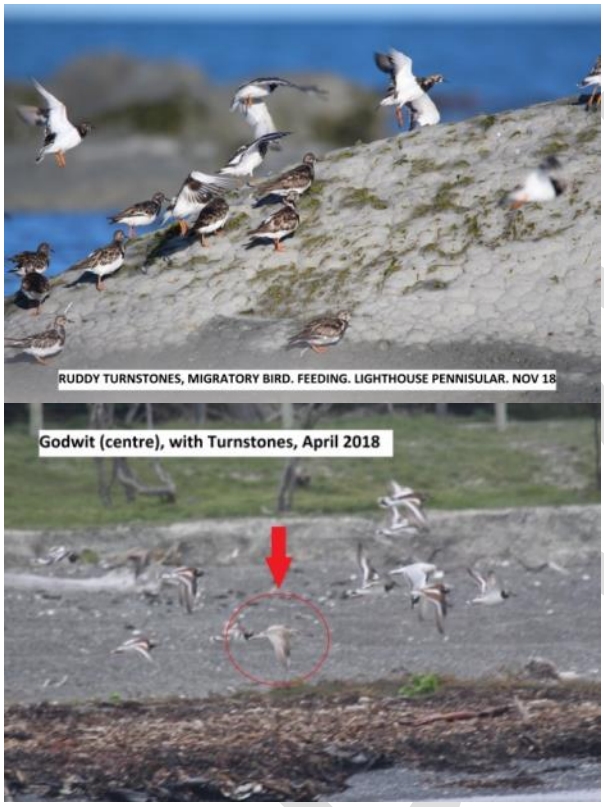


Figure 17: International migratory turnstones and godwits. Photo: Rob Peter.

Predation

Dogs pose a threat as a predator and disturbing feeding and resting of bird species using the shoreline. Other small mammal predators (rats, mustelids, wild cats, hedgehogs) are also a threat. Landowners and volunteers have been undertaking predator control programmes along the coast since the 1970's.

Another threat is flocks being disturbed. Damage of habitat can occur by vehicle traffic, particularly the breeding sites of ground nesting birds such as banded dotterels (Threatened-Nationally Vulnerable) and oystercatchers (At Risk-Recovering) which nest on the open beaches.

Figure 18: A predator at work. Photo: Mike Bell.

Figure 19: Banded dotterel at Ward Beach.

Figure 20: Did you spot the eggs?

Figure 21: Vehicle tracks in pea gravels.

Reptiles

Significant lizard habitat runs the length of the coast. Geckos and skinks are fairly common, especially among log debris which edges the land on the interface between grass and gravel and also on cobble strand (sand and gravel bars).

Species known to be in the focus area are Waiharakeke grass skink (At Risk-Declining), Marlborough mini gecko, Raukawa gecko, and perhaps the rarer Marlborough spotted skink, (At Risk –Declining)

Reptiles need cover (rocks, driftwood etc) and vegetation, for shelter and protection from predators, and a flood-free area above high tide not impacted by people. Favoured native plants – shrubby tororaro and coprosma species, grasses and sedges (including pīngao and kowhangatara/spinifex) are also important requirements for reptiles to thrive in this area.

Invertebrates

The diverse flora of the coast is host to a wide range of invertebrates, many are threatened and at risk. While some of these invertebrates are more general in their habitat – species such as ground weta, seashore earwigs, black cockroaches and sand scarab beetles, there are others that are very specific and may only occur with one particular plant host such as stone moth which is associated with lichens growing on stable boulderfields.

They are food for various other species, especially lizards and birds. There is much still to be learnt about the special invertebrate communities of the coast.

2.6.2. Marine ecosystems

Exposed and undersea reefs extending south from Cape Campbell/Te Karaka are rich in biodiversity, being at the southern end of Cook Strait. More than 200 species of shellfish are present on the coast. Various limpets, chitons, topshells, mussels, barnacles, sponges, ascidians and bryozoans – some newly discovered come and go over the course of a year. The marine ecosystems are mapped in Appendix 4.

Numerous seaweeds including bull and giant kelp grew in inter-tidal channels and pools and sub-tidal reef structures providing a rich habitat for multiple species including abundant rock lobsters and paua.

There is archaeological evidence from middens near Mussel Point that establishes shellfish have been harvested along the East Coast for over 700 years.

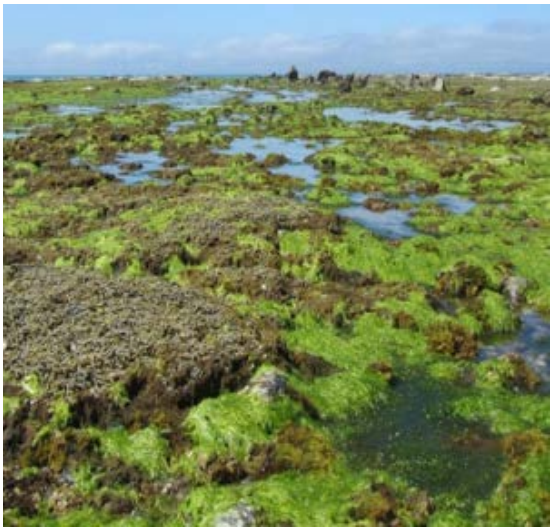


Figure 22: Cape Campbell/Te Karaka at low tide, 2014: Photo: Rob Peter.

Figure 23: Pre-quake kelp: Photo: Rob Peter.

2.6.2.1. Marine mammals

Dusky dolphins swim by, rounding Cape Campbell/Te Karaka, on an annual seasonal migration between the Kaikōura coast and sheltered shallow waters of the Marlborough Sounds. Nationally Vulnerable Hector's dolphins live and breed here, protected by the Clifford Bay Marine Mammal Sanctuary. Humpback whales, which frequent deep undersea canyons, and southern right whales (Nationally Vulnerable), pass through on their northward winter migration, while sperm whales and Orca (Nationally Critical) have also been located along the coastal str-Letch.

Historically the stretch of coast has been a haul-out area for fur seals which are now becoming more abundant again, compared with 10-20 years ago.

There are growing breeding rookeries of seals at Cape Campbell/Te Karaka and more recently, Needles Point, especially since the Kaikōura earthquake. The location of seal breeding areas are shown on a map in Appendix 5 at Cape Campbell/Te Karaka, Chancet Rocks and at Needles Point. Pups are usually present from the

end of December through the summer. During the breeding season males can tend to be the most aggressive and pose the most threats to users of the coast.

Elephant seals are making more frequent visits to the coast line and one or two have birthed in the area, which is a rare event on the New Zealand mainland. It is also known that leopard seals stop on this coastline to rest.

Figure 24: Elephant seals 2014. Photo: Rob Peter.

Marine mammal laws

The Marine Mammals Protection Regulations 1992 list the conditions governing behaviour around marine mammals. These are provided in Appendix 5 for reference. Commercial tourist operators viewing marine mammals require permits and are subject to further rules. All seals, sea lions, dolphins and whales are protected under the Marine Mammals Protection Act 1978.

Marine Mammals Protection Act 1978
Marine Mammals Protection Regulations 1992

It's an offence to harass, disturb, injure or kill marine mammals. Anyone charged with harassing, disturbing, injuring or killing a marine mammal faces a maximum penalty of two years imprisonment or a fine to a maximum of $250,000.

To guide expected behaviour around marine mammals DOC has provided information on their website under "Sharing our coast with Marine Mammals." This is included in Appendix 5 for reference.

Clifford and Cloudy Bay Marine Mammal Sanctuary

The offshore Clifford and Cloudy Bay Marine Mammal Sanctuary has been established to protect Hector's Dolphins and other marine mammals from acoustic noise. Its boundaries extend from Cape Campbell/Te Karaka to an offshore point in a direct line to Tory Channel/Kura Te Au. The Sanctuary covers 142,716ha and 338km of coastline, to the high tide mark (Mean High Water Springs, MHWS). The boundaries of the sanctuary are shown on a map in Appendix 5.

Figure 25: New Zealand fur seals at Needles Point.

2.7. Commercial activity

2.7.1. Commercial fishery

The lobster season is from late October until the end February/mid March. Commercial fishers access the coast using boats from Ward beach. The main access point is at Ward Beach.

2.7.2. Agriculture

Back from the beach, agriculture becomes important. Grapevines grow on terraces at the top of high bluffs extending from the Awatere mouth to Lake Grassmere/Kapara Te Hau, where half of New Zealand's salt is produced. Sheep and cattle graze on extensive dryland farms extending back from the coast, from Cape Campbell/Te Karaka south. A significant planting of pine nuts is located adjacent to Canterbury Gully.

2.7.3. Salt works at Lake Grassmere/Kapara Te Hau

Dominion Salt was established in this location in 1942. The Lake Grassmere/Kapara Te Hau site was chosen for its large areas of suitable flat land, high sunshine hours and the dry nor westerly winds which perfectly suited the solar evaporation process for salt making. Lake Grassmere/Kapara Te Hau continues to harvest and manufacture salt at this site today.

2.8. Recreational activity

The area has a long history of occupation and recreational use. Walkers have always been interested in walking to the lighthouse. The tides would influence when walkers would walk to Cape Campbell/Te Karaka. Tramping clubs would walk around once or twice a year. An adjoining landowner would give them permission to cross

private land on their return trip so that they didn't have to worry about tides. Horse riders sometimes went to Marfells Beach for a ride.

In the late 1980s the first motorbikes were seen on the beach. They were firstly 3 wheelers and had to watch the tides carefully. Once it was established that they could get to Cape Campbell/Te Karaka others followed. Because people didn't own these bikes widely it wasn't that common but as time went on 4-wheeler bikes became affordable they ventured further down the coast toward Long Point, but only the bravest did this trip as the tides would limit access. A very few 4WD's tried the trip around from Mussel Point and a couple made it to the Cape but after being stuck in the pea metal and also being caught by the incoming tides, it wasn't repeated.

Figure 26: An example of access using an ATV quad bike.

Public access to the East Coast is limited to eight access points. These are shown in Appendix 6. Marfells Beach recreation reserve and Ward Beach are where most public access the area. The DOC campground at Marfells Beach is used by locals and visitors year-round. Surf-casting for fish and bird-watching are popular and this is a setting-off point for a popular 6km walk to the lighthouse at Cape Campbell/Te Karaka.

Figure 27: Well-worn vehicle route around Mussel Point. Photo: Mike Aviss, Council.

The lighthouse that stands today started operating in 1905, painted with black and white stripes to stand out from the white hills behind. People who brave the wind to climb the steep steps to the Cape Campbell lighthouse are rewarded with views taking in the sweeping curve of Clifford Bay to the north and on a clear day, the southern shores of the North Island.

Vehicle access on formed private roads to Cape Campbell lighthouse is through farmland and is only accessible with the owners' permission. There are cottages near the lighthouse on private land which are rented as holiday accommodation.
Day and overnight visitors to the Cape enjoy walking, mountain-bike riding, horse-trekking, taking photos and viewing marine wildlife and seabirds in a spectacular landscape.

The Cape area is a popular place for people to fish, gather pāua and other shellfish and set crayfish pots. Access for these recreational food gatherers is via the beach from Marfells Beach generally using four wheel drive motorbikes (All Terrain Vehicles - ATV quad bikes). The uses of the area are shown in Appendix 7.

Ward Beach is another popular place for locals and tourists to visit. It is the main access point for the local commercial crayfishing industry where they launch their vessels directly from the beach. A small private campground for self-contained vehicles is located at Ward Beach. The area is used for surf-casting, viewing wildlife including birds and seals and walking to Chancet Rocks. There is also a designated area for dog walking/exercising at the road end. The maps in Appendix 7 show the locations of these recreational activities.

Figure 28: Ward Beach.

The Vehicle Access Maps in Appendix 8 show the use of the coastline by ATV and 4WD vehicles before the earthquake.

3. Effects following the 2016 Kaikōura Earthquake on Marlborough's East Coast environment

3.1. Earthquake details

The Kaikōura earthquake occurred just after midnight on the 14th November 2016. The M_W 7.8 earthquake initiated at ~15 km depth and ~4 km south of the north Canterbury rural township of Waiau, located 32 km inland from the coast and 60 km southwest of Kaikōura Peninsula. The Kaikōura earthquake, which lasted for ~ 2 minutes, was unprecedented in its complexity, propagating 170 km towards the northeast along a sequence of >20 faults. Fault surface rupture field surveys revealed the largest horizontal displacements of up to 12 m along the Kekerengu fault and vertical movement of up to 9 m on the Papatea fault.

The Kaikōura earthquake also generated more than 10,000 landslides over an area of about 10,000 km^2, several hundred of these occurred along the coastal slopes.

The coastal deformation that occurred in the Kaikōura earthquake is the most highly variable observed in any global earthquake in modern times. Along 110 km of coastline, the vertical displacement ranged from -2.5 to 6.5 m. GNS measured the coastal deformation using a combination of field surveying, satellite measurements and differencing between pre-and post-earthquake high-resolution topographic surveys. They defined the coastal stretch impacted by the earthquake as the region from Haumuri Bluff to Cape Campbell (a straight line distance of 110 km) then 80 km (73 %) of the coastline underwent uplift, with 48 km (44 %) undergoing uplift of > 1 m. Around 28 km (25%) underwent a minor amount of subsidence (<0.5 m), with only a very localised area (2 km around the Kekerengu fault) undergoing > 1 m subsidence. Only a very minor stretch (3 km, 2%) of coastline around Peketa was not impacted by coastal deformation. The entire Kaikōura Peninsula and much of the coastline north and south of the Peninsula was uplifted by between 0.8 and 1 m. Uplift of the Peninsula and the surrounding area is attributed to an entirely offshore fault called the Kaikōura Peninsula fault. Two strands of the Papatea fault cross the coastline at Waipapa Bay and between these faults the land was uplifted 5 -6 m, creating a new rocky coastal platform extending 200 -300 m offshore from the pre-earthquake coastline.

The coastal landforms of the Kaikōura coast attest to periodic sudden uplift in earthquakes, evidence of these events is preserved by uplifted beaches, also called marine terraces, that fringe many parts of the coastline from Oaro to Cape Campbell. These marine terraces are the subject of ongoing studies at GNS Science as they seek to understand how often large earthquakes like the 2016 earthquake occur. [GNS Science]

Further information about the earthquake is available from the Geonet website: https://www.geonet.org.nz/earthquake/story/2016p858000

Figure 29: Cape Campbell/Te Karaka reefs after the earthquake. Photo: Shane Orchard, UC.

3.2. Actions following the earthquake

3.2.1. Central Government intervention

Immediately after the Kaikōura earthquake, the Ministry for Primary Industries (MPI) stopped all fishing for three months until research could be conducted. Collection of shellfish and seaweed was prohibited between Marfells Beach and the Conway River in Canterbury, out to four nautical miles. The closure did not apply to the rock lobster fishery which came through the quake in relatively good shape. The shellfish ban is still in place.

3.2.2. Community groups formed

3.2.2.1. East Coast Protection Group (ECPG)

Following the earthquake, a group of long-term beach users and people living in the community were concerned about the potential impacts from the increase in public use of the beach and particularly the use of vehicles on the beach, reef

and dune systems. They held their first meeting in Ward on 16 February 2017. The East Coast Protection Group (ECPG) was officially formed on 29 May 2018 which seek to foster understanding of the biological diversity and cultural heritage of this outstanding natural landscape (ONL) while promoting appropriate use. Council and DOC have been technical advisors to the group.

Their vision is:

- To create local leadership and educate coastal users.
- To achieve protection of our coastal environment for future generations.
- To understand the distinctive biological diversity and cultural heritage of this outstanding natural landscape and its values.

Outputs of the ECPG include:

- Production of an information brochure A copy of the brochure is in Appendix 9.
- Education including signs.
- Predator control programme promoted.
- Letter to the Minister of Conservation and Land Information on 21 May 2018.
- Meetings and public field days

3.2.2.2. Recreational Access with Education (RAwE)

ECPG membership originally included recreational ATV and 4WD users. In mid-2018 the vehicle users produced a voluntary code of conduct, a copy is provided in Appendix 10. Other ECPG members would not accept the code and so the users withdrew their support from ECPG.

The code of conduct for ATV users was published in the Fishing and Hunting paper on 11 December 2018. A copy of the code along with approximately 250 signatures of users that agreed to follow the code was provided to Council.

In November 2019 an informal group was formed comprising beach users. Group members placed sign posts and logs to direct beach users below the high tide mark. The Group became incorporated in October 2020 known as Recreational Access with Education (RAwE). Their mission statement is to promote sustainable and low impact recreational access and use of Marlborough's East Coast beaches and coastlines.

In March 2020 a RAwE member provided a proposal for Council to consider prior to notification of a proposed Bylaw.

Outputs of the RAwE include:

- Code of Conduct
- Education including signs.
- Website

3.2.3. Technical Advice Workshop

On 23 July 2018 Council and DOC convened an expert group to provide advice on the biodiversity and ecological values as well as the historical and recreational context. The purpose was to determine the threats from human activities and identify the values of the East Coast environment. A secondary purpose was to identify potential measures to reduce the environmental impacts where identified.

The technical experts who presented at the Technical Advice Workshop are provided in Appendix11.

3.3. Impacts of the earthquake on the landscape

In November, 2016, the Magnitude 7.8 Kaikoura Earthquake raised Chancet Rocks by about 2 metres, exposing large new areas of the tidal platform.

Figure 30: Moeraki type boulders appeared at Ward Beach after the earthquake.

Figure 31: Uplifted pea gravels near Canterbury Gully. Photo: Shane Orchard, UC.

3.3.1. Impact of vehicle tracks on the landscape

Observations from the Technical Advice Workshop 2018:

Steep sided and high dune faces on the south side of Needles Point and Mirza Stream have tyre marks on them from motorbikes and ATVs. This threatens to undermine the stability and plant life of the dunes.

Vehicle track marks are continuous in places, extending from reefs, coastal platforms and sand exposed at low tide, right into the dunes. There is a concern that vehicle tracks impact negatively on the landscape.

Figure 32: Vehicle tracks south of Cape Campbell/Te Karaka. Photo: Shane Orchard, UC.

Post Technical Advice Workshop information:

Following the Technical Workshop, Council staff have consulted with James Bentley, a landscape specialist at Boffa Miskell, on whether the area of Outstanding Natural Landscape (ONL) identified in the Proposed Marlborough Environment Plan (PMEP) has changed or been impacted by the 2016 Kaikōura earthquake. He was also asked to comment on whether the multiple vehicle tracks that are now present on the beach from increased vehicle traffic between Marfells Beach and 18km south of Cape Campbell/Te Karaka have any impact on the ONL. He comments; "*essentially the biophysical change occurred due to a greater level of visibility of the intertidal areas. Nothing was specifically destroyed or added during that process that wasn't already captured in some way in the values. The main values are contained within The Limestone Coast ONL and the mapping extends sufficiently into the sea that all of these are already captured. Reference is made to the ongoing geological and tectonic forces that have moulded and sculpted the landform, and I am happy that this is still relevant*."

He also agrees that vehicle tracks will affect the landscape values but not to a degree that it will not make the area an ONL. The key values that underpin this area are listed in Appendix 12 and mainly concern the areas broader geomorphological and ecological values. The usage of the beach by vehicles will certainly affect the local legibility and visual coherence of the beach, and potentially its local ecology, but the ONL encompasses quite a broad area that cumulatively contains a variety of features and values that when read as one, meet the ONL threshold.

3.4. Impacts of the Earthquake on the Natural Habitats and Ecosystems

3.4.1. Impacts on the terrestrial ecosystems

3.4.1.1. Dunes

Observations from the Technical Advice Workshop 2018:

The dunes have now been uplifted and moved further from the influence of the sea. New dunes are gradually forming as vegetation re-establishes on the uplifted beaches. Log debris is gradually accumulating in a new zone seaward of the pre-earthquake log debris zone along the interface between grass and gravel. These zones provide an important home for lizards and there is a need to monitor the transition between old and new areas. New logs have to accumulate in order to provide this habitat in the future, and plant re-establishment plays a role in covering and stabilising them. This is expected to assist their accumulation over time [Peter Williams – Landcare Research. Shane Orchard – UC].

Potential threats:

- Vehicle disturbance in the new accumulation zones.
- Fires.

3.4.1.2. Indigenous vegetation

Observations from the Technical Advice Workshop 2018:

Mussel Point and Canterbury Gully are significant natural areas with heightened ecological importance.

In the Canterbury Gully area the vegetation is struggling to re-establish.

There is a concern that the zones along the coast have changed and will move as a result of natural processes of recovery.

There is evidence of damage to New Zealand native daphne at Needles Point.

Post Technical Advice Workshop information:

Following the 2016 Kaikōura earthquake, there are large areas of new, uplifted beach and dune that are gradually being invaded by introduced marram. Native species, such as kowhangatara/spinifex, coastal mat daisy and New Zealand ice plant, are also appearing where there is a nearby seed source but marram and other weeds will quickly dominate them if allowed to. These dynamics have been the focus of UC research in the area. The mapping of seed sources and recruitment (new plant) patterns on the uplifted beaches has led to the development of a potentially large-scale restoration project called 'Beach Aid.' This project is looking to fill gaps between the old dune remnants by creating new dunes on the uplifted beaches using a combination of planting activities and targeted marram control.

Raoulia sp. are colonising the bare areas of pea gravel which were formally the active beach but have now been uplifted. These will become important habitat for the invertebrate communities. Weeds are invading the pre-existing *Raoulia sp.* and New Zealand native daphne herbfields [Jan Clayton-Greene, DOC].

Looking ahead, the management of indigenous beach vegetation requires attention to beach disturbance and control of invasive marram to allow native sand species to establish and recover. Then natural beach communities would prevail, once again providing habitat for banded dotterels, skinks and other beach fauna.

3.4.1.3. Fauna

Birds

Observations from the Technical Advice Workshop 2018:

The stretch of coast is used both in summer and winter by different species. The whole stretch of coast is one ecosystem for birds as they move around so much.

Lake Grassmere/Kapara Te Hau is a key site for birds both in summer and winter. Other key sites are the Awatere River mouth, the Waima (Ure) and Lake Grassmere/Kapara Te Hau. Maps 3 and 4 below show the key wintering and summer sites. These were provided by Mike Bell from the Ornithological Society at the Technical Advice Workshop.

There are a whole range of species in the mid-threat category using these areas, including the black fronted tern and black billed gull. These are tomorrow's endangered species.

There is also a migration route up the coastline used by wrybills and South Island pied oystercatchers and some of them will stop off in the area, although the majority go right through.

One of the best sites in Marlborough for banded dotterel and variable oystercatcher, is along the scope area. Three areas with particularly high numbers are south of Cape Campbell/Te Karaka (airstrip), Long Point and north of Ure/Waima to Ward Beach. These birds nest in the pea gravel areas.

There are also colonies of red-bill gulls and white fronted terns. The colonies are mobile and shift around the coast in different years. There is often a large colony at Lake Grassmere/Kapara Te Hau. There have been colonies at the Waima/Ure and Awatere River mouths. There are usually colonies of red-billed gulls somewhere along the Cape Campbell/Te Karaka coast. Nationally numbers of these birds are declining.

Potential threats

- Dogs pose a threat as a predator and disturbing feeding and resting of bird species using the shoreline. Other small mammal predators (rats, mustelids, wild cats, hedgehogs) are a threat.
- Another threat is flocks being disturbed.
- Damage of habitat by vehicle traffic, particularly the breeding sites of ground nesting birds such as banded dotterels and oystercatchers which nest on the open beaches.

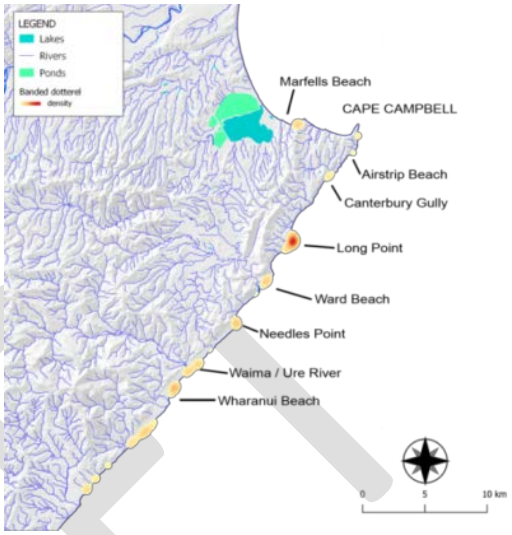
Figure 33: Birds and seal on the beach at Cape Campbell.

Map 3: Bird wintering sites. Source: Mike Bell, Ornithological Society.

Map 4: Bird summer sites. Source: Mike Bell, Ornithological Society.

Post Technical Advice Workshop information:

Banded dotterel nesting sites have been the subject of recent UC research on the coast. This has identified several 'hotspots' with high breeding densities, and confirmed that nests may be found anywhere on the uplifted high tide beaches, including close to the new high tide mark.



Map 5: Banded dotterel nesting sites. Source: Shane Orchard, UC.

Mike Aviss (Council) undertook a beach bird survey in November 2019. He walked from the Waima (Ure) River mouth to Ward Beach. The mouth of the Waima (Ure) is important for threatened gulls, terns and banded dotterels. The river mouth flows to the north forming a lagoon and a gravel spit before it flows out to sea. There are many birds using the spit for nesting and roosting.

Reptiles

Observations from the Technical Advice Workshop 2018:

While there are only four lizard species recorded as being present on the coast, the populations of the two common species are dense as there is a large area of unmodified habitat of the driftwood and vegetation that they require. Marieke Lettink observed approximately 70 Waiharakeke grass skink and Minimac/Marlborough mini gecko on a site visit in July 2018.

The driftwood zone where they live is now many metres away and will not be replenished but, over time, it is expected that a new driftwood zone will establish while the old zone gradually rots away. In the meantime, the reptiles need to be able to persist and then colonise the new habitat once it is established.

Prior to the Technical Advice Workshop in July 2018, Reptile Specialist Marrieke Lettink visited a number of sites on the coast, especially Ward Beach, Canterbury Gully and Mussel Point. She found high densities of skinks and geckos at these sites, living in the drift wood at the old storm high tide mark. There were two species seen, the Waiharakeke grass skink and minimac gecko, which were often found living together.

Thirty one lizards were found during 45 minutes of searching conducted by three observers. Lizards were found over a 0.4 km area above the (former) high tide mark, extending north from Mussel Point (this waypoint). No lizards were found immediately south of Mussel Point. This area experienced significant uplift in the Kaikōura earthquake.

In March 2018, another species, Raukawa gecko, was found at Mussel Point.

During SNA monitoring over 2018 and 2019, reptile searches were conducted all along the coast and Waiharakeke grass skink and minimac geckos were seen regularly. They are well spread and common along the coast in the debris and driftwood associated with the old high tide mark. There was evidence of vehicle tracks through much of this habitat and the driftwood is showing signs of breaking down now that it is beyond the reach of the storm high tide zone.

Monitoring observations in 2019 found a decline in the total numbers of geckos at Mussel Point with the greatest loss observed at the western end of the beach.

Potential threats:

- Habitat loss – Firewood collecting removes cover
- Poaching – Loss of individuals from natural habitats and mortality.
- Damage of habitat by vehicle use due to loss of sensitive habitats.

Figure 34: Important habitat for invertebrates.

Figure 35: Excellent cover for lizards.

Invertebrates

Observations from the Technical Advice Workshop 2018:

A DOC study on the Cloudy Bay foreshore showed that the transitional area between storm beach and dense pasture where you get pimelea mats, coastal mat daisies, a sprinkling of grasses and bare sand, is the area where there are a lot of rare species living. For example pimelea mats are the habitat of pimelea looper moth which is a relatively rare species with a limited distribution and pimelea leaf roller which is more widespread.

These areas have now been removed from the influence of the sea. The storm beach is now below that and new logs are being thrown up. Presumably this habitat will move down into the new area and denser vegetation will push down from above. The process of moving down is being interrupted by vehicle tracks which are acting as a barrier between the past system and the system of the future.

Vehicle tracks are being seen on what is presumably the old wave cut platforms and on what was the old storm beach but is now high and dry. This is the area that the plants should be colonising and species moving into over time.

There are good areas of pimelea mats south of Mirza Creek and at Needles Point.

In 1982 there were vast areas of pimelea mats behind Chancet Rocks but now agricultural land has pushed it out so that there is now only a very narrow strip of it left. The pimelea mat zone is vulnerable to stability. It will disappear if it is not regularly disturbed by coastal processes.

Limited disturbance would maintain the site (i.e. a single vehicle track) but too much overwhelms the site.

Driftwood is quite important to some species along the coast. The old driftwood on the storm beaches will rot away and the issue is how the animals and plants will move down to the new area below.

Potential threats:

- Habitat loss
- Predation

Post Technical Advice Workshop information:

A site visited by Brian Patrick during his country-wide survey for katipo, and for which he gave Ian Millar information on other species, is the area of coast immediately south of Cape Campbell/Te Karaka (which we visited prior to the Council workshop). Here he found what he described at the time as a good population of katipo (he selected it as one of a number of populations around the coast for potential monitoring) as well as a good population of pimelea looper moth.

A flightless moth – the mat daisy jumper has recently (2021) been discovered on *Raoulia sp* mats in several locations. This tiny moth has lost the ability to fly and when disturbed will jump instead. Originally only known from Cloudy Bay this species is Nationally Critical and only occurs where there is *Raoulia sp* in the sand and pea gravels in South Marlborough.

The At Risk and Declining pimelea looper moth is a distinctive moth with orange and brown wings whose caterpillars only live on the New Zealand native daphne.

Other invertebrate associations include the caterpillars of the boulder copper butterfly are only found on *Muehlenbeckia* plants.

The distinctive katipo occurs in the dune systems along the coast – once widespread across New Zealand, these distinctive spiders have disappeared from many areas due to habitat loss and predation by introduced spiders.

Current research by Shane Orchard (UC), Mark Anderson and Eve Anderson (Blenheim) is measuring katipo densities at four places; Cape Campbell/Te Karaka, Marfells Beach, Mussel Point and Long Point to gauge the potential effects of vegetation differences in uplifted areas where the dune system is undergoing change.

Figure 36: Dune research on the coast. Photo: Shane Orchard, UC.

3.4.2. Impacts on the marine ecosystems

Observations from the Technical Advice Workshop 2018:

The existing reef ecosystems were badly damaged by the earthquake. Large areas are now above water for most or all of the time and support no marine life. The marine ecosystems present in the focus area are shown on the maps in Appendix 4.

- Uplift thrust some reefs and algal beds out of the water.
- Structural change of some areas still covered by tide.
- Insufficient new reef emerged to replace what was lost.
- Up to 200m shift, between old and new high tide marks.
- Temperature increased significantly as shallow rocky reefs became more exposed, surpassing thermal tolerance for many species.
- Disappearance of almost all seaweed except in very low tidal zone, with little recovery up to 2 years after the quake.
- Seaweed disappearance triggered massive biodiversity loss – approximately 40% of coastal fish biomass is directly related to seaweeds through food web interactions.
- Rockpool species, including sucker fish, anemones and starfish, disappeared on many reefs as tidepools in the mid-tidal zone become high and dry.
- On the south side of the Cape newly exposed mudstone is eroding as it dries, creating sediment that smothers habitats.
- Many of the 19 ship wrecks along the coast between Cape Campbell/Te Karaka and the Waima (Ure) are now exposed by quake uplift.

The UC Marine Ecology Research Group (MERG) has monitored the coast from Cape Campbell/Te Karaka to Oaro (south of the focus area) since the mid-1990s. High diversity reefs and the convergence of northern and southern species made the Cape Campbell/Te Karaka area especially interesting. Monitoring intensity increased after the November 2016 quake, with over 3000 hours of study clocked up in 18 months. Monitoring of ecosystem recovery by UC is ongoing and reported in the next section. However, the current MBIE funded Reef Ecology

and Coastal Values Earthquake Recovery (RECOVER) project is due to end later in 2021. Regular updates are available on the MERG website (www.merg.nz).

Figure 37: Post earthquake, November 2016.

"With increased temperatures due to little water coverage at high tide, more sediments that prevent attachment or smother organisms, and more wave exposure on vertical surfaces that remain after horizontal reefs were uplifted, the conditions required for many species have changed." David Schiel, Professor of Marine Science, University of Canterbury.

Figure 38: Four weeks after the earthquake.

Post Technical Advice Workshop information:

Rocky reef impacts from the Kaikōura earthquake (David R Schiel, Tommaso Alestra, Shawn Gerrity, Robyn Dunmore, Islay Marsden, John Pirker, Shane Orchard, Leigh Tait, Mads Thomsen); UC, Cawthron Institute and NIWA.

"Nineteen months after the November 2016 earthquakes a collaborative study by the University of Canterbury, Cawthron Institute and NIWA (funded by Ministry for Primary Industry) reported that the devastation to parts of the marine ecosystem had not stabilised. Their highly detailed sampling following the earthquakes showed a massive loss of habitat-dominating large brown algae, understorey species of red algae, and substantial losses of mobile invertebrates such as pāua and grazing snails. For several months, there was a bloom of green algae (sea lettuce) in the mid and lower tidal zones along most of the coastline from Omihi to Cape Campbell/Te Karaka, which was a response to the loss of other algae, the reduction in grazing snails, and the large amounts of fine sediments that emerged from deteriorating sedimentary rocks that comprised most of the coastal zone. At the time they observed that there had been little recovery of algal beds in the new configuration of rocky reef.

On some platforms where tidal inundation still occurs, such as Cape Campbell/Te Karaka, the water is shallow, immersion times are short, and temperatures can reach lethal levels, In other areas, there is a vastly changed intertidal morphology, with often near-vertical topographies. Sediments are still clouding the nearshore waters in many areas, which reduces primary productivity and therefore the amount of food available to small invertebrates and other species in the coastal food web. On the positive side, post-earthquake recruit pāua (those up to around 50mm in shell length) are abundant in many sites where appropriate habitat exists. The ongoing task is to figure out how much juvenile pāua habitat remains on the coastline and how quickly these recruits can make their way into the fishery.

Based on 25 years of experimental work along the coast of the South Island, recovery of algal populations is likely to take many years and will depend both on natural recovery from highly fragmented remaining algal stands and on efforts of restoration."

Figure 39: Drone view of reef platforms south of Cape Campbell/Te Karaka. Photo: Shane Orchard, UC.

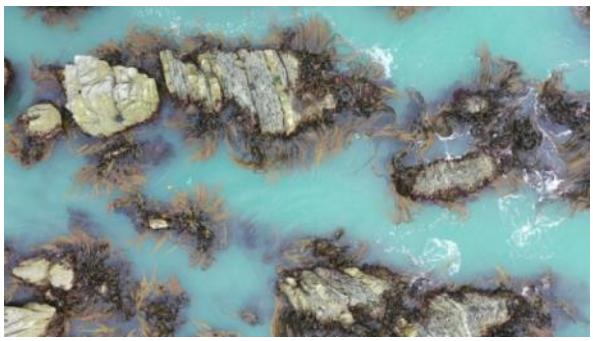


Figure 40: Monitoring seaweed recovery on the uplifted reefs near Ward Beach. Photo: Shane Orchard, UC.

Rocky reef impacts of the Kaikōura earthquake: quantification and monitoring of nearshore habitats and communities. New Zealand Aquatic Environment and Biodiversity Report No. 212. May 2019

"The surveys and resulting data presented in this report establish an important baseline for the rocky shore environment between Oaro and Cape Campbell/Te Karaka. Such comprehensive and extensive information has never been previously available and will help to guide management initiatives and new research.

For the purpose of both management and research, there are important considerations to take into account. First, the data presented here cover only the first 16 months following the earthquake and recovery from impacts is still in its early stages. Longer time series would help better characterise the trajectory of recovery of intertidal and subtidal communities. This information would provide a better assessment of the recovery potential of different species and community types along the uplifted coastline. It would also shed light on how informative small-scale experiments are in forecasting recovery following large-scale impacts. University of Canterbury researchers have done numerous experiments over many years on the effects of stressors on key algal species, grazer dynamics, the role of diversity in resilience, and the early life-stage demographics of habitat-forming macroalgae (e.g., Lilley & Schiel 2006, Schiel 2006, Schiel & Lilley 2007, 2011, Alestra & Schiel 2014, 2015, Schiel et al. 2016). The Kaikōura earthquake will be a test of how well the knowledge and understanding gained from these studies may scale up to entire seascapes. As well, future studies will help determine the ecosystem-wide effects of these changes, such as in coastal food webs that rely on benthic algal primary productivity and detrital flows.

Second, the prime requisite for the recovery of hard reef communities is the availability of rocky substrata. At this stage, it is unknown how much rocky habitat was lost in the uplift and how much is still available. Research quantifying the extent of intertidal and subtidal reefs in their post-earthquake configuration would aid predictions of where populations of different rocky reef species, such as paua, are likely to recover. A detailed assessment of the extent and distribution of paua intertidal recruitment grounds could inform decisions about the management of this fishery and the planning of reseeding operations.

Finally, it is important to consider that the implications of the uplift coastline can be much wider than just the direct ecological impacts on nearshore systems. The new land uplifted in the earthquake has new values and with these come new uses, stressors and threats. The area around Cape Campbell/Te Karaka, for example, is now accessible to recreational vehicles along a coastline that was formerly isolated by headlands and bays at high tide. The area is increasingly used for tourism, fishing, and recreation and there is the potential for adverse effects on nesting birds, hauled out seals, and vulnerable coastal vegetation. Although the current understanding of these changing land use patterns is at an early stage, they will be important aspects of management in the earthquake recovery process."

Figure 41: Measuring rock erosion.

The Kaikōura earthquake in southern New Zealand: Loss of connectivity of marine communities and the necessity of a cross-ecosystem perspective. (David R Schiel, Tommaso Alestra, Shawn Gerrity, Shane Orchard, Robyn Dunmore, John Pirker, Stacie Lilley, Leigh Tait, Michael Hickford, Mads Thomsen. UC, Cawthron Institute, NIWA.

Abstract

1. *The Mw 7.8 earthquake that struck the north-east coast of the South Island of New Zealand in November 2016 caused extensive upheaval, of up to 6 m, over 110 km of coastline. Intertidal habitats were greatly affected with extensive die-off of algal communities, high mortalities of benthic invertebrates, and greatly reduced ecosystem functioning, such as primary productivity. Only isolated pockets of key species remained in these areas, many of which were within protected areas around Kaikōura.*
2. *The loss of key species of algae and invertebrates fragmented marine populations and compromised connectivity and recovery processes because of the large dispersal distances needed to replenish populations. Severe sedimentation from terrestrial slips and erosion of newly exposed sedimentary rock compromised settlement and recruitment processes of marine species at many sites, even if distant propagules should arrive.*
3. *The combination of habitat disruption, loss of species and their functioning, and impacts on commercial fisheries, especially of abalone (Haliotis iris), requires multiple perspectives on recovery dynamics.*
4. *This paper describes these effects and discusses implications for the recovery of coastal ecosystems that include the essential involvement of mana whenua (indigenous Māori people), fishers, and the wider community, which suffered concomitant economic, recreational, and cultural impacts. These community perspectives will underpin the protection of surviving remnants of intertidal marine populations, the potential use of restoration techniques, and ultimately a successful socio-ecological recovery.*

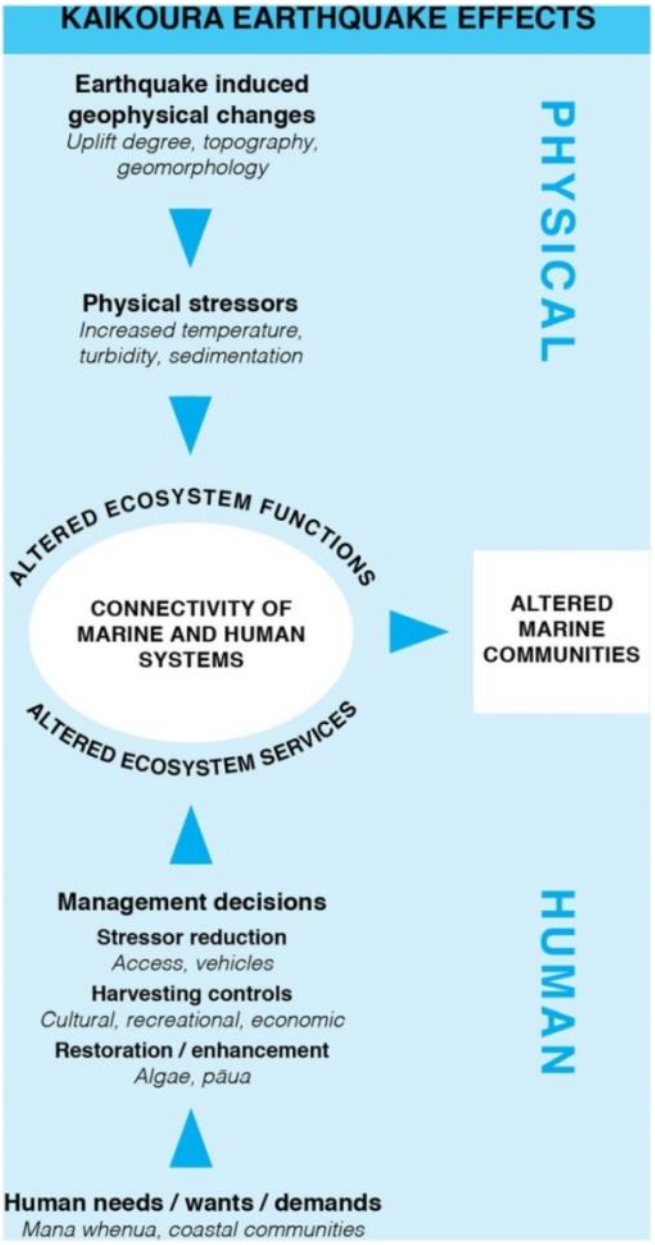


Figure 42: A summary and template graphic of the issues centred around altered ecosystem functions and services, related to connectivity within and between the marine and human dimensions of earthquake-related events.

3.4.2.1. Pāua

Observations from the Technical Advice Workshop 2018:

Adult pāua have survived in many areas, despite high mortalities in some places. Larger pāua disappeared between surveys, suggesting loss or movement. Recruitment is patchy as juvenile pāua habitat-shallow water, no more than about 1m below low tide – is lost in places due to uplift or smothering by sediment. Shucked pāua shells indicate illegal take in some areas. Pāua recruitment areas are being compromised by people pressure, as well as natural erosion. Because young pāua recruit in very shallow water (no more than 3-4m below low tide) they are vulnerable to illegal poaching.

There is currently a ban in place for the collection of paua. Ilegal activities (poaching) are occurring along the coast. It is not known how long the ban will be in place and what the impacts will be once the ban is lifted.

Locations: Rocky reef areas all along the coast, especially Cape Campbell/Te Karaka to Canterbury Gully, Long Point, Ward Beach/Chancet Rocks.

3.4.2.2. Shellfish

Observations from the Technical Advice Workshop 2018:

Not included in post-earthquake research.

Potential threats:

- Walkers appear to have minimal impact, although the UC MERG has discovered trampling of newly exposed reef platforms is causing damage, especially of eroding sandstone rocks. A track being worn through a reef by someone checking their cray-pot will take two to nine years to recover.
- Vehicles driving on the reef ecosystem are causing further stress.

3.4.2.3. Marine mammals

Observations from the Technical Advice Workshop 2018:

There are approximately 300 seals in the Needles Point area. The area is becoming a breeding colony but is also easily accessible by the public. One or two elephant seals have chosen to breed in the Cape Campbell/Te Karaka area. It is critical for a few weeks that the females have their pups there, are left undisturbed. It is significant that elephant seals have chosen to breed at Cape Campbell/Te Karaka as they are an uncommon breeding visitor.

DOC has observed that compared to previously, the majority of bikes have to go higher up the beach as the shoulder from the high to low water mark is now very soft pea shingle. Bike users are able to go further and travel more quickly by being higher on the beach.

DOC predicts that negative impacts for marine mammals from increased vehicle access will become exponentially greater as it becomes more known that tracts of the coast are ideal vehicle tracks.

Potential threats:

- Disturbance by people, their pets and vehicles.

Figure 43: New Zealand Fur Seals at Needles Point.

3.5. Impacts of the earthquake on commercial activities

Post Technical Advice Workshop information:

At Ward Beach the shallowness of the new beach prevents unhindered launching and retrieving. Commercial fishers are only achieving 35% of pre-earthquake launching. Gravel movement is constant. A resource consent has become a necessity to maintain access at the current launching and retrieving site. There is uncertainty about being able to maintain this site as an access point.

Launching at alternative sites, such as Port Underwood, are said to be uneconomic with extra time and travel involved.

The presence of a new bar has created a surf break. This is impacting launching and retrieving in big swells. The surf break is a bonus for

surfers but difficult for fishers who are required to give way.

Figure 44: Ward Beach showing boat launching area. Photo: Shane Orchard, UC.

3.6. Impacts of the earthquake on access and recreational activities

3.6.1. Public access

Observations from the Technical Advice Workshop 2018:

The New Zealand Walking Access Commission (NZWAC) is a government commission who play a lead role in protecting access to New Zealand's lakes, rivers, beaches and mountains. Their area of expertise is promoting rather than restricting public access. For them the key issue is that the increased utilisation of the public space by vehicles may be causing a negative impact on wildlife, the wider ecosystems and causing public safety concerns.

At the workshop they advised participants that there is a gap in legal public access from the Awatere River mouth to the end of Flemings Road and from Mussel Point for about 1.5km to near a rocky outcrop. Most of the access is on unformed legal road plus areas of reserve land and public conservation land. There is also public access on the common marine and coastal area, seaward of mean high water springs, accessible at low tide. Driving or even walking along these legal roads may not always be practical.

In summary: The east coast from the Awatere River mouth to the Waima (Ure) River mouth includes areas of high recreational value for walking, 4WD driving, access to recreational fishing and camping at Marfells Beach. The walk from Marfells Beach to Cape Campbell/Te Karaka is especially popular as a return day-walk with the lighthouse as a destination.

Otherwise, public access interest is focused on Marfells Beach where there is a DOC camping ground and Ward Beach. Surf-casting is popular at Ward Beach, Chancet Rock Scientific Reserve and Needles Point are interesting places to visit. There is also a new surf break at Ward Beach, created by reef raised in the earthquake.

It is understood that using 4WD's and ATV's for recreation and to access fishing has grown in popularity, as uplift has greatly increased the length of coast accessible by vehicle as far south as Willawa Point on the Marlborough-Kaikōura boundary.

The Proposed Marlborough Environment Plan Policy 9.1.1, under the heading "Public Access and Open Space', includes "Ward Beach" among areas "having a high degree of importance for public access". High priority waterbodies for access include "the coastal marine area, particularly in and near Marfells Beach and Ward Beach."

Potential threats

- These public access activities may not be compatible, and benefits of public access may have to be weighed up against potential damage to the environment.

3.6.2. Recreational activity

Observations from the Technical Advice Workshop 2018:

The recreational opportunities, in particular, along Marlborough's East Coast have changed post-quake due to uplift shifting the high tide line further down the beach. This has made more of the beach accessible more of the time.

Figure 45: Marfells Beach. Photo: Shane Orchard, UC.

DOC is the primary "gatekeeper" to northern coastline via Marfells Beach campground. Although DOC does not have much public conservation land in the area they have a responsibility to guide the management and behaviour of people.

DOC has recorded an increase in use of the campground by national and international campers at Marfells Beach after the earthquake. This started due to the highway restrictions and closures but his trend continued after the highway re-opened. Post COVID-19, the international of this use has dropped off, but local use still continues.

Figure 46: DOC camping ground at Marfells Beach.

"The uplift caused by the earthquake exacerbated the issues by making previously difficult areas more available. Yet the very environmental treasures that we value along the beach are being damaged, altered and destroyed." Forest and Bird regional manager, Debs Martin, speaking to the Marlborough District Council Environment Committee, March 2018.

Quake uplift means it's now possible to walk or drive from Marfells Beach to Cape Campbell/Te Karaka, then around the Cape and south to as far as Chancet Rocks, at virtually any tide. This is a journey of approximately 30km in each direction. What was previously only a low-tide route is now accessible at most times by 4WD vehicles, 4-wheeler and trail-bikes as well as on foot.

Figure 47: Looking south from Marfells Beach to Mussell Point, part of the 6km walk to Cape Campbell lighthouse.

Off-road vehicles can now easily reach the coast from SH1 at Flemings Road, Marfells Beach, Ward Beach, the Waima (Ure) River mouth and Wharanui Beach. It's possible to drive for many kilometres in either direction, prevented only by headlands at Chancet Rocks and Needles Point. Occasional soft sand/pea gravel and flooded rivers can also present challenges to driving and vehicles do get stuck. As the awareness increases about the changes to the beach, locals are seeing more people visiting on foot, in 4WD vehicles, on 4-wheeler motorbikes and on trailbikes. Some of these users are often driving at speed that may put the public at risk.

Figure 48: Vehicle track above the MHWM at Mussel Point.

Figure 49: Vehicle track below the MHWM at Mussel Point.

The wheel marks left by all vehicles on the dunes and wider coastal environment are long lasting and have an impact on the visual look of this "Outstanding Coastal Natural Character" landscape as well as inhibiting the re-colonisation and re-adjustment of the natural fore dune ecosystems that would naturally occur after an event such as earthquake uplift.

Potential threats:

- Public Safety
- Vehicles
- Safety for boat owners if only access for fishing is launching and retrieval of boats from the beach.

Post Technical Advice Workshop information:

Impacts of earthquake uplift are documented in a report prepared by UC MERG titled **"Beach dynamics and recreational access changes on an earthquake –uplifted coast.** August 2020. The Executive summary is included below:

"*This report responds to a request from Marlborough District Council (MDC) for information on the coastal environment, with a particular focus on supporting the development of a bylaw to address changes in recreational use patterns that have occurred since the Kaikōura earthquake. We present a selection of information from our earthquake recovery research that has a focus on understanding the impacts and ongoing processes of change. Major impacts of the natural disaster are associated with vertical uplift of the coastal environment, although ongoing erosion and deposition processes are also important. In addition, interactions with human activities are important because they can exert strong influences on the reassembly of ecosystems which is a critical aspect of outcomes over the longer-term. Earthquake uplift caused widespread mortality of many coastal habitats and species (e.g., algal assemblages) that are adapted to a relatively specific set of conditions, often associated with characteristic locations in relation to the tidal range. In uplifted areas the intertidal zone has moved seaward leading to a physical widening of many beaches. This has provided greater opportunity for off-road vehicle access to the coast and has become particularly noticeable at headlands and other natural barriers that were previously impassable at high tide. Off-road vehicles pose threats to sensitive vegetation and wildlife unless appropriately managed. Achieving this is assisted by an understanding of the specific impacts of vehicle use, which in turn requires information on the location of sensitive areas. To ensure the best outcomes for earthquake recovery there is an urgent need to assess and respond to the new spatial patterns, and to make plans to avoid conflicts where possible. In our RECOVER (Reef Ecology and Coastal Values, Earthquake Recovery) project funded by the Ministry of Business, Innovation and Employment (MBIE) and supported by the Ministry for Primary Industries (MPI) we are collecting information on important conservation values and activities. Although research is continuing, this report provides findings that include mapping of indigenous dune system remnants, recruitment of the indigenous sand-binders spinifex (Spinifex sericeus) and pīngao (Ficinia spiralis) on uplifted beaches, distribution of katipō (Latrodectus katipo) within earthquake-affected dune systems, distribution of banded dotterel / pohowera (Charadrius bicinctus bicinctus) nesting pairs to determine important areas, and spatial overlaps with vehicle tracking measurements along the coast."*

Figure 50: More ATV users are using the coast for recreation.

Figure 51: A 4WD club visiting the coast in 2019.

Figure 52: Vehicles can drive on multiple habitats, from coastal platforms to dunes.

Figure 53: The new coast is providing more options for 4WD vehicles to access the coast.

Figure 54: The new coast between Marfells Beach and Cape Campbell/Te Karaka. Photo: Mark Davies Jan 2017.

Figure 55: New uplifted coast south of Cape Campbell provides new opportunities. Photo: Shane Orchard, UC.

Figure 56: Vehicle tracks at Cape Campbell.

Figure 57: Tracks 3-4 km south of Cape Campbell.

Figure 58: Walking along the coast is a popular activity. Photo: A Wiltshire.

Figure 59: Walking along the coast.

Figure 60: Users are sharing the coast.

3.6.2.1. ECPG user surveys

It has been observed and reported anecdotally, that there has been an increased number of visitors to the area and more vehicle traffic on the coastal margin. The ECPG has documented some beach users' observations at Marfells Beach for Easter 2018 and 2019 and at Mussel Point on a weekend in October 2018.

The observations at Mussel Point showed of the 48 visitors on the Saturday between 7.00 am and 3.00 pm, 34 of them were using 20 quad bikes. There were three 4wd vehicles. The results recorded the purpose being mostly for fishing followed by leisure activities (not defined). On the Sunday between 7.00 am and 7.00 pm there were 124 visitors. There were 52 users on 28 quad bikes, with five 4WD and 7 motorbikes. On this particular day, 78 of the visitors were recorded as visiting the area for leisure activities followed by 40 using the area for fishing. Three horses and 1 dog were recorded. The observations of the recorder on the Sunday noted:

- Vehicles driving all over the beach, some quads and 4WDs going up into upper pea gravel terraces.
- Other vehicles going just above the water.
- Vehicles drive within five metre strip at narrow point between the rocks near Mussel Point, and over 70 metre wide strip where beach is wider.
- Walkers tend to be nearer to the water on firmer sand.

At Marfells Beach on the Thursday before Easter in 2018, 22 quads (25 people) were observed driving out to the Cape between 9.40 am and 2.37 pm. There were 37 walkers. On Good Friday in 2019, only 6 quads (7 people) were observed heading out to the Cape with 28 walkers observed.

3.6.2.2. UC MERG user survey

December 2020

An on-line survey of public perceptions was undertaken by UC MERG for the earthquake-affected beaches in Marlborough. The survey was undertaken as part of the RECOVER project. A summary of the key findings is reported below:

"At least 20 diverse recreational activities are valued by the public on beaches in the earthquake affected area. Some are incompatible with others leading to potential conflicts between interest groups. Many survey respondents reported a lengthy association with the area indicative of a depth of local knowledge and involvement with recreational activities and the wider environment of the coast. Although important locations are scattered throughout the study area, there is some evidence for heightened interest around commonly-used access points for activities such as physical exercise and fishing. Positive aspects of recreational activities in the area include benefits associated with being in a wild and natural environment, wildlife encounters, other mental or physical health benefits, fishing & food harvesting benefits, and valued family time.

A diverse set of negative aspects were identified several of which are contradictory to others and involve topics such as vehicle use, fishing pressure, and aversion to particular activities. This highlights a need for conflict resolution in finding workable solutions. Although a wide range of suggested interventions were identified in survey responses, several of these are largely incompatible with others in keeping with the wide divergence of views on positive and negative aspects. Despite this, several classes of ideas may be identified which either seek, or make suggestions for arrangements that could address diverse values and preferences in compatible ways. They include improving the knowledge of human impacts on the coast, and two different though complementary spatial planning approaches involving the establishment of designated routes and / or exclusion zones to reduce impacts by design. Considerations along these lines could also potentially encompass more specific suggestions involving preferential access modes, or the need for improvement of recreational access arrangements at specific sites."

4. Restoration work to assist natural processes of recovery

A number of initiatives are being undertaken along this coast by Council and the community. These are aimed at assisting with the process of recovery and improving the East Coast Natural Environment. Council is collaborating with UC under the Beach Aid banner to try and develop cost effective options which will help to allow larger areas of the coast to be restored to a natural state within a limited budget.

Council is funding much of this work through its SNA programme in which it works with landowners to improve indigenous biodiversity on private land. SNA's have been identified along many parts of the coast although much of the area being targeted is outside of the SNAs as it is not private land. Private landowners and community groups, such as the ECPG, have established predator trapping along 7.5km of coast line and have also been involved in planting dune plants provided by themselves and Council.

Efforts are also being made by Council, ECPG and RAwE to direct beach traffic away from sensitive areas, especially newly planted areas and where birds are nesting.

Most of the coast has already been fenced to prevent stock from accessing it. Gaps have been fenced by farmers and old fences have been upgraded.

Signs have been placed at significant access points and near important bird nesting areas in an effort to educate the public about the natural values present and how best to behave to help protect them from damage.

4.1.1. Restoration plantings

Kowhangatara/spinifex and pīngao have been planted on 500m of uplifted sand beach at Marfell's Beach and south of Cape Campbell/Te Karaka.

Seed has been collected and is being propagated to expand this planting area and in future to also include other indigenous species such as sand tussock, sand coprosma, ngaio and akeake. This includes a plan to plant coastal native trees in some of the dunes which have been stabilised by invasive marram grass over the last few decades.

4.1.2. Weed control

Marram grass, an invasive species, has been locally controlled with herbicide to protect the most important indigenous dune areas, and where it has been competing with newly planted indigenous species. Marram grass will continue to be controlled or planted over with indigenous forest.

4.1.3. Predator control

In 2018 the ECPG embarked on a predator control programme aiming to reduce predation on ground nesting birds along Marlborough's East coast to very low levels. After speaking with people who had existing experience controlling predators both on Marlborough's east coast, and in similar habitats in other places a staged programme was instigated.

Birds, lizards, invertebrates and plants were all being impacted by mustelids, feral cats, hedgehogs and rats. The area adjacent to the coastline is largely dry open grassland, scattered coastal scrubs and intermittent patches of exotic trees. This habitat hosts rabbit populations, and the rabbits are the main prey species driving numbers of ferrets and feral cats. Sudden drops in rabbit numbers results in these predators changing food sources to birds, eggs, lizards, eels, and insects. Hedgehogs primarily eat insects but also eat birds eggs, chicks, lizards, and some plant material. Rats have a varied diet eating birds, eggs, chicks, seeds, lizards, insects and plants. The ECPG predator control programme targets ferrets, feral cats, hedgehogs and rats.

Starting in August 2019 new predator traplines were installed from Ward Beach to Chancet Rocks, and around Mussel Point. Existing traplines were extended to cover the coastline from Cape Campbell/ Te Karaka to Canterbury Gully, and improve coverage at Lake Elterwater. All of these areas are important breeding, resting and feeding areas for coastal birds. A combination of DOC 250, Timms and cage traps are being used. A number of baits have been used including fresh and dried rabbit, fish, fat, tinned cat food, and dog biscuits. Hedgehogs and rats are not fussy, they will try most things. The mustelids and feral cats have shown a preference for fresh or dried rabbit or tinned cat food. Between August 2019 and March 2021 a total of 351 hedgehogs, 71 feral cats, 21 ferrets, 1 stoat, 7 weasels, 31 rats and 6 possums have been removed. With less mammalian predators the banded dotterel and variable oystercatcher have a much better chance of successfully rearing their chicks. Data on chick survival would be useful to collect to confirm that the efforts of predator control are providing benefit to nesting birds. Predator control is ongoing and all records are being kept.

5. Conclusion

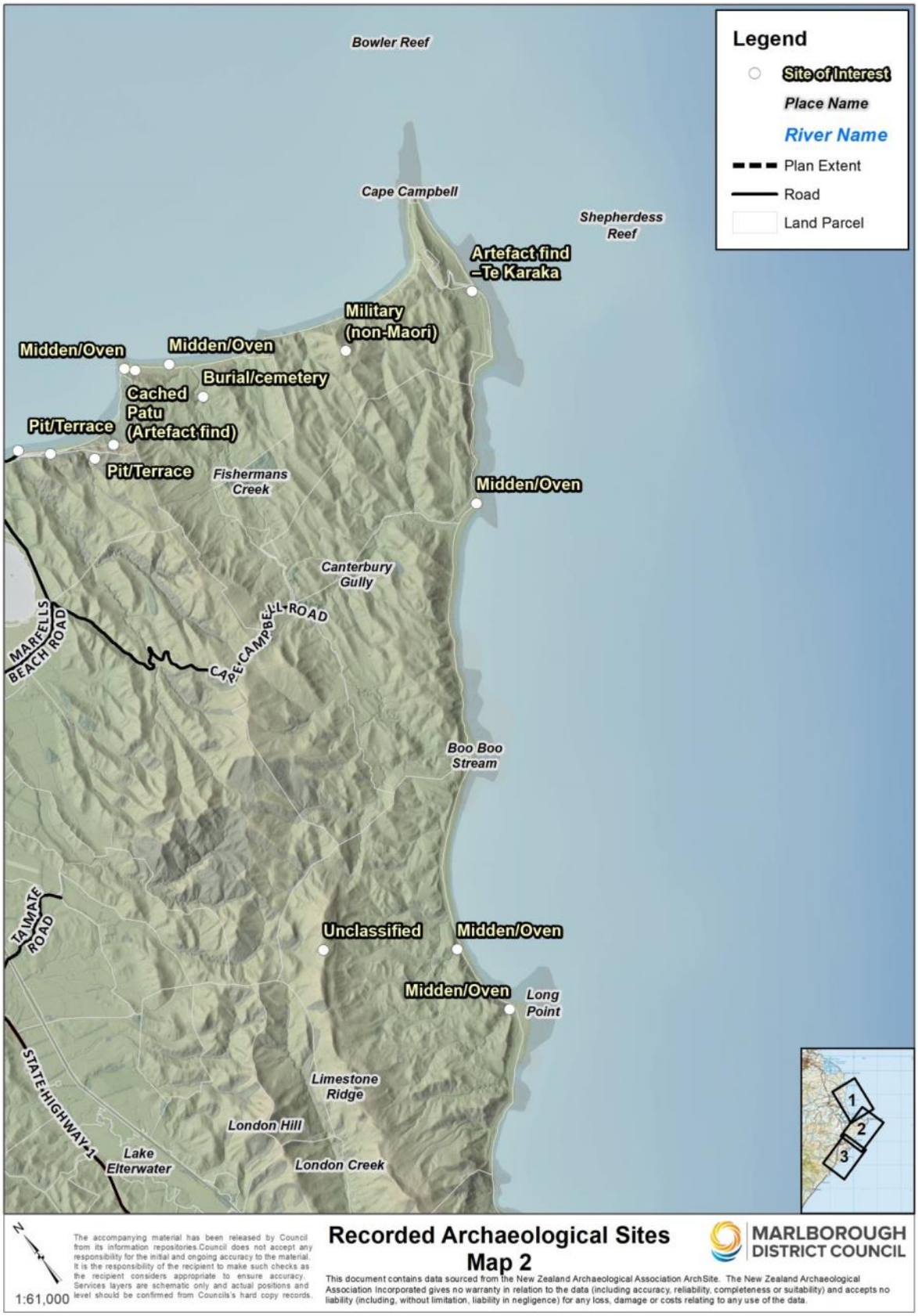
The coastal environment along Marlborough's East Coast has a number of significant landscape, cultural and ecological values, is recognised by the public as a recreational place of interest and is a place where commercial activities such as fishing occurs along the coastal margin.

The November 2016 Kaikōura earthquake caused a massive change in the landscape physically. While users are benefiting from the increased platforms and beach areas, this has changed the way users are choosing to recreate along the coast in vehicles. This increased use and where vehicles are now travelling is threatening the unique ecosystems along this coast.

The earthquake has provided the Marlborough community an opportunity to consider how we interact with the east coast that assists the natural produces of recovery following the earthquake and also preserves the uniqueness and valuable characteristics of the east coast into the future.

The introduction of management initiatives will have to take account the multiple values of this coast, the potential for delayed recovery because of access and over-use to formerly isolated areas.

Appendix 1: Archaeological Sites (Maps 1-3)


Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
Bowler Reef
Cape Campbell
Shepherdess Reef
Artefact find –Te Karaka
Military (non-Maori)
Midden/Oven
Midden/Oven
Burial/cemetery
Cached Patu (Artefact find)
Pit/Terrace
Pit/Terrace
Fishermans Creek
Midden/Oven
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Boo Boo Stream
TAIMATE ROAD
Unclassified
Midden/Oven
Midden/Oven
Long Point
STATE HIGHWAY 1
Limestone Ridge
London Hill
Lake Elterwater
London Creek
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3
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The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Council's hard copy records.
Recorded Archaeological Sites
Map 2
MARLBOROUGH DISTRICT COUNCIL
This document contains data sourced from the New Zealand Archaeological Association ArchSite. The New Zealand Archaeological Association Incorporated gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (including, without limitation, liability in negligence) for any loss, damage or costs relating to any use of the data.


Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
WARD BEACH ROAD
Flaxbourne River
London Creek
KAKA ROAD
NEEDLES ROAD
Tatchell Creek
Ward
Ward
Butt Stream
HIGHWAY 1
STATE
Rocks
Weld Cone
Cement/lime works
Chancet Rocks
Historic - domestic
Clay pit
Artefact find
Industrial
Ward Beach
Midden/Oven
Midden/Oven
Working area
Midden/Oven
Round Knob
Midden/Oven
Hollow Top
Midden/Oven
Midden/Oven
STATE HIGHWAY 1
Midden/Oven
Mirza Creek
Midden/Oven
Hungry Hill
Tar Barrel
Single Hill
Midden/Oven
Horehound Knob
Midden/Oven
Waima River
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The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.
Recorded Archaeological Sites
Map 3
MARLBOROUGH DISTRICT COUNCIL
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Schedule of archaeological sites

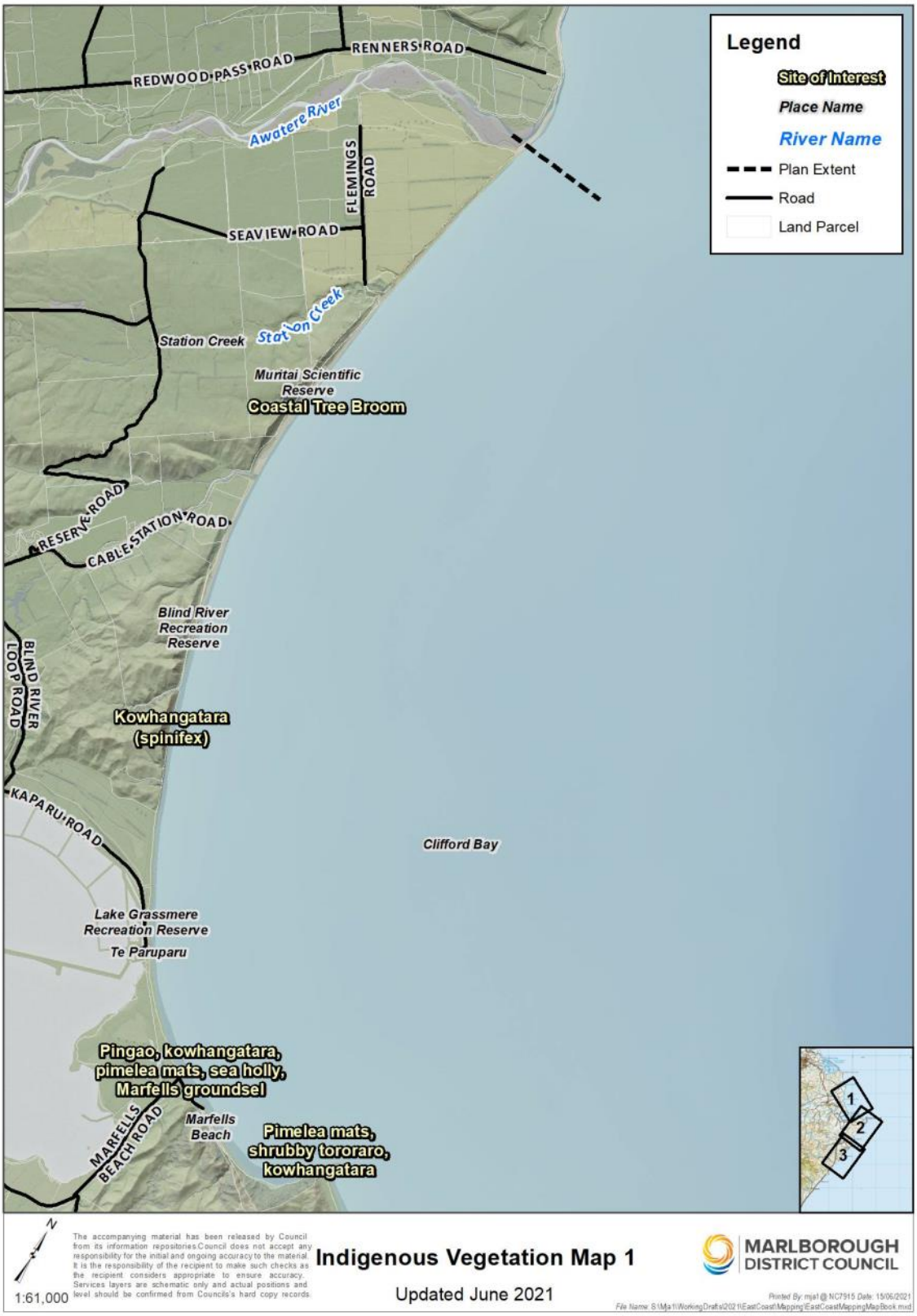
May 2021

Metric Map Sheet	NZAA file Reference	Site Description
P28	17	Pit/Terrace
P29	40	Transport/communication
P29	4	Midden/Oven
P29	5	Burial/cemetery
P29	2	Midden/Oven
P29	23	Pit/Terrace
P29	3	Pit/Terrace
Q29	9	Midden/Oven
Q29	8	Midden/Oven
Q29	5	Pit/Terrace
Q29	4	Pit/Terrace
Q29	1	Midden/Oven
Q29	2	Cached Patu (Artefact find)
Q29	12	Midden/Oven
Q29	6	Burial/cemetery
Q29	13	Military (non-Maori)
Q29	3	Artefact find –Te Karaka
Q29	7	Midden/Oven
P29	36	Unclassified
Q29	11	Midden/Oven
Q29	10	Midden/Oven
P29	38	Midden/Oven
P29	39	Midden/Oven
P29	6	Artefact find
P29	20	Industrial
P29	19	Industrial
P29	21	Clay pit

Metric Map Sheet	NZAA file Reference	Site Description
P29	22	Historic - domestic
P29	18	Cement/lime works
P29	7	Working area
P29	8	Midden/Oven
P29	9	Midden/Oven
P29	10	Midden/Oven
P29	11	Midden/Oven
P29	12	Midden/Oven
P29	13	Midden/Oven
P29	14	Midden/Oven
P29	15	Midden/Oven
P29	16	Midden/Oven
P29	17	Midden/Oven

Appendix 2: Indigenous Vegetation (Maps 1-3)

Note: The locations identified in the following maps are indicative only. The reality is that the species of vegetation presented here can be scattered along the coast.




Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
Bowler Reef
Pimelea mats, muehlenbeckia ephedroides
Shepherdess Reef
Coastal mat daisy, sand tussock, shrubby tororaro, sea holly, kowhangatara
Pimelea mats, shrubby tororaro, kowhangatara
Mount Tako
Marfells Beach Recreation Reserve
Marfells Beach
Pingao
Fishermans Creek
Coastal mat daisy, pingao, kowhangatara, sand tussock, sand coprosma, pimelea mats, prostrate matagouri, shrubby tororaro
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Boo Boo Stream
Sea holly
TAWATE ROAD
Coastal mat daisy, sand tussock, kowhangatara
STATE HIGHWAY 1
Limestone Ridge
London Hill
Pingao, kowhangatara
Lake Elterwater
London Creek
1
2
3
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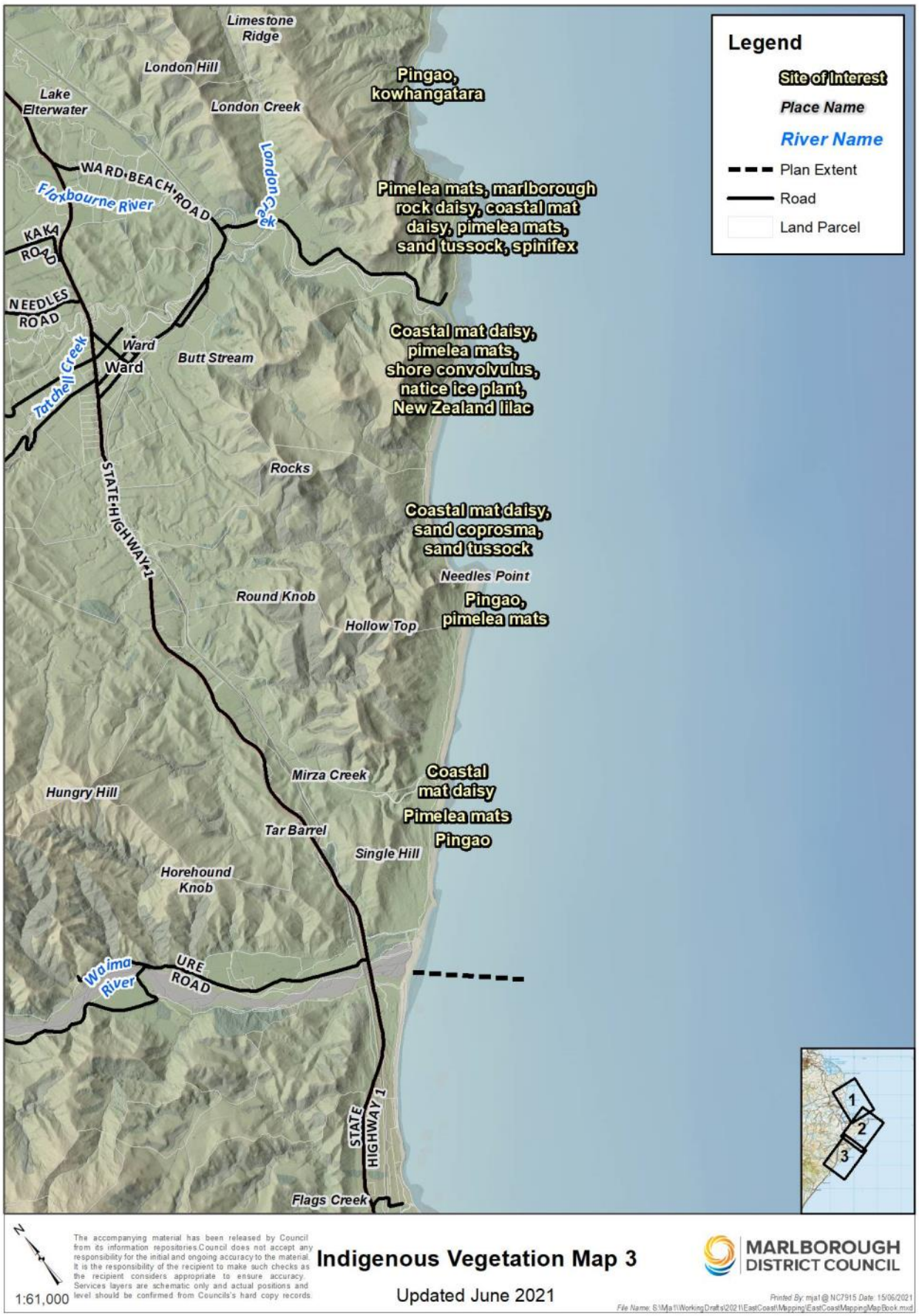
Indigenous Vegetation Map 2
Updated June 2021
MARLBOROUGH DISTRICT COUNCIL
Printed By: mjaf @ NC7915 Date: 15/06/2021
File Name: S:\Mja1\WorkingDrafts\2021\EastCoast\Mapping\EastCoastMappingMapBook.mxd


Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
Limestone Ridge
London Hill
Lake Elterwater
London Creek
Pingao, kowhangatara
WARD BEACH ROAD
Floxbourne River
London Creek
Pimelea mats, marlborough rock daisy, coastal mat daisy, pimelea mats, sand tussock, spinifex
KAKA ROAD
NEEDLES ROAD
Ward
Ward
Butt Stream
Tatchell Creek
Coastal mat daisy, pimelea mats, shore convolvulus, natice ice plant, New Zealand lilac
Rocks
STATE HIGHWAY 1
Coastal mat daisy, sand coprosma, sand tussock
Needles Point
Round Knob
Pingao, pimelea mats
Hollow Top
Mirza Creek
Coastal mat daisy
Pimelea mats
Pingao
Hungry Hill
Tar Barrel
Single Hill
Horehound Knob
Waima River
URE ROAD
STATE HIGHWAY 1
Flags Creek
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Indigenous Vegetation Map 3
Updated June 2021
MARLBOROUGH DISTRICT COUNCIL
Printed By: mjat @ NC7915 Date: 15/06/2021
File Name: S:\Mjat1\Working Drafts\2021\EastCoast\Mapping\EastCoastMappingMapBook.mxd

Conservation status

The New Zealand Threat Classification System (NZTCS) is explained on the NZTCS website at https://nztcs.org.nz/. Its inclusion here is to provide a reference to explain the NZTCS categories identified for the indigenous vegetation and fauna species included in this report. For each species a factsheet has been prepared that includes their classifications. A black border identifies the relevant classification. The focus has been on those species that are Threatened or At Risk-Declining. In some cases the species itself may not be threatened but their host species might be and vice versa.

The conservation status of a species is a forecast based on observed trends and likely pressures. As new threats emerge after the earthquake the status of the species present on the east coast may alter as a result of the natural processes of recovery or from interference from external pressures.

In the NZTCS endangered and threatened mean two different things.

- A threatened species is an umbrella term used to describe a range of threat categories.
- An endangered species is one specific threat category.

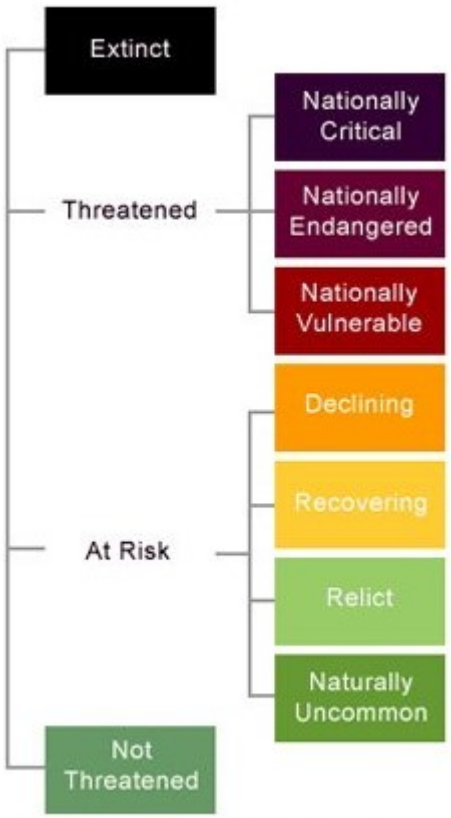

Figure 61: New Zealand Threat Classification System.
[Source: https://nztcs.org.nz/]

Threatened

Threatened species have the greatest risk of extinction.

- **Nationally Critical:** most severely threatened, facing an immediate high risk of extinction.
- **Nationally Endangered:** facing high risk of extinction in the short term.
- **Nationally Vulnerable:** facing a risk of extinction in the medium term.

At Risk

At Risk species are not considered Threatened, but could quickly become so if declines continue, or a new threat arises.

- **Declining:** population declining but still common.
- **Recovering:** Small population but increasing after previously declining.
- **Relict:** small population stabilised after declining.
- **Naturally uncommon:** naturally small population and therefore susceptible to harmful influences.

Index of fact sheets for indigenous vegetation

Common name	Scientific name	Conservation status
Coastal mat daisy/scabweed	*Raoulia australis*	At Risk - Declining
Coastal mat daisy/scabweed	*Raoulia aff. hookeri "coast"*	At Risk - Declining
Coastal tree broom	*Carmichaelia muritai*	Threatened – Nationally Endangered [2017]
Kowhangatara	*Spinifex sericeus*	Not threatened [2017]
Marfells groundsel	*Senecio hauwai*	Threatened – Nationally Endangered [2017]
Matagouri	*Discaria toumatou*	At Risk – Declining [2018]
New Zealand ice plant/Horokaka	*Disphyma australe*	Not threatened
New Zealand native daphne	*Pimelea prostrata*	Not threatened [2017]
Pīngao	*Ficina spiralis*	At Risk – Declining [2017]
Sand coprosma	*Coprosma acerosa*	At Risk – Declining [2017]
Sand tussock/hinarepe	*Poa billardierei*	At Risk – Declining [2017]
Sea holly	*Eryngium vesiculosum*	Threatened – Nationally Vulnerable [2017]
Shrubby tororaro	*Muehlenbeckia astonii*	Threatened – Nationally Endangered [2017]
	Muehlenbeckia ephedroides	Threatened – Nationally Vulnerable [2017]

Coastal mat daisy/scabweed (*Raoulia australis)*

Description

Raoulia australis forms compact large amorphous grey cushion-like masses with only the growing tips visible above the sand. This species is flatter and less robust than *Raoulia aff. hookeri* "coast."

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Largest population of this threatened species in the South Island, possibly NZ.

Habitat

Open stable sand dune and pea gravel. *Raoulia sp* grows in coastal sand dune areas, forming very fine and dense growths, often in association with pimelea mats and sand tussock.

Location on Marlborough's East Coast

Raoulia sp has been found these locations; Cape Campbell/Te Karaka, Canterbury Gully, Long Point, Mirza Stream, Needles Point. A survey is required to confirm the distribution of the two species, *Raoulia australis* and *Raoulia aff. hookeri* "coast."

Observations following the earthquake

Not known

Potential threats

- Loss of dune habitat by development and cultivation.
- Competition from marram grass and other invasive weeds.
- Damage by vehicles driving on beaches and dunes, preventing establishment on new dune systems.

Coastal mat daisy/scabweed (*Raoulia aff. hookeri* "coast")

Description

Raoulia aff. hookeri "coast" forms compact large amorphous grey cushion-like masses with only the growing tips visible above the sand. Due to their shape and form, the plant clusters resemble sheep from afar, this giving them their alternate name, vegetable sheep.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Largest population of this threatened species in the South Island, possibly NZ.

Habitat

Open stable sand dune and pea gravel. *Raoulia* aff. *hookeri* "coast" grows in coastal sand dune areas, forming very fine and dense growths, often in association with pimelea mats and sand tussock.

Location on Marlborough's East Coast

Raoulia sp has been found these locations; Cape Campbell/Te Karaka, Canterbury Gully, Long Point, Mirza Stream, Needles Point. A survey is required to confirm the distribution of the two species, *Raoulia australis* and *Raoulia aff. hookeri* "coast."

Observations following the earthquake

2016-2019: No impact from the earthquake other than vehicles being able to access its habitat, especially at Mirza Stream, Needles Point and Long Point.

2021: Populations on terraces that have been raised are being invaded by other terrestrial species, especially grasses whilst new plants are colonising the new bare areas of raised pea gravel. [Jan Clayton-Greene, DOC]

This species is protected at Cape Campbell/Te Karaka and Canterbury Gully by farm boundary fences and partially protected at Needles Point.

Potential threats

- Loss of dune habitat by development and cultivation.
- Competition from marram grass and other invasive weeds.
- Damage by vehicles driving on beaches and dunes, preventing establishment on new dune systems.

Coastal tree broom (*Carmichaelia muritai*)

Description

A leafless tree up to 6 metres tall. Twigs oval in cross section, smooth, lower twigs drooping. Flowers on racemes, and are white with intense purple violet markings. Fruit a small pod containing 1-2 hard yellowish seeds. An attractive endemic tree broom only found in coastal South Marlborough.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	**Threatened – Nationally Endangered**	Threatened – Nationally Critical

Population

Two of only three known populations in New Zealand occur in the focus area. Small population due to historical clearing of vegetation for farming and browsing by animals.

Habitat

Dry coastal cliffs, specifically associated with the “Great Marlborough Conglomerate.”

Location on Marlborough’s East Coast

Coastal cliffs of South Marlborough including Clifford Bay.

Observations following the earthquake

Destabilising of cliff habitat and coastal erosion may impact habitat.

The population at White Bluffs/Te Parinui o Whiti - Plants lost from earthquake slips and then further plants lost due to erosion and slips during the following cyclones.

Potential threats

- Coastal erosion.
- Browsing by goats and other ungulates.
- Climate extremes – including drought and storm events.
- Fire.

Kowhangatara (*Spinifex sericeus*)

Description

A stoloniferious (creeping grass) with leaves covered in silky hairs which gives plants a silvery green colour. Individual plants are either male or female. The female plant produces the 'tumbleweed' of seeds, the male plant has compact flowers in a 'fan.'

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

The most important remaining native sand binding plant in Marlborough, but only scattered populations remain. Declining in Marlborough due to marram domination and browse by cattle and rabbits.

Habitat

Mobile sand dunes especially the storm high tide faces.

Location on Marlborough's East Coast

- Clifford Bay.
- Marfells Beach.
- Mussel Point.
- Cape Campbell/Te Karaka.
- Canterbury Gully.
- Long Point.

Observations following the earthquake

Uplifting and new dune creation is giving kowhangatara/spinifex an opportunity to colonise new areas and is the subject of current research. Vehicles are currently able to access its habitat.

Potential threats

- Competition from marram grass.
- Browsing by cattle and rabbits.
- Damage by vehicles driving on beaches and dunes, preventing establishment on new mobile dune systems.

Marfells grounsel (*Senecio hauwai*)

Photo: Jan Clayton-Greene, DOC.

Description

A small native groundsel with small yellow flowers. Leaves are fleshy and divided.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Marfells Beach and several other scattered locations.

Habitat

Calcareous siltstone.

Location on Marlborough's East Coast

Endemic to the coastal cliffs between White Bluffs/Te Paranui o Whiti and Marfells Beach.

Observations following the Earthquake

Not known.

Potential threats

- Weed invasion.
- Erosion events.

Matagouri (*Discaria toumatou*)

Description

Spiky grey shrub with many zig-zagging long flexible twigs bearing long (up to 5cm long) green spines interspersed with small oval dark green leaves. Bark rough, broken into squares. Leaves 10-20mm long. Flowers small, white, inconspicuous. Fruit a dry, 3 sided capsule.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Very uncommon in the North Island. In the South Island mainly east of the main divide, appearing to avoid areas of high rainfall.

Habitat

Inland grow as large shrubs, on the coast grow as prostrate mats on the shingle beach terraces.

Location on Marlborough's East Coast

Cape Campbell

Observations following the Earthquake

Not known.

Potential threats

- .

New Zealand ice plant / horokaka (*Disphyma australe*)

Description

A creeping succulent with a sprawling habit, green/red leaves which are 3 angled. Flowers are white to deep pink in colour which open and close to the light levels.

Photo: Jan Clayton-Greene, DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Scattered populations along coast.

Habitat

Tolerates very dry salty conditions often found on coastal cliffs and rocks

Location on Marlborough's East Coast

Chancet Rocks, Needles Point and other rock outcrops along the coast.

Observations following the Earthquake

Not known.

Potential threats

- Competition and hybridisation with much larger garden escapee.
- Damage by vehicles.

New Zealand native daphne (*Pimelea prostrata*)

Description

A low prostrate shrub with grey-green leaves and clusters of small white flowers, which are then followed by small fleshy white berries.

Photo: Jan Clayton-Greene, DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Scattered populations along coast.

Habitat

Gravel and sandy terraces and dunes.

Location on Marlborough's East Coast

Scattered populations.

Observations following the earthquake

Not known.

Potential threats

- Loss of dune habitat by development and cultivation.
- Vulnerable to disturbance by vehicles especially if it colonises new bare areas.
- Marram grass, pasture grasses and other weeds invading its habitat.

Photo: Jan Clayton-Greene, DOC

Pīngao (*Ficinia spiralis*)

Description

Golden sand sedge is one of the major native sand binding plants suited to sand dunes. It has stiff golden leaves and grows rhizomatously.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Scattered and declining in the region. Is now rarely found but was once abundant.

Habitat

Mobile sand dunes especially foredunes which it is suited to.

Location on Marlborough's East Coast

Restricted to a few scattered remnant colonies near Marfells Beach, Cape Campbell/Te Karaka, Canterbury Gully, Long Point, Needles Point and Mirza Stream. In dune country above high tide.

Observations following the earthquake

This species is protected at Cape Campbell/Te Karaka and Canterbury Gully by farm boundary fences, elsewhere vulnerable to vehicle disturbance. UC research has recorded recent evidence of pīngao decline.

Potential threats

- Loss of dune habitat by development and cultivation.
- Competition from marram grass and other weeds.
- Stabilisation of dunes by succession.
- Browsing by cattle and rabbits.
- Damage by vehicles driving on beaches and dunes preventing re-establishment on the "new" mobile dune.

Sand coprosma (*Coprosma acerosa*)

Description

Sand coprosma is a sprawling, low growing bush with narrow small leaves. Twigs are orange.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Only two populations are known in the region.

Habitat

Stable sand dunes.

Location on Marlborough's East Coast

- Canterbury Gully.
- Cape Campbell Farm.

Observations following the earthquake

This species is protected at Cape Campbell/Te Karaka and Canterbury Gully by farm boundary fences.

Potential threats

- Loss of dune habitat by development and/or cultivation of its habitat.
- Competition from marram grass and other weeds.
- Unable to recolonise new areas due to disturbance from vehicles.
- Browsing by rabbits.

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Sand tussock / hinarepe (*Poa billardierei*)

Description

Similar to silver tussock only smaller and a distinctive yellow colour. Seed heads are compact and do not extend beyond the height of leaves.

Photo: Jan Clayton-Greene, DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Small isolated populations. Now restricted to populations at Canterbury Gully, Chancet Rocks, Long Point andeedles Point.

Habitat

Open stable sand dune terraces and dune hollows.

Location on Marlborough's East Coast

Canterbury Gully.

Observations following the earthquake

No impact from the earthquake other than vehicles being able to access its habitat.

This species is protected at Cape Campbell/Te Karaka and Canterbury Gully by farm boundary fences.

Potential threats

- Competition from marram grass and other invasive weeds.
- Browsing by cattle and rabbits.
- Damage by vehicles driving on beaches and dunes, preventing establishment on new dune systems.
- Storm surges eroding habitat.

Sea holly (*Eryngium vesiculosum*)

Description

Sea holly is a small prickly endemic coastal herb.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Near Long Point and at Marfells Beach.

Habitat

Coastal turfs and seasonally damp areas.

Location on Marlborough's East Coast

Scattered along the coast.

Observations following the earthquake

No impact from the earthquake other than vehicles being able to access its habitat.

Potential threats

- Loss of dune habitat from development and cultivation.
- Pasture grasses and other weeds invading its habitat.

Shrubby tororaro (*Muehlenbeckia astonii*)

Description

A divaricating shrub with zig-zagging branchlets and heart shaped leaves. Individual shrubs can reach up to 4 metres high and 4 metres wide. Male and female flowers occur on separate plants.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	**Threatened – Nationally Endangered**	Threatened – Nationally Critical

Population

Scattered individuals along the coast.

Habitat

Shrublands on toe slopes, back dunes, and alluvial terraces. Often single individuals left after land clearance.

Location on Marlborough's East Coast

Scattered individuals and remnant populations.

Observations following the earthquake

Not known.

Potential threats

- Clearance activities.
- Lack of recruitment. Fragmentation means there are often lone individuals unable to reproduce. Long grass swards inhibit germination and seed predation from introduced species such as mice.
- Browsing of seedlings and damage to adult plants from stock.

Muehlenbeckia ephedroides

Photo: Jan Clayton-Greene, DOC.

Description

A prostrate leafless shrub – appears to be a mat of grey-green to grey-black seemingly dead sticks lying on the gravels, has small flowers and black seeds inside a fleshy fruit.

Current conservation status.

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Population

Scattered along the coastal gravel terraces.

Habitat

Gravel terraces and dunes.

Location on Marlborough's East Coast

Scattered.

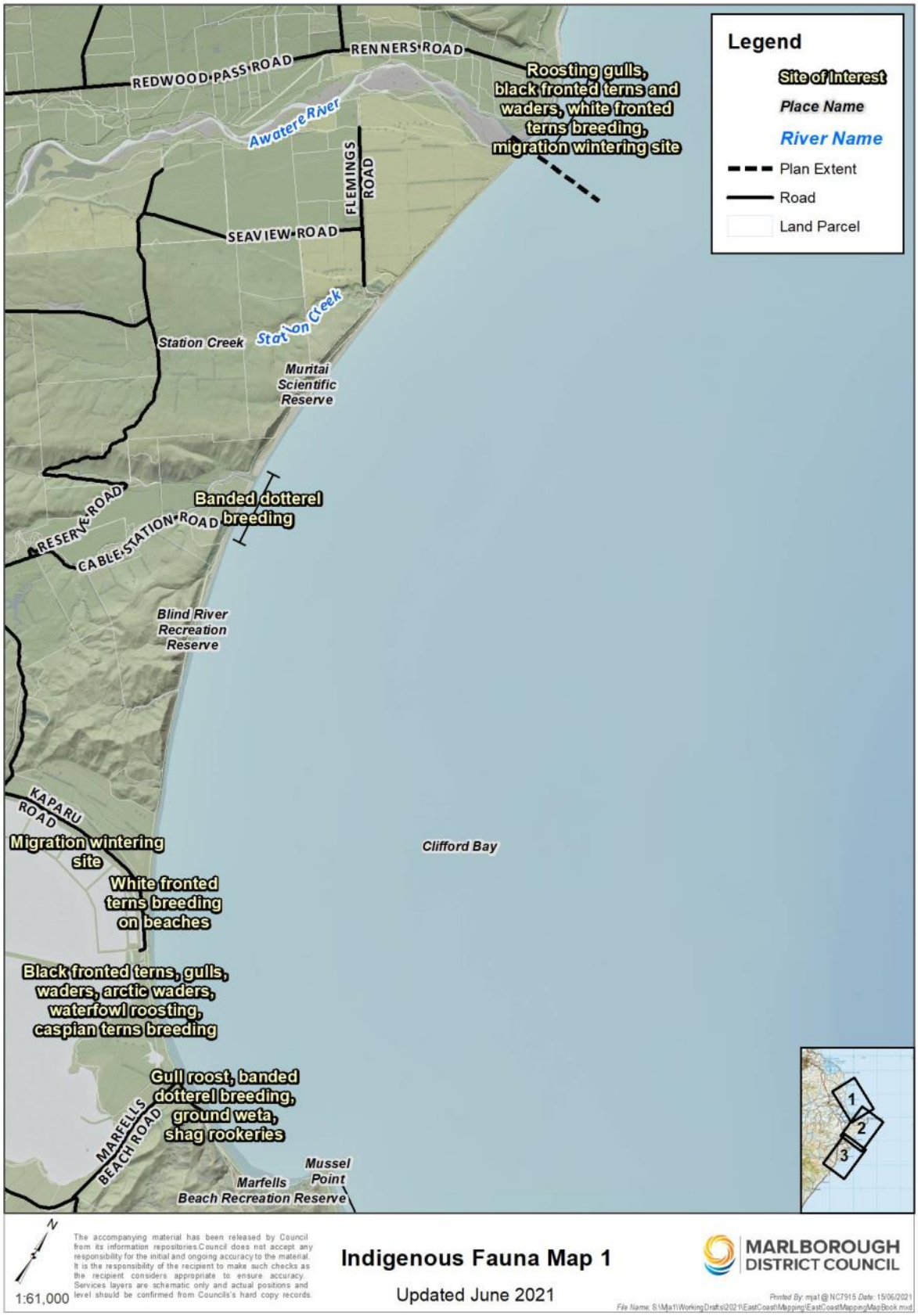
Observations following the earthquake

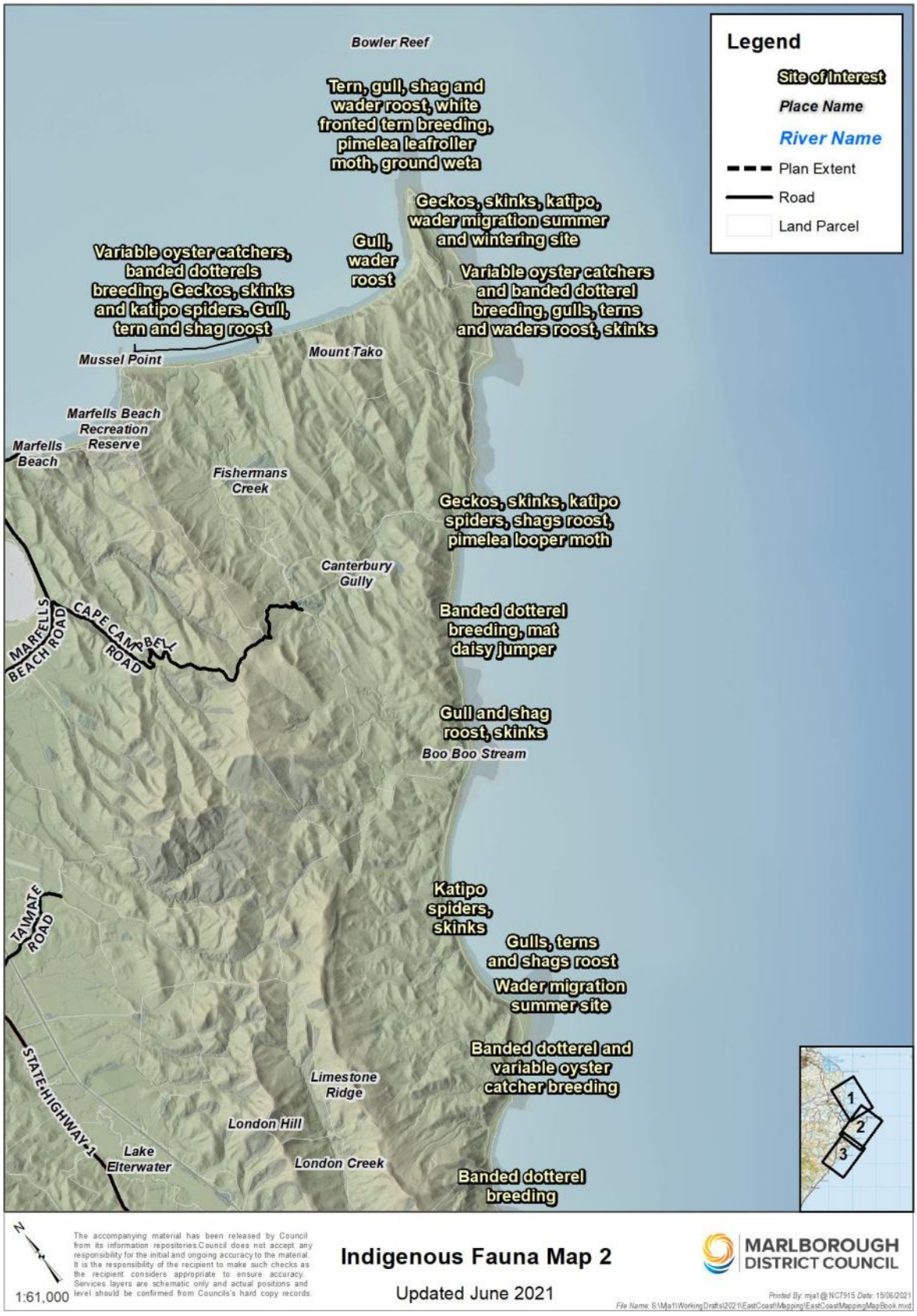
It will colonise new bare gravel areas if left undisturbed.

Potential threats

- Loss of dune habitat from development and cultivation.
- Vulnerable to disturbance by vehicles if it colonises in new bare areas.
- Marram grass and pasture grasses invading its habitat.

Appendix 3: Fauna (Maps 1-3)




Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
Bowler Reef
Tern, gull, shag and wader roost, white fronted tern breeding, pimelea leafroller moth, ground weta
Geckos, skinks, katipo, wader migration summer and wintering site
Gull, wader roost
Variable oyster catchers, banded dotterels breeding. Geckos, skinks and katipo spiders. Gull, tern and shag roost
Variable oyster catchers and banded dotterel breeding, gulls, terns and waders roost, skinks
Mussel Point
Mount Tako
Marfells Beach Recreation Reserve
Marfells Beach
Fishermans Creek
Geckos, skinks, katipo spiders, shags roost, pimelea looper moth
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Banded dotterel breeding, mat daisy jumper
Gull and shag roost, skinks
Boo Boo Stream
TAMAIKE ROAD
Katipo spiders, skinks
Gulls, terns and shags roost
Wader migration summer site
Banded dotterel and variable oyster catcher breeding
STATE HIGHWAY 1
Limestone Ridge
London Hill
Lake Elterwater
London Creek
Banded dotterel breeding
1
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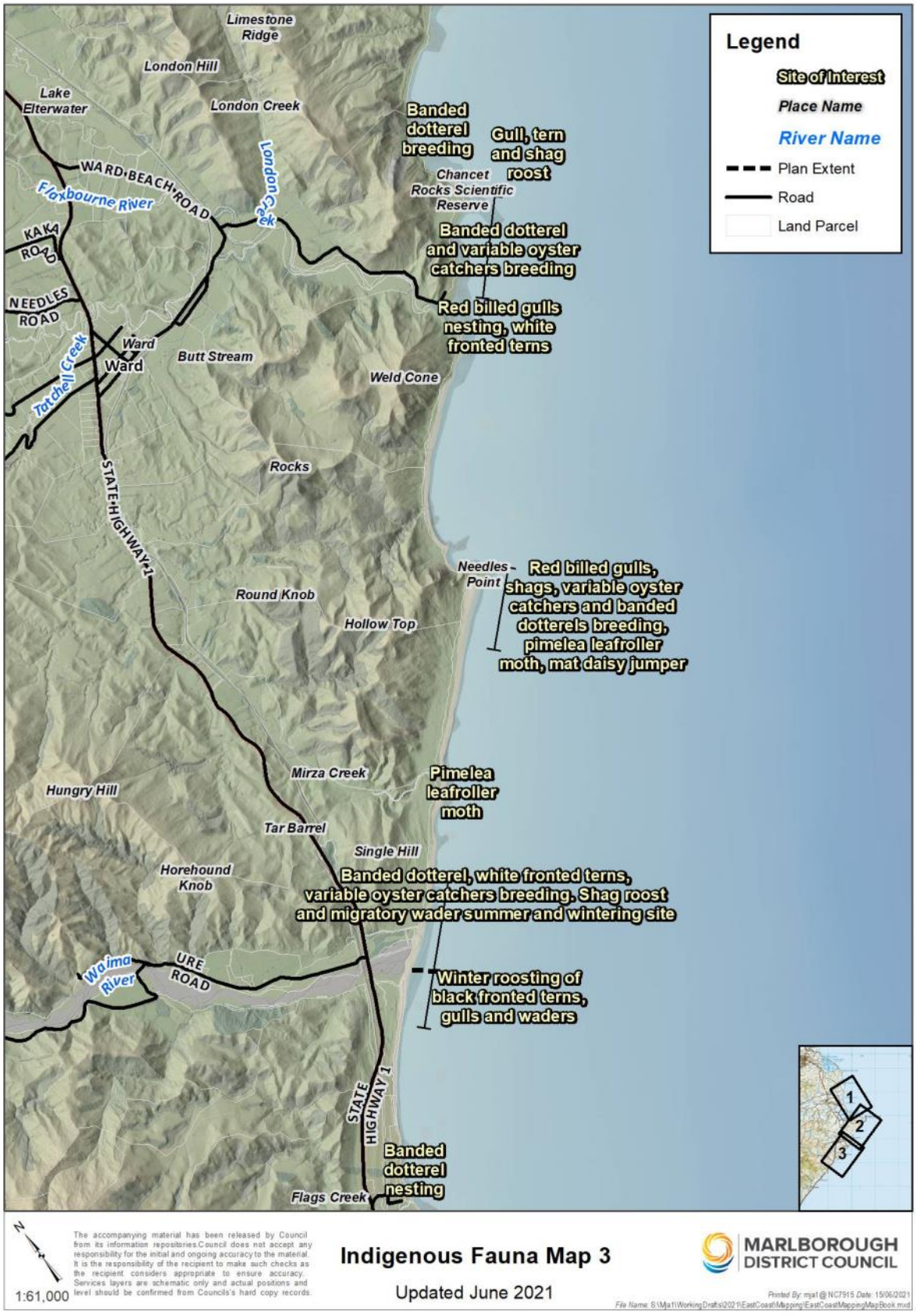
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Banded dotterel breeding
Gull, tern and shag roost
Chancet Rocks Scientific Reserve
WARD BEACH ROAD
Flaxbourne River
London Creek
KAKA ROAD
Banded dotterel and variable oyster catchers breeding
NEEDLES ROAD
Red billed gulls nesting, white fronted terns
Ward
Ward
Butt Stream
Tatchell Creek
Weld Cone
Rocks
STATE HIGHWAY 1
Needles Point
Red billed gulls, shags, variable oyster catchers and banded dotterels breeding, pimelea leafroller moth, mat daisy jumper
Round Knob
Hollow Top
Mirza Creek
Pimelea leafroller moth
Hungry Hill
Tar Barrel
Single Hill
Horehound Knob
Banded dotterel, white fronted terns, variable oyster catchers breeding. Shag roost and migratory wader summer and wintering site
Waima River
URE ROAD
Winter roosting of black fronted terns, gulls and waders
STATE HIGHWAY 1
Banded dotterel nesting
Flags Creek
1
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Indigenous Fauna Map 3
Updated June 2021
MARLBOROUGH DISTRICT COUNCIL

Conservation status

The New Zealand Threat Classification System (NZTCS) is explained on the NZTCS website at https://nztcs.org.nz/. Its inclusion here is to provide a reference to explain the NZTCS categories identified for the indigenous vegetation and fauna species included in this report. For each species a factsheet has been prepared that includes their classifications. A black border identifies the relevant classification. The focus has been on those species that are Threatened or At Risk-Declining. In some cases the species itself may not be threatened but their host species might be and vice versa.

The conservation status of a species is a forecast based on observed trends and likely pressures. As new threats emerge after the earthquake the status of the species present on the east coast may alter as a result of the natural processes of recovery or from interference from external pressures.

In the NZTCS endangered and threatened mean two different things.

- A threatened species is an umbrella term used to describe a range of threat categories.
- An endangered species is one specific threat category.

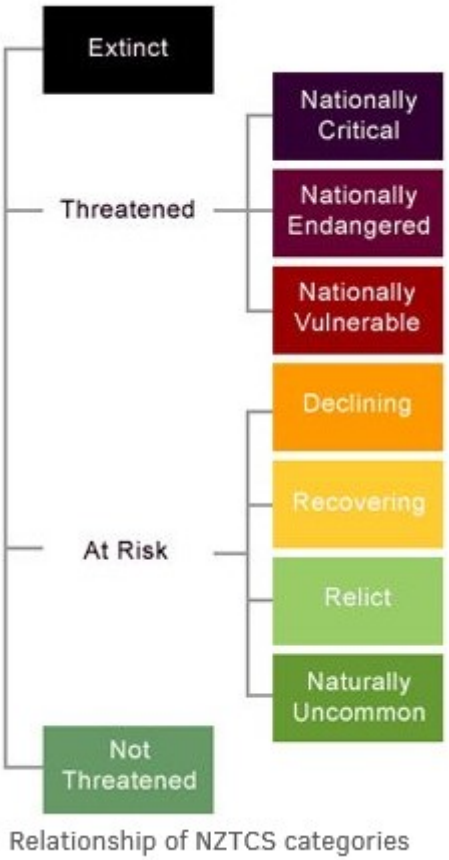


Figure 62: New Zealand Threat Classification System.
[Source: https://nztcs.org.nz/]

Threatened

Threatened species have the greatest risk of extinction.

- **Nationally Critical:** most severely threatened, facing an immediate high risk of extinction.
- **Nationally Endangered:** facing high risk of extinction in the short term.
- **Nationally Vulnerable:** facing a risk of extinction in the medium term.

At Risk

At Risk species are not considered Threatened, but could quickly become so if declines continue, or a new threat arises.

- **Declining:** population declining but still common.
- **Recovering:** Small population but increasing after previously declining.
- **Relict:** small population stabilised after declining.
- **Naturally uncommon:** naturally small population and therefore susceptible to harmful influences.

Index of fact sheets for fauna

Type	Common name	Scientific name	Conservation status
Bird (wader)	Banded dotterel	*Charadrius bicinctus*	Threatened – Nationally Vulnerable
Bird (wader)	Bar-tailed godwit	*Limosa lapponica*	At Risk - Declining
Bird (gull)	Black-backed gull	*Larus dominicanus*	Not threatened
Bird (gull)	Black billed gull	*Larus bulleri*	Threatened – Nationally Critical
Bird (tern)	Black-fronted tern	*Chlidonias albostriatus*	Threatened – Nationally Endangered
Bird (tern)	Caspian tern	*Hydroprogne caspia*	Threatened – Nationally Vulnerable
Bird	Huttons shearwater	*Puffinus huttoni*	Threatened – Nationally Vulnerable
Bird	Pied shag	*Phalacrocorax varius*	At Risk - Recovering
Bird (gull)	Red billed gull	*Larus novaehollandiae scopulinus*	At Risk - Declining
Bird (wader)	Ruddy turnstone	*Arenaria interpres*	Migrant
Bird	Southern blue penguin	*Eudyptula minor minor*	At Risk - Declining
Bird (wader)	South Island pied oystercatcher	*Haematopus finschi*	At Risk - Declining
Bird (wader)	Variable oystercatcher	*Haematipus unicolour*	At Risk - Recovering
Bird (tern)	White fronted tern	*Sterna striata striata*	At Risk - Declining
Bird (wader)	Wrybill	*Anarhynchus frontalis*	Threatened – Nationally Vulnerable
Reptile	Marlborough spotted skink	*Oligosoma aff.lineoocellatum* "South Marlborough"	Threatened – Nationally Vulnerable
Reptile	Minimac gecko	*Woodworthia* "Marlborough mini"	Not threatened
Reptile	Raukawa gecko	*Woodworthia maculata*	Not threatened
Reptile	Waiharakeke grass skink	*Oligosoma aff.polychroma Clade 2*	At Risk - Declining
Invertebrate	Black cockroach	*Platyzosteria novaeseelandiae*	Not threatened
Invertebrate	Ground weta	*Hemiandrus* "Cape Campbell"	Not threatened
Invertebrate	Katipo	*Latrodectus katipo*	At Risk - Declining
Invertebrate	Mat-daisy jumper	*Kiwaia* "Cloudy Bay"	Threatened – Nationally Critical
Invertebrate	Pimelea leafroller moth	*Ericodesma aerodana*	At Risk - Declining

Type	Common name	Scientific name	Conservation status
Invertebrate	Pimelea looper moth	*Notoreas perornata* “Cape Campbell”	Threatened – Nationally Endangered
Invertebrate	Sand scarab beetle	*Pericoptus truncatus*	
Invertebrate	Seashore earwig	*Anisolabis littorea*	
Invertebrate	Stone Moth	*Dichromodes* “Cloudy Bay”	Threatened – Nationally Endangered

Banded dotterel (*Charadrius bicintus*)

Description

A small brown bird with a white chest and distinctive thin black band and broad chestnut band.

Photo: Mike Bell

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Spread along the length of the East Coast on areas of pea gravel and especially near fresh water seeps, ponds or streams.

Important breeding areas along the coast include Cape Campbell/Te Karaka, Mussel Point, the Airstrip, Long Point, Ward Beach to Chancet Rocks and Waima (Ure) River to Needles Point.

Habitat

Endemic wading bird which nests on the coastal pea gravel habitat and beaches as well as inland on braided rivers.

Nest above the high tide mark. Dotterels defend their territory during the breeding season.

Feed on hoppers and invertebrates on wet sand just above the surge zone.

Observations following the earthquake

Evidence of increased areas available for nesting in some places.

Negative impacts from the earthquake associated with increased vehicle traffic being able to access its habitat with related disturbance effects.

Potential threats

- Predation by introduced mammals.
- Disturbance of habitat by people, dogs and vehicles.

Bar-tailed godwit (*Limosa lapponica*)

Description

The bar-tailed godwit is the most common Arctic migrant in New Zealand. It is a large long-legged wader, predominantly brown above, pale below, with a long tapering and slightly upturned bi-coloured bill, pink at the base and black towards the tip. Males are markedly smaller with shorter bills than females.

Photo: Craig McKenzie

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Cape Campbell, south to Canterbury Gully. Following the breeding season, birds generally begin arriving from early September, usually after a non-stop 8-9 days flight. They begin departing on northern migration from early March, heading for refuelling sites around the Yellow Sea. They do not breed until their third or fourth year, so each southern winter there are hundreds of non-breeding birds remaining in New Zealand.

Habitat

Bar-tailed godwits forage over the intertidal zone at low tide – either individually dispersed or in loose formations. They congregate in flocks at high tide roosts, but can be extremely wary birds, often difficult to closely approach at New Zealand sites.

Observations following the earthquake

Not known

Potential threats

- Predation by introduced mammals.
- Disturbance of habitat by people, dogs and vehicles.
- Bar-tailed godwits are fully protected in New Zealand. Current count data indicates an annual population decline of nearly 2%, the primary driver of which is extensive habitat loss at staging areas in the Yellow Sea region. Godwits tend to be wary and easily spooked, and so preventing or minimising disturbance at high tide roost sites is an important conservation consideration.

Black-backed gull (*Larus dominicanus*)

Description

A familiar large gull throughout New Zealand. Adults have white head and underparts with black back, yellow bill with red spot near tip of lower mandible, and pale green legs. Juveniles are dark mottled brown with black bill and legs; their plumage lightens with age until they moult into adult plumage at 3 years old.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Common throughout. The southern black-backed gull (or 'black-back') is one of the most abundant and familiar large birds in New Zealand

Habitat

Abundant where food can be obtained, including estuaries and harbours, rocky and sandy shores, and riverbeds.

Observations following the earthquake

Not known.

Potential threats

Black-billed gull (*Larus bulleri*)

Description

They have long, thin black beaks that are easily distinguished from the shorter and stouter bright red beak of the red-billed gull (although juvenile red-billed gulls have dark beaks that turn red as they age). They are a similar size to red-billed gulls, but have paler wings and a thinner black border on the wingtips.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Mirza Stream.

Habitat

Black-billed gulls mostly breed on sparsely-vegetated gravels on inland riverbeds and rivermouths The majority of the population nests in Southland. After the breeding season, most South Island birds migrate to the coast, though movement patterns are poorly known.

Observations following the earthquake

Not known.

Potential threats

- Predation.
- Disturbance of habitat by people, dogs and vehicles.

Black fronted tern (*Chlidonias albostriatus*)

Description

A smallish grey tern with black cap, orange bill and legs.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Uses the coast in the winter season, roosting on rocks and sand and at Lake Grassmere/Kapara Te Hau after feeding along the coast. Nests inland on braided rivers.

Overwinters on the coast and at Lake Grassmere/Kapara Te Hau. Feeds along the coast and roosts at Mussel Pt, Cape Campbell/Te Karaka.

Habitat

Feeds on plankton offshore and roosts on the coast with other tern and gulls when not feeding.

Observations following the earthquake

More prone to disturbance now that more people use the coast environment.

Potential threats

- Predation by introduced mammals.
- Disturbance of roosting habitat by people and vehicles.

Caspian tern (*Hydroprogne caspia*)

Description

The Caspian tern is the largest of all species of terns. With its 1 metre wingspan, it is similar in size to a black-backed gull. Caspian terns are silver-grey above and white below, with dark wing tips. The tail is relatively short and only slightly forked compared to other terns. The large bill is mostly bright red in adults, becoming dark near the tip, with the extreme tip yellowish (only apparent at close range). Adults have black legs and a black cap to below the eye during the breeding season. The cap becomes speckled with white and less sharply delineated at other times of the year.

Photo: DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	**Threatened - Nationally Vulnerable**	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Scattered along the coast

Habitat

Caspian terns are found on sheltered bays, harbours and estuaries. They breed mainly on open coastal shell banks and sandspits.

Observations following the earthquake

Not known

Potential threats

- Predation by introduced mammals.
- Disturbance of roosting habitat by people and vehicles.

Hutton shearwater/Kaikōura titi (*Puffinus huttoni*)

Description

The Hutton's shearwater is a small black and white shearwater, 36-38 cm in length with a wingspan of about 75 cm. The upper parts are uniform brownish black. The dark brown of the cap extends below the eye merging into the white of the chin and throat. The dark hindneck extends down behind the cap to form a broad collar almost encircling the neck and upper breast. The rest of the underbody extending from the lower breast to the undertail coverts is white except for a small dark patch on the thigh and the sides of the undertail coverts. The underwing is off-white with broad brownish borders with extensive dusky grey armpits. Bill is long, slender, and dark grey. Iris brown. Leg is light to dark pink and mauve on the inside and pink and dark grey outside; feet pink with black webs.

Photo: DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

During the breeding season (August to March), Hutton's shearwaters are present over the inshore coastal waters off Kaikōura. They fly low over the water and congregate in large flocks (rafts) before their evening flights to the mountain colonies. Only two colonies remain in the Seaward Kaikōura Range, on steep tussock-covered mountain slopes above 1,200 – 1,800 m altitude – making Hutton's shearwaters the highest breeding seabirds in the world.

There are sightings and beach-wrecked birds from Northland to Foveaux Strait, including East Cape and Westland, though it is apparent that the bulk of the population stays between Cape Campbell and Banks Peninsula, off the north-east coast of the South Island, when breeding.

Outside the breeding season Hutton's shearwaters are migratory and most are absent from New Zealand waters. Adults fitted with geo-locators revealed details of their winter migration to Australia, where birds spend the non-breeding season feeding in warm fish-rich coastal waters, never making landfall.

Habitat

During the breeding season (August to March), Hutton's shearwaters are present over the inshore coastal waters off Kaikōura. They fly low over the water and congregate in large flocks (rafts) before their evening flights to the mountain colonies. Only two colonies remain in the Seaward Kaikōura Range, on steep tussock-covered mountain slopes above 1,200 – 1,800 m altitude – making Hutton's shearwaters the highest breeding seabirds in the world.

Observations following the earthquake

Damage to colonies through rockfall.

Potential threats

- Habitat loss and predation by introduced mammals outside the area of interest.

Pied shag (*Phalacrocorax varius*)

Description

A large coastal black and white shag which nests in colonies in trees on or near the coast. Stands up to 81cm tall and has a long grey bill. They feed along the coast on small pelagic fish.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

High numbers along the coast in suitable trees, supported by a good natural food resource nearby. Shag rookeries are found at Marfells Beach and at Long Point. Away from these places they are often seen on beaches drying their wings or flying up and down the coast between the sea and their nests.

Habitat

Nest in trees behind the beach. Roost on sandy beaches all along the coast, but especially Marfells Beach, Mussel Point, Cape Campbell/Te Karaka, Canterbury Gully, Boo Boo Stream, Long Point, Ward Beach/Chancet Rocks, Needles Point, where they feed.

Observations following the earthquake

No direct effect from the earthquake other than increased disturbance of them while they roost on the high tide mark on sand and gravel beaches.

Potential threats

- Disturbance on the beach which forces them to flee while still drying their wings or digesting food.

Red billed gull (*Larus novaehollandiae scopulinus*)

Description

A grey and white gull with distinctive red bill and feet.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Large flocks congregate along the coast, roosting on the beach, rocks and islets after feeding along the coast.

They nest on rocks at Needles Point and Ward Beach.

Roosting in groups of up to thousands on Marfell's Beach, Mussel Point, Cape Campbell/Te Karaka, Long Point, Chancet Rocks, Needles Point and Waima (Ure) River mouth.

Nesting on beaches at Cape Campbell/Te Karaka and Waima (Ure) River mouth. There is often a large colony at Lake Grassmere/Kapara Te Hau. There have also been colonies at the Waima (Ure), Flaxbourne and Awatere River mouths

Habitat

Nests on beaches as well as rocks. Feeds mostly along the coast on krill.

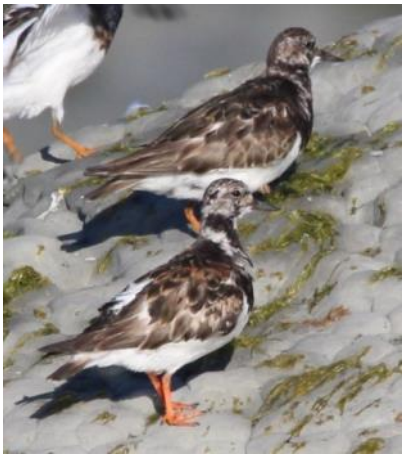
Observations following the earthquake

Not known.

Potential threats

- Predation by introduced mammals.
- Disturbance of habitat and nesting sites by people, their pets and vehicles.
- Changes in food supply due to climate change.

Ruddy turnstone (*Arenaria interpres*)



Description

The ruddy turnstone is a distinctive medium-sized, stocky dotterel-like wading bird with a short bill, short neck and short orange-red legs. It has 'tortoiseshell' plumage on the back, which is reddish-brown with blackish-brown patches on the back and upper wings, contrasting with the white underparts. The head, neck and breast are boldly pied black-and-white. A diamond-shaped white patch on the back and the white rump are prominent in flight. The short black-brown bill is wedge-shaped with a slightly upturned tip. In breeding plumage, males are slightly brighter than females. Non-breeding birds are markedly duller. Juveniles resemble non-breeding adults, but are browner with a paler head.

Current conservation status

Migrant

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Cape Campbell to Chancet Rocks. Migration south is in August-September. Birds arrive in New Zealand during August-November and depart northwards during March-May, usually forming small flocks near the coast. They are widespread in New Zealand with regular sites in summer including Parengarenga, Rangaunu, Kaipara, Manukau and Tauranga Harbours, Waipu estuary, the Firth of Thames, Farewell Spit, Motueka estuary, Lake Grassmere, Kaikoura Peninsula, and coastal lagoons or estuaries in Southland.

Habitat

Ruddy turnstones usually inhabit coastal areas, typically on rocky or stony shores, although sometimes on sandy beaches, salt marshes, mudflats, short grass and ploughed fields. Exceptionally they have been recorded on a braided river bed.

Observations following the earthquake

Not known.

Potential threats

- Predation by introduced mammals

Southern blue penguin (*Eudyptula minor minor*)

Description

A small penguin about 40cm high. Slate-blue upperparts and white below.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

The world's smallest penguin, found all over New Zealand. The population was declining in the area even prior to the earthquake, probably due to predation by introduced mammals.

Found in low numbers along the coast from Cape Campbell/Te Karaka to Wharanui but not well documented. Nocturnal so can be difficult to detect in remote places.

Habitat

Nests in burrows along the coast in rocks or under logs or vegetation.

Observations following the earthquake

Not known.

Potential threats

- Caused by predation by introduced mammals and disturbance in their nesting habitat.

South Island pied oystercatcher (*Haematopus finschi*)

Description

The 'SIPO' is one of two species of oystercatcher on the New Zealand mainland. Solidly built, it is a striking black-and-white wader with a long, stout red bill and thick pink legs. There is a sharp border on the lower breast between the black upperparts and white underparts. In flight there is a white wingbar, rump and lower back.

Photo: Dick Veitch, DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Found along the coast post breeding season between Lake Grassmere and Waima (Ure) River.

Habitat

Inland roosts at high tide, then returning to feed along the shore when the tide drops.

Observations following the earthquake

Not known.

Potential threats

- Future abundance may now be threatened by land use changes in breeding areas, pollution of winter feeding areas, and increased disturbance to feeding and roosting birds at coastal sites.

Variable oystercatcher (*Haematipus unicolour*)

Description

A wader with a long stout red bill and short pink legs. The variable oystercatcher has variable plumage ranging from pied to black.

Photo: Mike Bell

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Scattered along the length of the coast in relatively low numbers, nowhere common. Occupy the coast all year round.

Habitat

Nests on sand and pea gravel beaches and feeds on the water's edge. Defend their territory during the breeding season. Adults also feed on reef platforms.

Observations following the earthquake

- Affected by uplift of reef feeding habitat which is now devoid of marine life.
- Evidence of increased areas available for nesting in some places.
- Nesting habitat affected by vehicle disturbance.

Potential threats

- Predation by introduced mammals.
- Disturbance of habitat and nesting sites by people, their pets and vehicles.

White fronted tern (*Sterna striata striata*)

Description

The most common endemic tern nesting around the coast in New Zealand, there has been a marked decline over the last 40 years. A small tern with a long black bill. Adults are very pale grey and white with a black cap separated from the bill by a white forehead.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Large numbers of these terns associate with red billed gulls, and breed and feed along this coastline.

Nests in different sites in different years, often in association with red billed gulls. Nesting on beaches at Cape Campbell/Te Karaka and Waima (Ure) River mouth. There is often a large colony at Lake Grassmere/Kapara Te Hau. There have also been colonies at the Waima (Ure) River, Flaxbourne and Awatere River mouths.

Habitat

Feeds on pelargic fish in the surf and offshore along this coast all year round, often with red billed gulls. Roosts on the rocks and sand all along the coast.

Observations following the earthquake

More prone to disturbance now that more people use the coast environment.

Potential threats

- Predation by introduced mammals.
- Disturbance of habitat and nesting sites by people, their pets and vehicles.

Wrybill (*Anarhynchus frontalis*)

Description

Wrybills are small, pale plovers that are much more approachable than most New Zealand waders. Their underparts are white, with a black upper breast band from mid-winter to the end of the breeding season. The upper parts and sides of the face are pale grey, and the forehead white. The bill is long and black, with the distal third curved 12-26° to the right. The legs are dark grey to black. The sexes are alike in eclipse plumage; juveniles lack the black breast band. In breeding plumage, males are distinguishable by a black line above the forehead; this is highly variable however, and difficult to see in some individuals.

Photo: DOC

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Northward migration typically begins in late December, and peaks in January. Southward migration is mainly in August and early September (adults), with some first-year birds (which will not breed) following in October-November.

Habitat

The wrybill is a small pale plover which breeds only in braided rivers of the South Island. It is the only bird in the world with a laterally-curved bill (always curved to the right), which it uses to reach insect larvae under rounded riverbed stones. Wrybills are completely dependent on braided rivers for breeding; all their life stages are predominantly grey, and highly cryptic among the greywacke shingle of the riverbeds.

The wrybill is an internal migrant. After breeding, almost the entire population migrates north to winter in the harbours of the northern North Island, notably the Firth of Thames and Manukau Harbour. On their wintering grounds, wrybills form dense flocks at high-water roosts; the highly-coordinated aerial manoeuvres of these flocks have been described as resembling a flung scarf.

Observations following the earthquake

Not known.

Potential threats

- Predation by introduced mammals.

Marlborough spotted skink (*Oligosoma aff. lineocellatum* "South Marlborough")

Description

Marlborough spotted skinks are spectacular large-bodied skinks that can be brown, grey or have a greenish tinge, but are always heavily flecked and usually have a salmon belly. Marlborough spotted skinks were until recently considered part of a single and widespread species called "spotted skinks."

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	**Threatened - Nationally Vulnerable**	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Not known.

Habitat

Oligosoma skinks are both diurnal and nocturnal and occur in diverse habitats from rocky and sandy shorelines, to forests, to subalpine habitats.

Marlborough spotted skinks are likely to be found in open areas associated with exotic forestry, especially with rocky substrate.

Observations following the earthquake

Not known.

Potential threats

- Predation by introduced mammals.
- Loss and fragmentation of habitat.

Minimac gecko (*Woodworthia* "Marlborough mini")

Description

Variable patterning but generally buff coloured with markings in lighter and darker shades. Body length up to 65mm.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

The most commonly seen gecko in South Marlborough in farmland and coastal sites. Relatively common all along this coastal area wherever the habitat exists. This is a significant population.

Habitat

Lives under driftwood and in vegetation along the coast, especially along the storm high tide mark where driftwood collects.

Observations following the earthquake

Raising of the coastal zone and changing the location of the habitat there. A new storm high tide mark now exists.

Potential threats

- Mainly predation by introduced mammals.
- Loss of habitat.
- Disturbance of habitat by people and vehicles.

Raukawa gecko (*Woodworthia maculatus*)

Description

Larger (up to 82mm body length) and more striking than the Marlborough mini. Dull brown or grey with longitudinal or transverse stripes, blotches or chevron markings.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Seldom detected along this coast. Mussel Point. Rare on the mainland but common on sounds islands.

Habitat

Lives under driftwood and in vegetation along the coast, especially along the storm high tide mark where driftwood collects.

Observations following the earthquake

Raising of the coastal zone and changing the location of the habitat there. A new storm high tide mark now exists.

Potential threats

- Mainly predation by introduced mammals.
- Loss of habitat.
- Disturbance of habitat by people and vehicles.

Waiharakeke grass skink (*Oligosoma aff. polychrome* Clade 2)

Description

Up to 80cm in body length, the Waiharakeke grass skink is tan to dark brown with prominent pale stripes down its back and a dark brown stripe (often finely edged in black) down its side.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

The most commonly seen skink in South Marlborough in farmland and coastal sites.

Mussel Point to the Waima (Ure) River. Relatively common all along this coastal area wherever the habitat exists. This is a significant population with over 70 seen in a single day of searching along the top of the beach.

Habitat

Lives under driftwood and in vegetation along the coast, especially along the storm high tide mark where driftwood collects.

Observations following the earthquake

Raising of the coastal zone and changing the location of the habitat there. A new storm high tide mark now exists.

Potential threats

- Mainly predation by introduced mammals.
- Loss of habitat.

Black cockroach (*Platyzosteria novaeseelandiae*)

Description

New Zealand native. Body length, 20mm.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Where there is suitable cover, especially driftwood piles.

Habitat

Lives on the shore under logs and stones above the mean high water mark.

Observations following the earthquake

Not known.

Potential threats

- Loss of habitat.
- Disturbance of habitat by people and vehicles.

Ground wētā (*Hemiandrus* "Cape Campbell")

Description

A ground wētā is about 12mm in length.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

From Marfells Beach and Cape Campbell/Te Karaka and subsequently found at White Bluffs/Te Parinui o Whiti and Seaview. Steve Trenwick (pers com 2008) and students at Massey University had the opportunity to get DNA sequence data from Marfells Beach and Seaview specimens and preliminary results indicated that the two populations were conspecific but with surprisingly high variation between the two which Steve described as "not negligible."

Habitat

Occurs on a range of habitats ranging from the remnant shrub lands to other areas of undisturbed ground. Have moved into many vineyard areas, favouring the moist irrigated areas where they can burrow. They hide in burrows in the ground during the day, and those that live in open ground conceal their exit holes with perforated doors. During the night, ground wētā hunt invertebrate prey and eat fruit.

Observations following the earthquake

Not known.

Potential threats

Katipo (*Latrodectus katipo*)

Description

A small spider. The adult female has a pea sized abdomen, which is black with a pronounced red stripe. The males are about half the size of the females and have more white markings.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	**At Risk - Declining**	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Cape Campbell/Te Karaka area described as one of the key sites nationally in 2002.

Habitat

Mainly restricted to areas of undeveloped dunes. Driftwood and vegetation above the high tide mark. They make their tunnel webs in sparse dune vegetation typical of kowhangatara/spinifex and pīngao dunes. Nests above the high tide mark in sparse vegetation and under driftwood .

Observations following the earthquake

Their habitat has moved and will be re-establishing over time.

Potential threats

- Loss of habitat through the modification of dunes.
- Competition with introduced spiders.
- This species appears to be in decline in many sites around the country. In some instances this is a result of modification of and general human impacts on dune lands.

Mat daisy jumper (*Kiwaia* "Cloudy Bay")

Description

A very small flightless moth.

Photo: Ian Millar

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Known from at least four sites of *Raoulia* sp. along the east coast.

Habitat

Occurs in area of semi-bare sand and pea gravels with *Raoulia* mats and other sparse sand plants: primarily associated with *Raoulia* sp.

Observations following the earthquake

Not known.

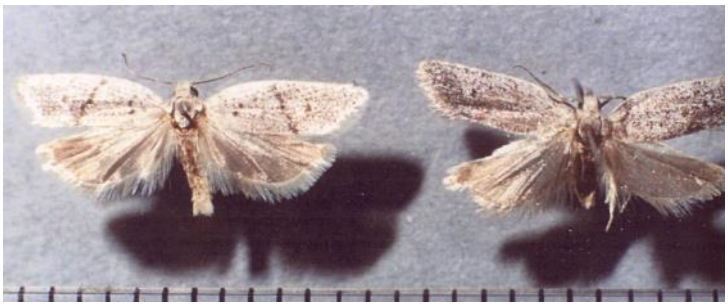
Potential threats

- Loss of dune habitat.
- Damage by vehicles preventing establishment of host plants on new dune systems.
- Loss of host species.
- Potentially introduced predators such as paper wasps and Darwin or Argentine ants.
- Weed growth modifying their habitat.

Pimelea leafroller moth (*Ericodesma aerodana*)

Description

A small grey moth.



Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk – Declining, unless different taxon	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Although not confirmed it is likely to occur wherever there are good populations of *Pimelea prostrata* e.g. Cape Campbell/Te Karaka, Needles Point and Mirza Stream mouth. The species noted at Cloudy Bay was thought to differ from other populations of this species but the taxonomy has not been investigated.

Habitat

Larvae lives on the *Pimelea prostrata* mat plants which are on coastal gravels.

Observations following the earthquake

The largest population of *Pimelea prostrata* is at Needles Point. This site is badly tracked by vehicle on the dunes and gravels since the earthquake and the plants badly damaged.

Potential threats

- Disturbance to the boulderfields and damage by vehicles preventing establishment of host plants on new dune systems.
- Potentially introduced predators such as paper wasps and Darwin or Argentine ants.
- Weed growth modifying their habitat.

Pimelea looper moth (*Notoreas peromata* "Cape Campbell")

Photo: Simon Litchwark, DOC.

Description

A medium sized moth with striking orange and black lower wings.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

This subspecies was formerly known from three populations, on the Te Koko-o-Kupe/Cloudy Bay foreshore, on the foreshore just south of Canterbury Gully (where it co-occurs with katipo) and at Gore Bay, North Canterbury. The latter population became extinct when its hostplant population died out. Likely to occur where there are good populations of *Pimelea prostrata*.

Habitat

Larvae feed on the *Pimelea prostrata* mats.

Observations following the earthquake

Not known.

Potential threats

- Disturbance of habitat and nesting sites by vehicles.
- Disturbance to the boulderfields and damage by vehicles preventing the establishment of host plants on new dune systems.
- Potentially introduced predators such as paper wasps and Darwin or Argentine ants.
- Weed growth modifying their habitat.

Photo: Ian Millar

Sand scarab beetle (*Pericoptus truncatus*)

Description

Pericoptus truncatus is a large sand scarab beetle. Its Māori name is ngungutawa.

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

It is native to New Zealand and is found on beaches throughout New Zealand. The larvae, pupae and adults are common amongst the roots of marram grass and under or within driftwood. The beetles can be found to be living up to 1.2m below ground.

Habitat

Pericoptus truncatus lives in sandy shore areas where driftwood is present. The beetle and its larvae inhabit the area extending from above the high tide mark and including the dunes fronting the beach. They do not seem to occur in dunes found further inland. Larvae are found in sand, under logs at the beach. The adult spends the daylight hours buried in the sand, emerging at night to fly noisily around in search of mates and food

Observations following the earthquake

Not known.

Potential threats

Seashore earwig (*Anisolabis littorea*)

Description

Very similar to Maritime earwigs, the seashore earwig is a native insect to Australia and New Zealand that can be found on beaches hiding in the sand and under stones. Unlike the maritime earwig that has a darker black coloration on the whole of its back, the seashore earwig holds some lighter brown pigmentation near the front of its back

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

Where there is suitable cover, especially driftwood piles.

Habitat

Commonly found on beaches under stones and debris.

Observations following the earthquake

Not known.

Potential threats

Stone moth (*Dichromodes* "Cloudy Bay")

Description

A smallish grey brown moth.

Photo: Ian Millar

Current conservation status

Not threatened	At Risk – Naturally Uncommon	At Risk - Relict	At Risk - Recovering	At Risk - Declining	Threatened - Nationally Vulnerable	Threatened – Nationally Endangered	Threatened – Nationally Critical

Location on Marlborough's East Coast

It has been found in reasonable numbers immediately south of White Bluffs/Te Parinui o Whiti where it may occupy habitat along a short creek bed between the bluffs and shore. Although not surveyed for it is likely to be associated with the other stable boulder fields with lichens.

Habitat

Caterpillars of this species are presumed to feed on lichens on stable stones and boulders.

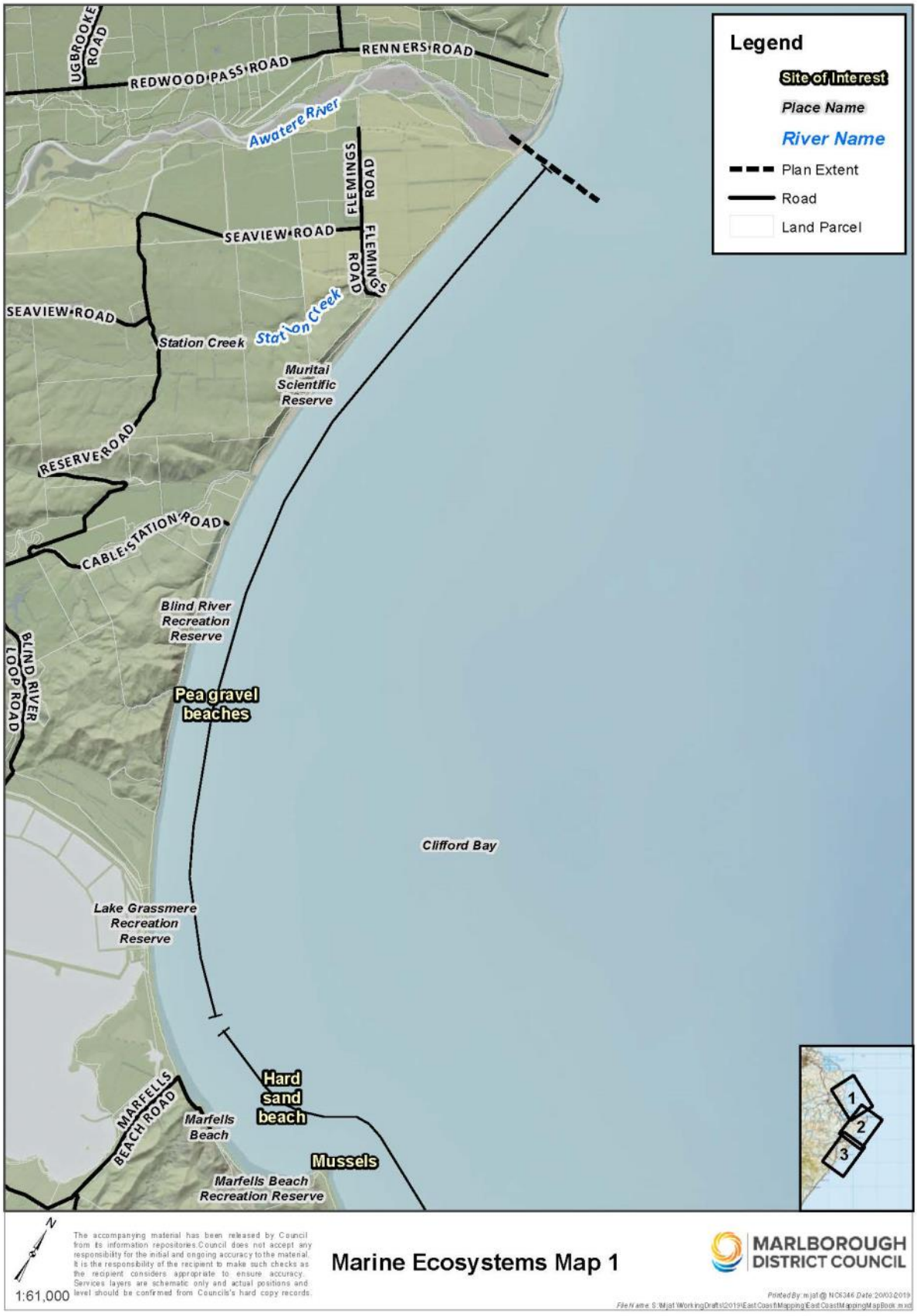
Observations following the earthquake

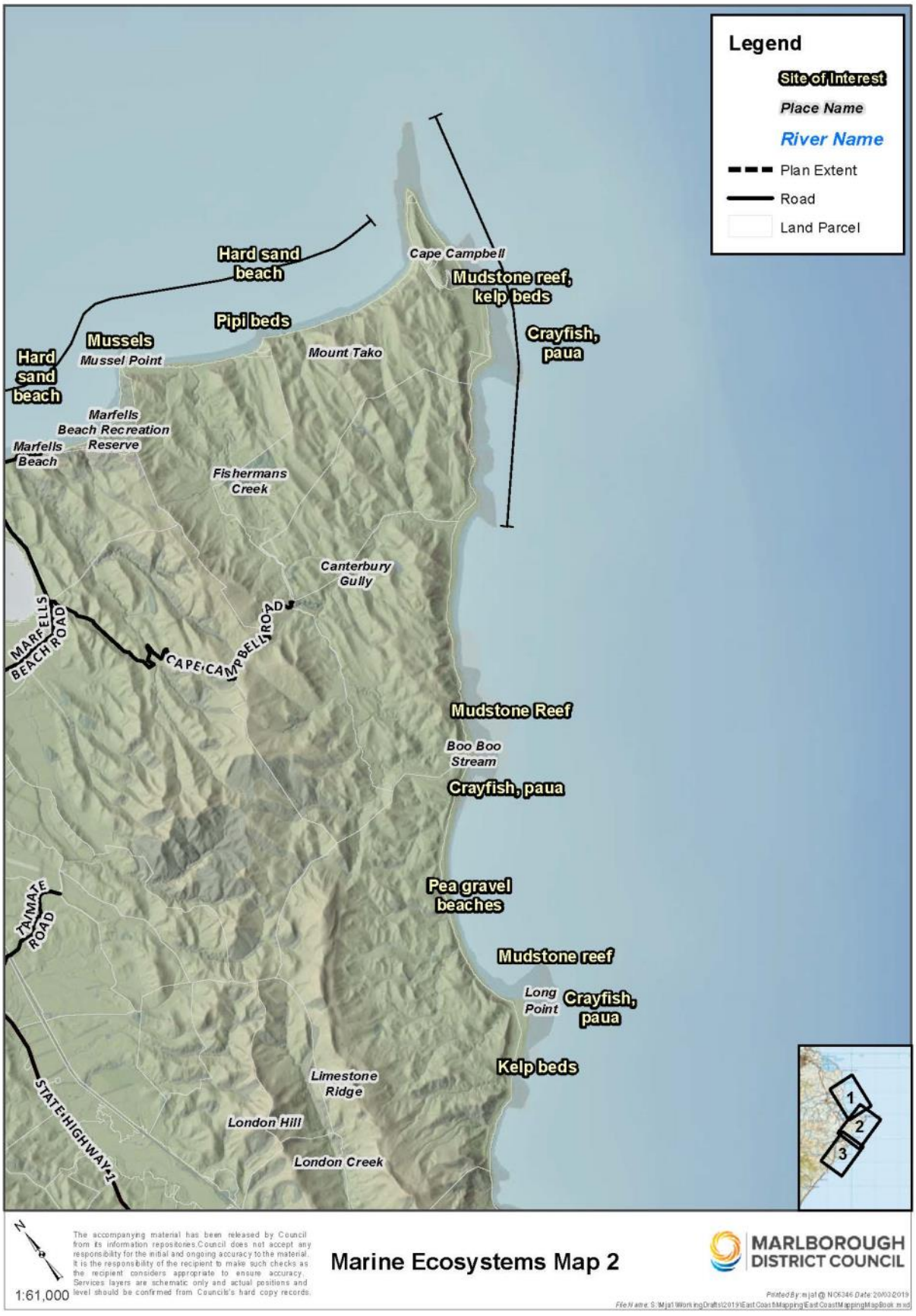
Not known.

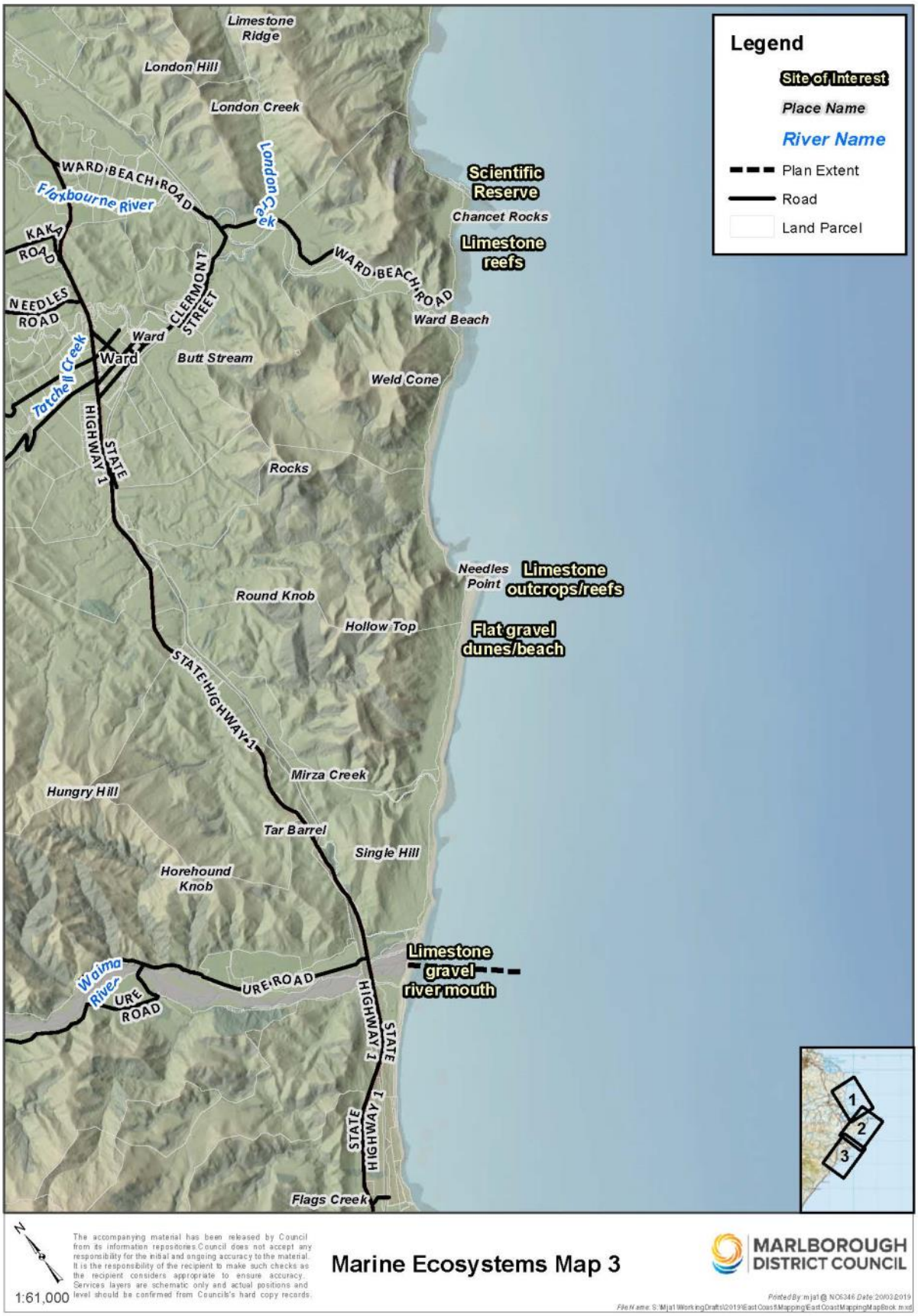
Potential threats

- Disturbance to the boulderfields and damage to their lichen growth.
- Potentially introduced predators such as paper wasps and Darwin or Argentine ants.
- Weed growth modifying their habitat.

Appendix 4: Marine ecosystems (Maps 1-3)

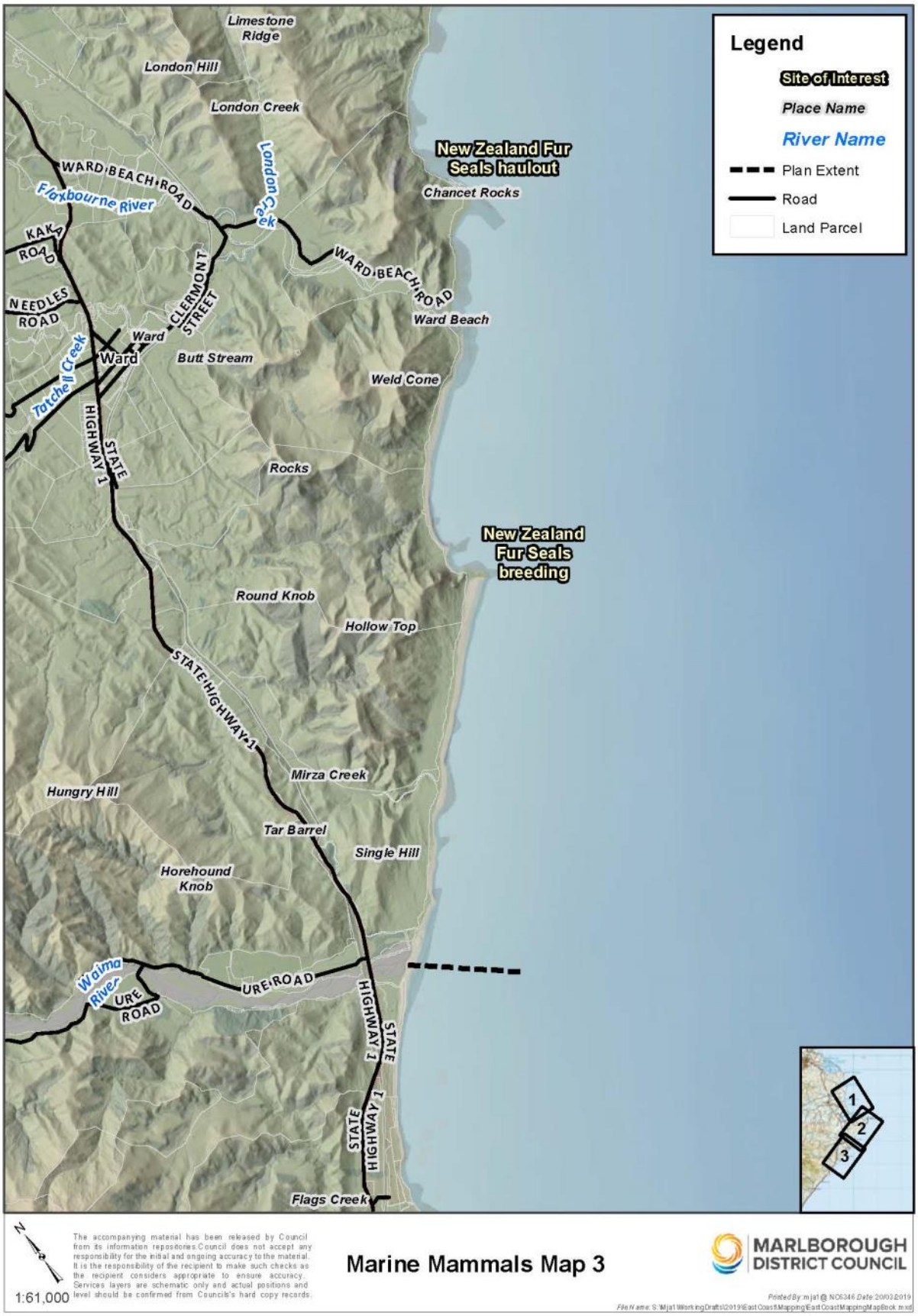



Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
Hard sand beach
Cape Campbell
Mudstone reef, kelp beds
Pipi beds
Mussels
Mussel Point
Crayfish, paua
Mount Tako
Hard sand beach
Marfells Beach Recreation Reserve
Marfells Beach
Fishermans Creek
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Mudstone Reef
Boo Boo Stream
Crayfish, paua
Pea gravel beaches
TAIMATE ROAD
Mudstone reef
Long Point
Crayfish, paua
Kelp beds
Limestone Ridge
STATE HIGHWAY 1
London Hill
London Creek
1
2
3
N
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.
Marine Ecosystems Map 2
MARLBOROUGH DISTRICT COUNCIL


Limestone Ridge
London Hill
London Creek
London Creek
WARD BEACH ROAD
Flaxbourne River
KAKA ROAD
NEEDLES ROAD
CLERMONT STREET
Ward
Ward
Tatchell Creek
Butt Stream
HIGHWAY 1 STATE
Rocks
Round Knob
Hollow Top
STATE HIGHWAY 1
Mirza Creek
Hungry Hill
Tar Barrel
Single Hill
Horehound Knob
Waima River
URE ROAD
URE ROAD
HIGHWAY 1 STATE
HIGHWAY 1 STATE
Flags Creek
Scientific Reserve
Chancet Rocks
Limestone reefs
WARD BEACH ROAD
Ward Beach
Weld Cone
Needles Point
Limestone outcrops/reefs
Flat gravel dunes/beach
Limestone gravel river mouth
Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
1
2
3
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Council's hard copy records.
Marine Ecosystems Map 3
MARLBOROUGH DISTRICT COUNCIL
Printed By: mjal @ NC6346 Date: 20/03/2019
File Name: S:\Mjal\Working Drafts\2019\East Coast\Mapping\East Coast Mapping\Map Book.mxd

Appendix 5: Marine mammal locations (Maps 1-3)


Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
New Zealand Fur Seals breeding
Cape Campbell
Elephant seal breeding
Mount Tako
Mussel Point
Marfells Beach Recreation Reserve
Marfells Beach
Fishermans Creek
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Boo Boo Stream
TAIMATE ROAD
Long Point
Limestone Ridge
STATE HIGHWAY 1
London Hill
London Creek
1
2
3
N
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.
Marine Mammals Map 2
MARLBOROUGH DISTRICT COUNCIL


Limestone Ridge
London Hill
London Creek
London Creek
New Zealand Fur Seals haulout
Chancet Rocks
WARD BEACH ROAD
Flaxbourne River
KAKA ROAD
NEEDLES ROAD
CLERMONT STREET
WARD BEACH ROAD
Ward Beach
Ward
Ward
Butt Stream
Weld Cone
Tatchell Creek
HIGHWAY 1 STATE
Rocks
New Zealand Fur Seals breeding
Round Knob
Hollow Top
STATE HIGHWAY 1
Mirza Creek
Hungry Hill
Tar Barrel
Single Hill
Horehound Knob
Wairau River
URE ROAD
URE ROAD
HIGHWAY 1 STATE
STATE HIGHWAY 1
Flags Creek
Legend
Site of Interest
Place Name
River Name
Plan Extent
Road
Land Parcel
1
2
3
N
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Council's hard copy records.
Marine Mammals Map 3
MARLBOROUGH DISTRICT COUNCIL
Printed By: mjat @ NO5346 Date: 20/03/2019
File Name: S:\Mjat1\Working Drafts\2019\East Coast\Mapping\East Coast Mapping\MapBook.mxd

Marine mammal laws

NZ Gazette Notice 2008

https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-protected-areas/marine-mamals-protection-cliffordcloudy.pdf

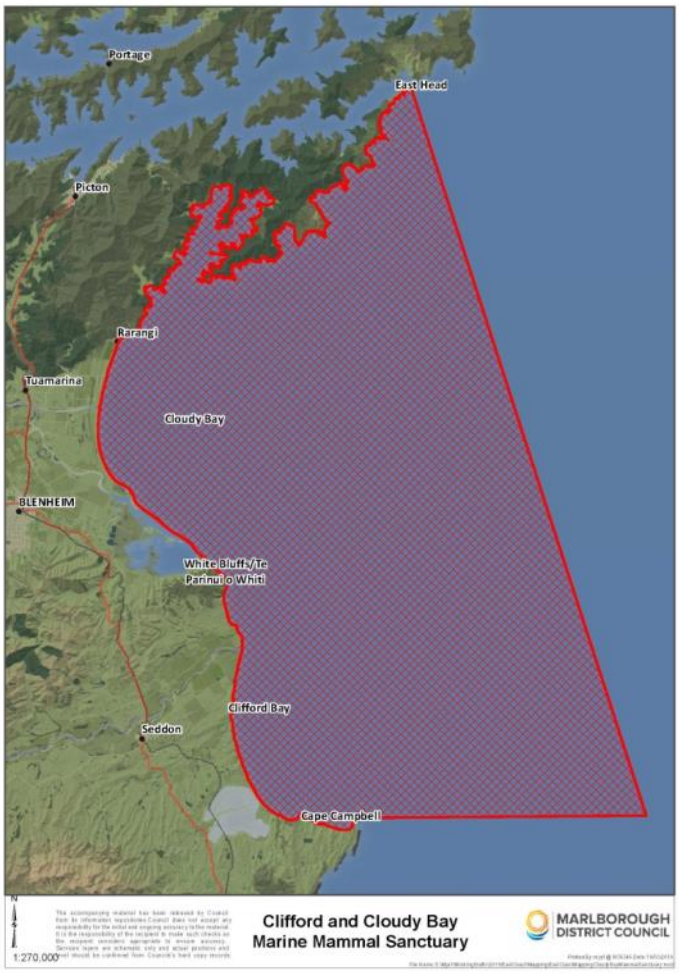
NZ Gazette Notice 2020

https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-protected-areas/clifford-cloudy-bay-mms-amendment-notice-2020.pdf

Boundaries:

All the areas of the sea enclosed—

(a) by the line of mean highwater springs from a point on Cape Campbell (at approximately 41°43.54′S and 174°16.57′E) thence by a line running in an easterly direction to a point at sea (at approximately 41°43.54′S and 174°32.59′E), thence by a line running in a northwesterly direction to a point on West Head on the Tory Channel (at approximately 41°12.79′S and 174°18.93′E); and (b) by the line of mean highwater springs alongshore in a northsouth direction between the point on West Head on the Tory Channel (at pproximately 41°12.79′S and 174°18.93″E) to the point on Cape Campbell (at approximately 41°43.54′S and 174°16.57′E).



Marine Mammal Protection Regulations 1992

Part 3 – section 18: Conditions governing commercial operations and behaviour of all persons around any marine mammal

Every commercial operation, and every person coming into contact with any class of marine mammal, shall comply with the following conditions:

(a) persons shall use their best endeavours to operate vessels, vehicles, and aircraft so as not to disrupt the normal movement or behaviour of any marine mammal:

(b) contact with any marine mammal shall be abandoned at any stage if it becomes or shows signs of becoming disturbed or alarmed:

(c) no person shall cause any marine mammal to be separated from a group of marine mammals or cause any members of such a group to be scattered:

(d) no rubbish or food shall be thrown near or around any marine mammal:

(e) no sudden or repeated change in the speed or direction of any vessel or aircraft shall be made except in the case of an emergency:

(f) where a vessel stops to enable the passengers to watch any marine mammal, the engines shall be either placed in neutral or be switched off within a minute of the vessel stopping:

(g) no aircraft engaged in a commercial aircraft operation shall be flown below 150 metres (500 feet) above sea level, unless taking off or landing:

(h) when operating at an altitude of less than 600 metres (2 000 feet) above sea level, no aircraft shall be closer than 150 metres (500 feet) horizontally from a point directly above any marine mammal or such lesser or greater distance as may be approved by the Director-General, by notice in the *Gazette*, from time to time based on the best available scientific evidence:

(i) no person shall disturb or harass any marine mammal:

(j) vehicles must remain above the mean high water spring tide mark and shall not approach within 50 metres of a marine mammal unless in an official carpark or on a public or private slipway or on a public road:

(k) no person, vehicle, or vessel shall cut off the path of a marine mammal or prevent a marine mammal from leaving the vicinity of any person, vehicle, or vessel:

(l) subject to paragraph (m), the master of any vessel less than 300 metres from any marine mammal shall use his or her best endeavours to move the vessel at a constant slow speed no faster than the slowest marine mammal in the vicinity, or at idle or “no wake” speed:

(m) vessels departing from the vicinity of any marine mammal shall proceed slowly at idle or “no wake” speed until the vessel is at least 300 metres from the nearest marine mammal, except that, in the case of dolphins, vessels may exceed idle or “no wake” speed in order to outdistance the dolphins but must increase speed gradually, and shall not exceed 10 knots within 300 metres of any dolphin:

(n) pilots of aircraft engaged in a commercial aircraft operation shall use their best endeavours to operate the aircraft in such a manner that, without compromising safety, the aircraft’s shadow is not imposed directly on any marine mammal.

Sharing our coast with marine mammals

The following information is from DOC website:

https://www.doc.govt.nz/nature/native-animals/marine-mammals/sharing-our-coasts-with-marine-mammals/

Anywhere you encounter a marine mammal, protect them from stress or displacement.
Make sure you:

- do not disturb, harass or make loud noises near marine mammals
- cease contact if marine mammals show signs of being disturbed or alarmed
- do not feed or throw any rubbish near marine mammals.

Keep marine mammals and their young safe by following the right rules for the environment and species. This will make sure you and the animals have an enjoyable experience.
If you notice a marine mammal being harassed, severely injured or entangled, contact us immediately on 0800 DOC HOT (0800 362 468).

Onshore

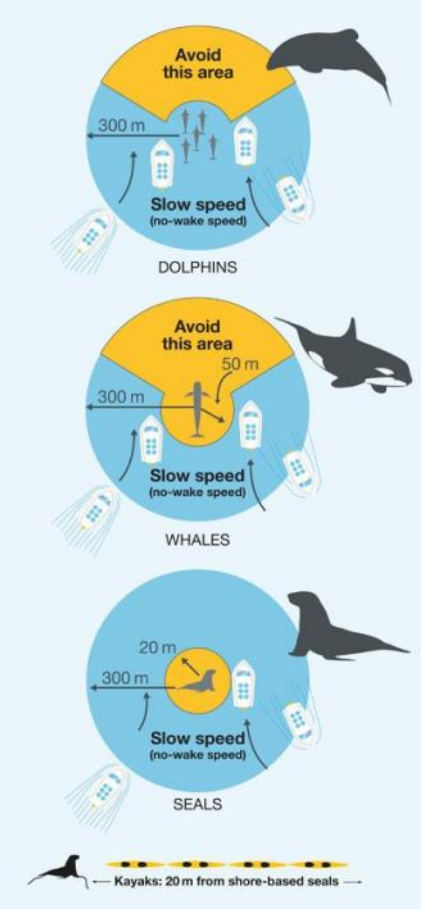
When marine mammals are onshore:

- give seals and sea lions space stay at least 20 m away if you can
- avoid coming between fur seals and the sea
- keep dogs on a leash and well away
- do not drive vehicles closer than 50 m of a marine mammal if you can
- never attempt to touch seals or sea lions – they can be aggressive and often carry diseases.

At sea

If you're travelling at sea near marine mammals:

- travel no faster than idle or 'no wake' speed within 300 m
- make sure there are no more than three vessels within 300 m, including any aircraft
- approach from a direction that is parallel and slightly to the rear
- do not circle the marine mammals, obstruct their path or cut through any groups
- idle slowly away.



Whales including orca and pilot whales

For whales:

- stay at least 50 m away from any whale
- stay at least 200 m away from any baleen or sperm whale mother and calf
- do not swim with whales.
- **Dolphins**

For dolphins:

- you may gradually increase speed to outdistance dolphins
- do not exceed 10 knots until more than 300 m away
- do not swim with dolphin pods containing juveniles. Juveniles are half the size or smaller of an adult.
- **Seals**

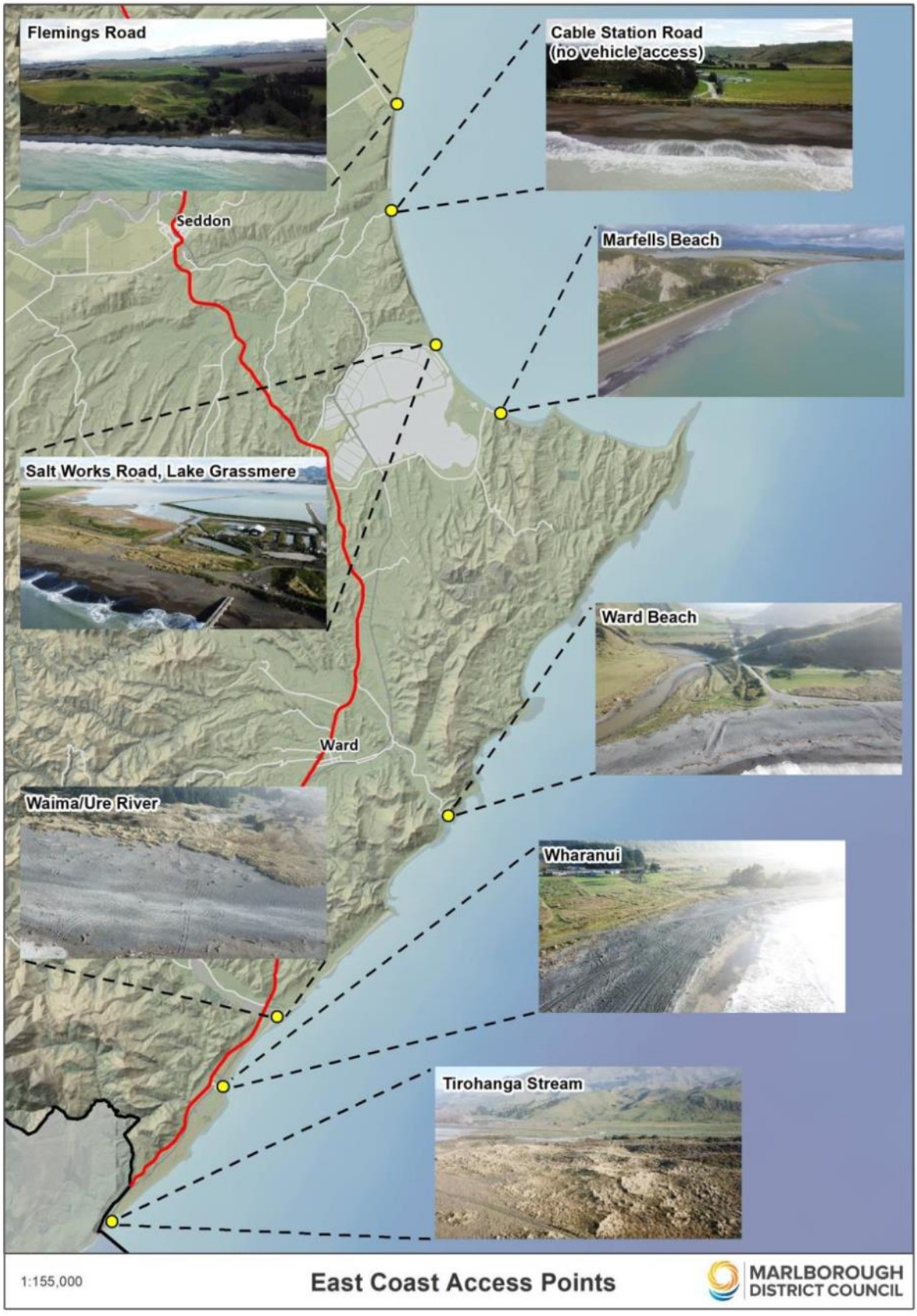
For seals:

- vessels need to stay at least 20 m away from the water's edge where seals may be present.
- swimmers need to stay at least 5 m away from the water's edge.
- **Air**

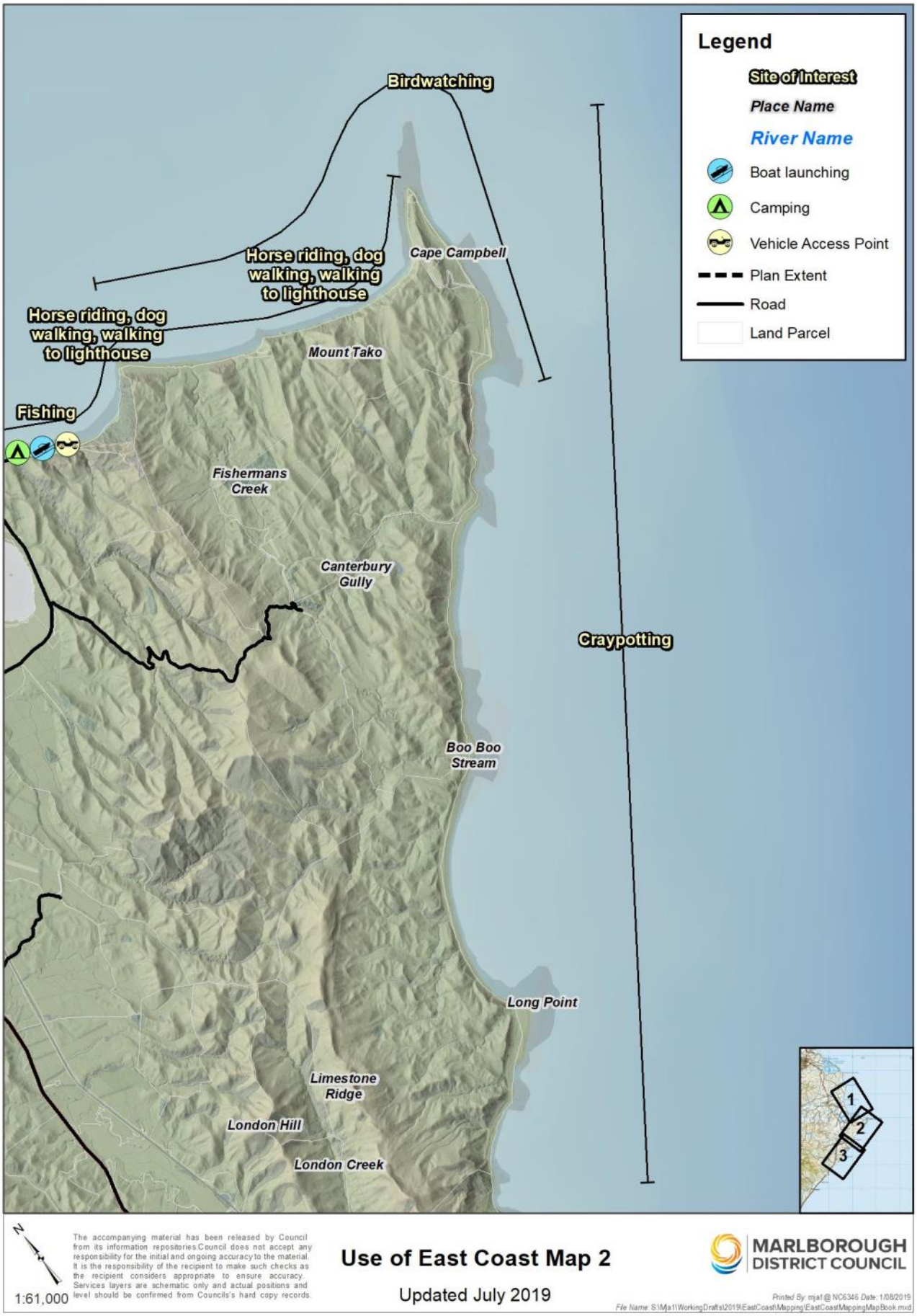
For aircraft:

- maintain a horizontal distance of greater than 150 m when flying near any marine mammal.
- make sure there are no more than three vessels within 300 m, including any aircraft
- avoid flying or imposing a shadow directly over a marine mammal either at sea or onshore.
- drones have the same restrictions as aircraft. Drone rules near marine mammals.

Appendix 6: Access points



Appendix 7: Use of East Coast Maps (Maps 1-3)


Legend
Site of Interest
Place Name
River Name
Boat launching
Camping
Vehicle Access Point
Plan Extent
Road
Land Parcel
Birdwatching
Horse riding, dog walking, walking to lighthouse
Cape Campbell
Horse riding, dog walking, walking to lighthouse
Mount Tako
Fishing
Fishermans Creek
Canterbury Gully
Craypotting
Boo Boo Stream
Long Point
Limestone Ridge
London Hill
London Creek
1
2
3
1:61,000
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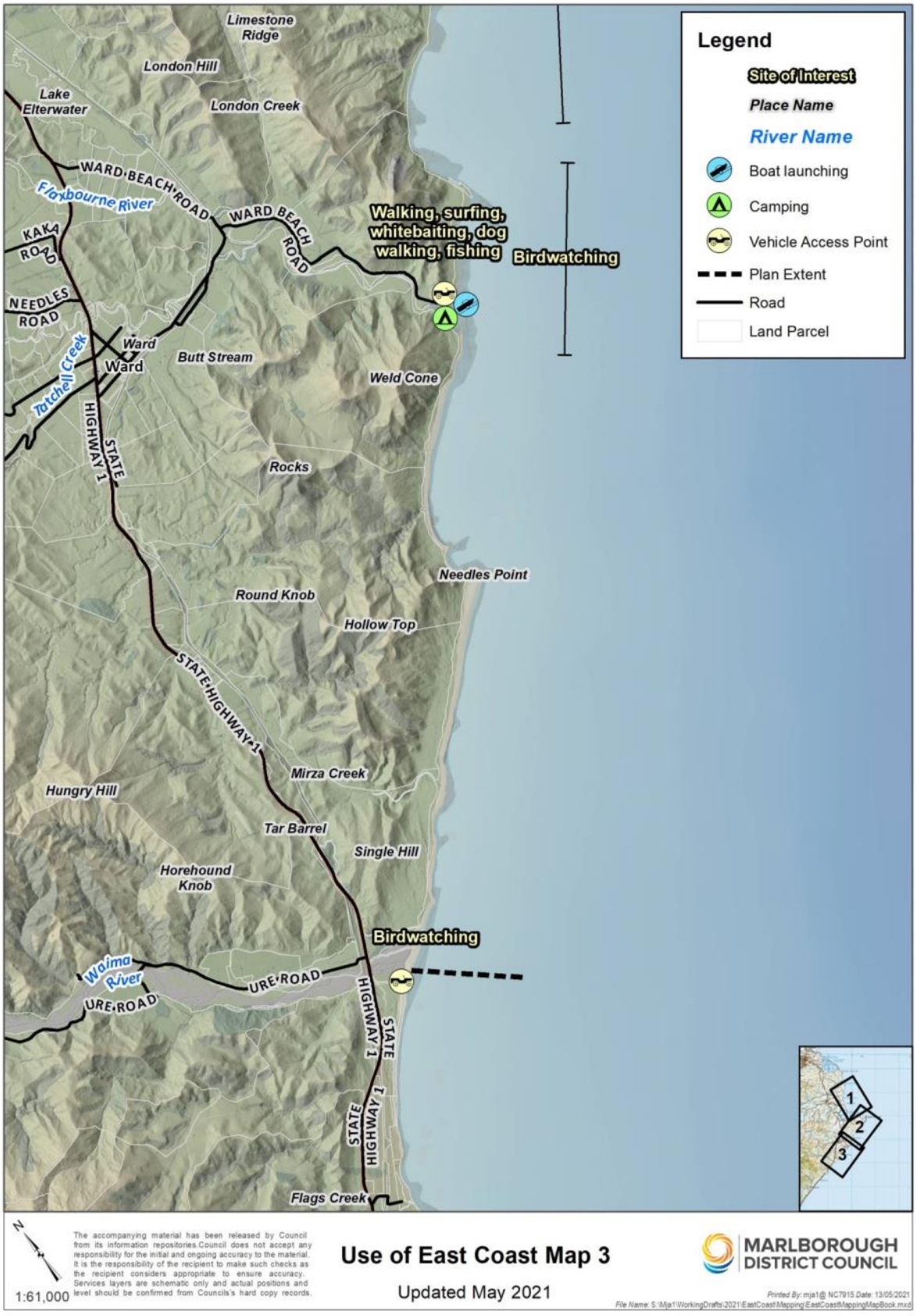
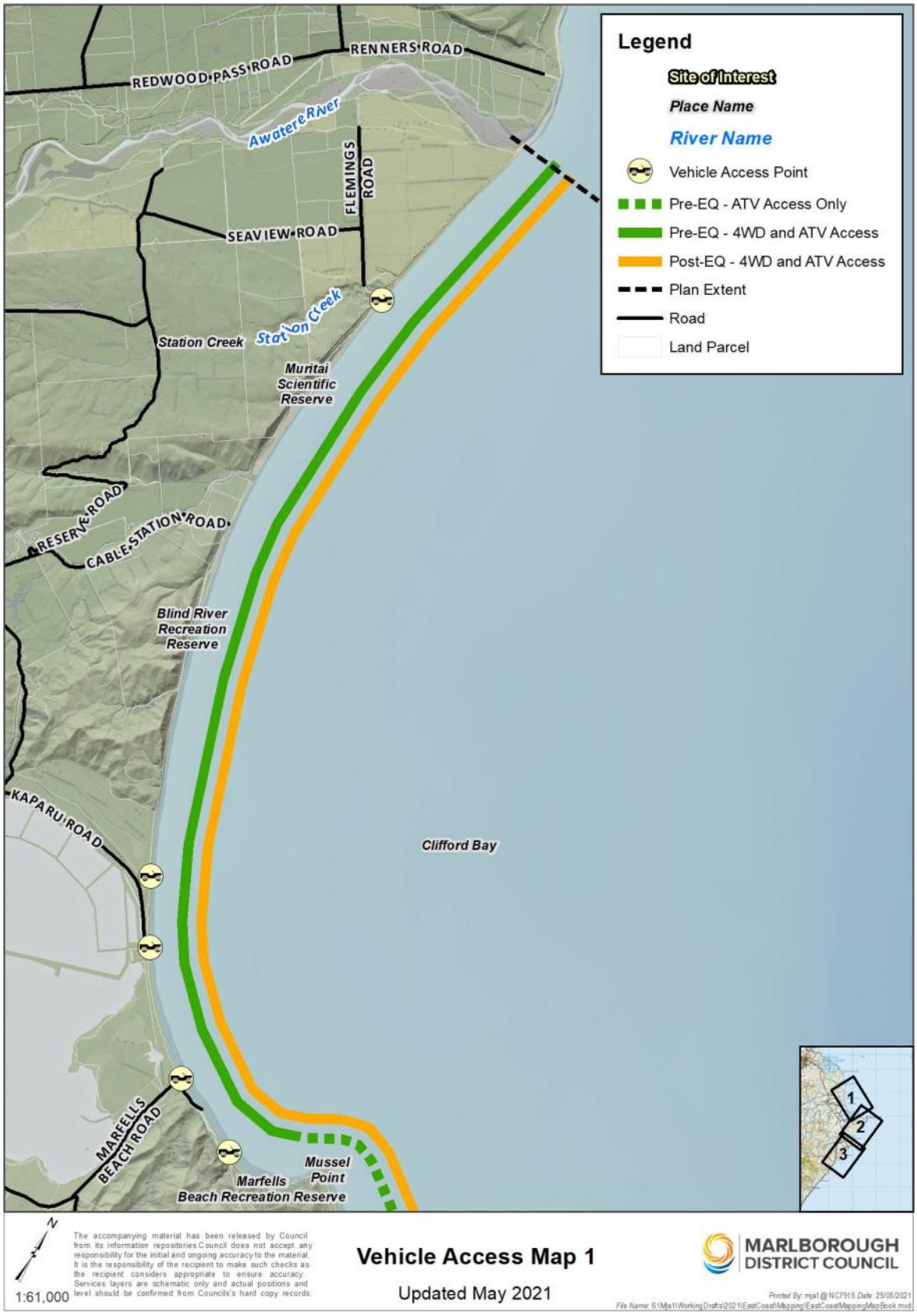
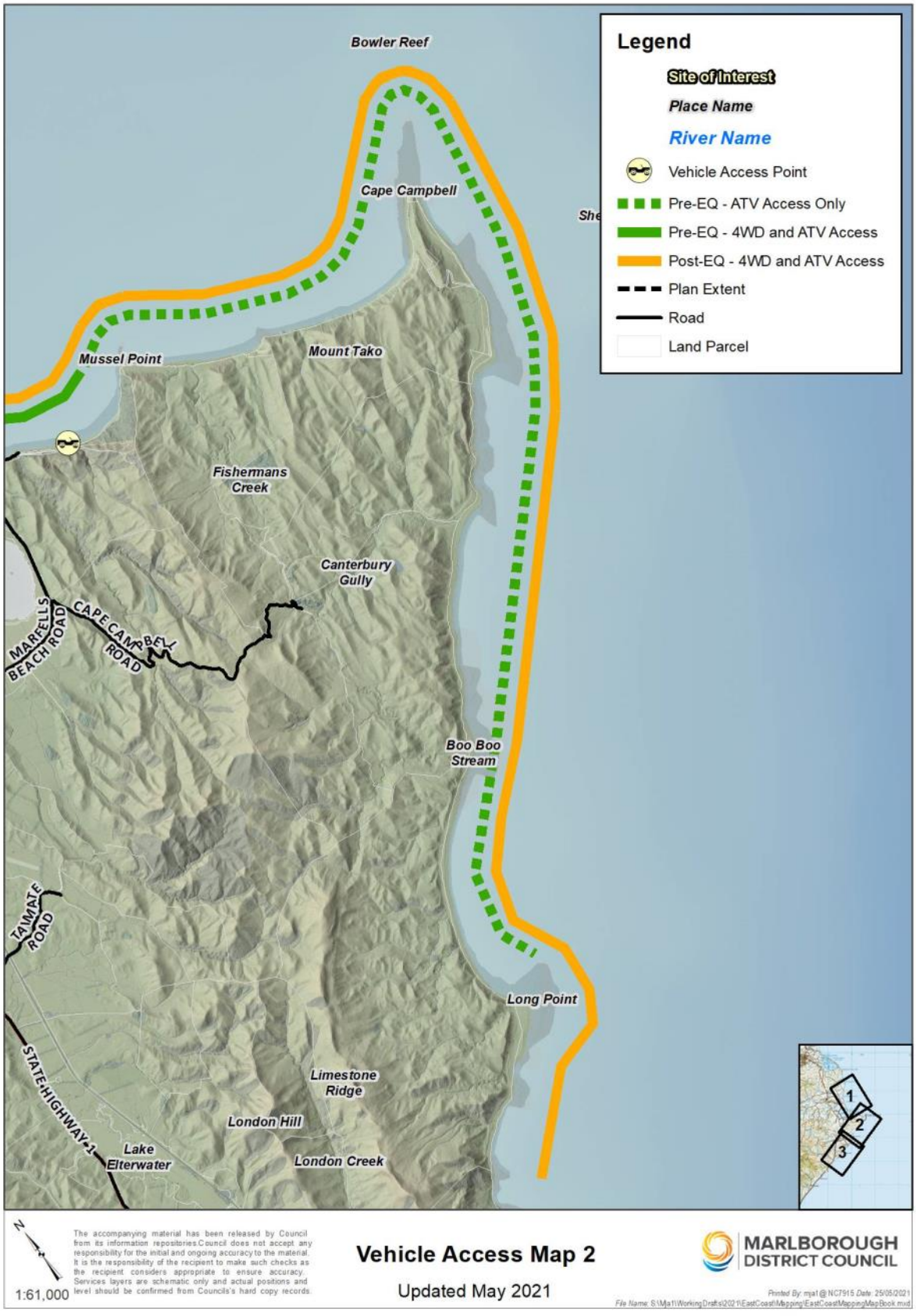
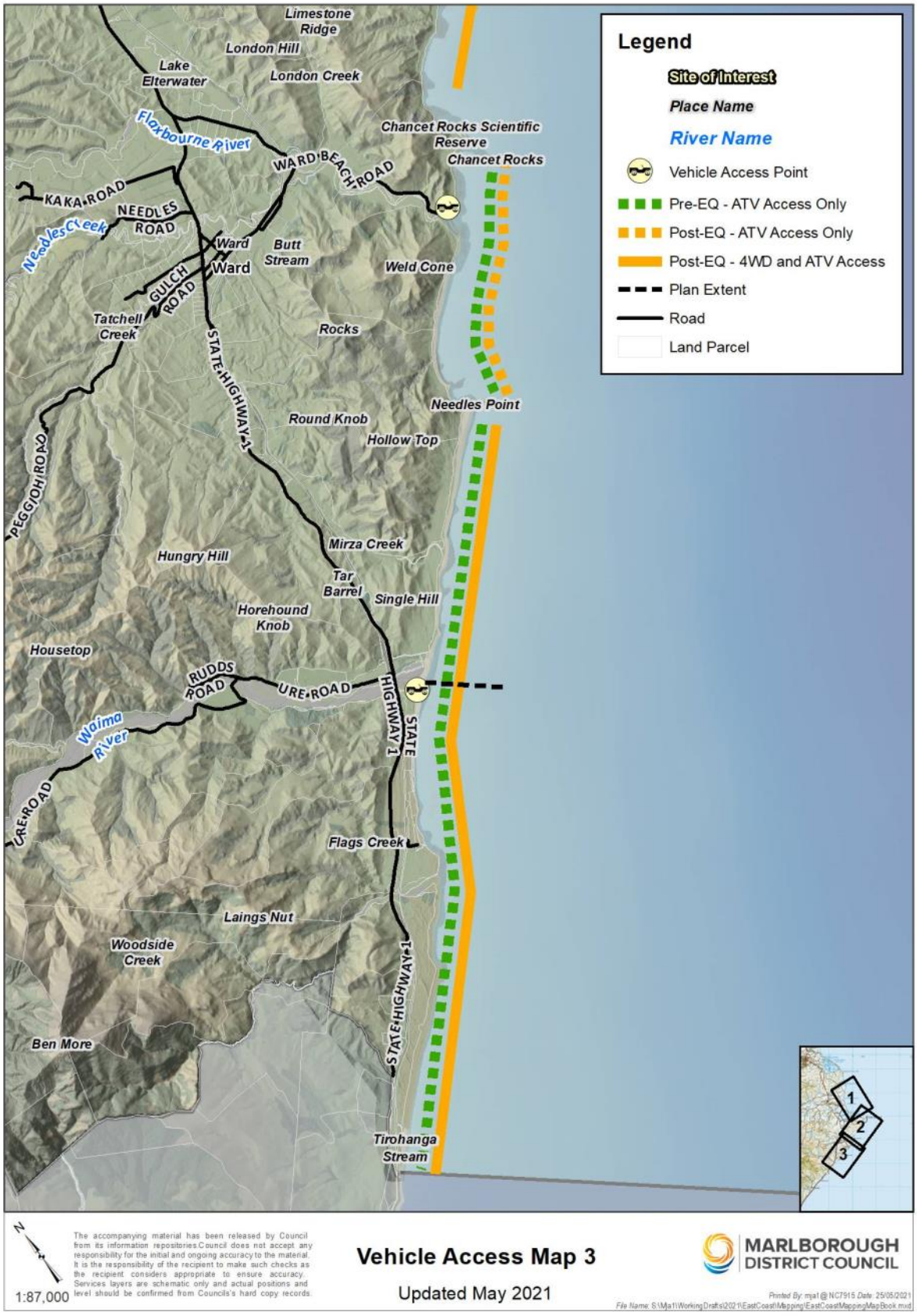
Use of East Coast Map 2
Updated July 2019
MARLBOROUGH DISTRICT COUNCIL


Limestone Ridge
London Hill
Lake Elterwater
London Creek
WARD BEACH ROAD
Flaxbourne River
WARD BEACH ROAD
KAKA RO
NEEDLES ROAD
Ward
Ward
Butt Stream
Tatchell Creek
HIGHWAY 1 STATE
Weld Cone
Rocks
Needles Point
Round Knob
Hollow Top
STATE HIGHWAY 1
Mirza Creek
Hungry Hill
Tar Barrel
Single Hill
Horehound Knob
Birdwatching
Walking, surfing, whitebaiting, dog walking, fishing
Birdwatching
Waima River
URE ROAD
URE ROAD
HIGHWAY 1 STATE
HIGHWAY 1 STATE
Flags Creek
Legend
Site of Interest
Place Name
River Name
Boat launching
Camping
Vehicle Access Point
Plan Extent
Road
Land Parcel
1
2
3
N
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.
Use of East Coast Map 3
Updated May 2021
MARLBOROUGH DISTRICT COUNCIL
Printed By: mja1@ NC7915.Date: 13/05/2021
File Name: S:\Mja1\WorkingDrafts\2021\EastCoast\Mapping\EastCoastMappingMapBook.mxd

Appendix 8: Vehicle access maps (Maps 1-3)




Legend
Site of Interest
Place Name
River Name
Vehicle Access Point
Pre-EQ - ATV Access Only
Pre-EQ - 4WD and ATV Access
Post-EQ - 4WD and ATV Access
Plan Extent
Road
Land Parcel
Bowler Reef
Cape Campbell
Mussel Point
Mount Tako
Fishermans Creek
Canterbury Gully
MARFELLS BEACH ROAD
CAPE CAMPBELL ROAD
Boo Boo Stream
TAIMATE ROAD
Long Point
STATE HIGHWAY 1
Limestone Ridge
London Hill
Lake Elterwater
London Creek
1
2
3
N
1:61,000
The accompanying material has been released by Council from its information repositories.Council does not accept any responsibility for the initial and ongoing accuracy to the material. It is the responsibility of the recipient to make such checks as the recipient considers appropriate to ensure accuracy. Services layers are schematic only and actual positions and level should be confirmed from Councils's hard copy records.
Vehicle Access Map 2
Updated May 2021
MARLBOROUGH DISTRICT COUNCIL


Legend
Site of Interest
Place Name
River Name
Vehicle Access Point
Pre-EQ - ATV Access Only
Post-EQ - ATV Access Only
Post-EQ - 4WD and ATV Access
Plan Extent
Road
Land Parcel
Limestone Ridge
London Hill
Lake Elterwater
London Creek
Flaxbourne River
Chancet Rocks Scientific Reserve
Chancet Rocks
WARD BEACH ROAD
KAKA ROAD
NEEDLES ROAD
Needles Creek
Ward
Butt Stream
Weld Cone
GULCH ROAD
Tatchell Creek
Rocks
STATE HIGHWAY 1
Needles Point
Round Knob
Hollow Top
PEGGIOH ROAD
Hungry Hill
Mirza Creek
Tar Barrel
Single Hill
Horehound Knob
Housetop
RUDDS ROAD
URE ROAD
Waima River
Flags Creek
Laings Nut
Woodside Creek
Ben More
Tirohanga Stream
1
2
3
1:87,000
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Vehicle Access Map 3
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Appendix 9: ECPG information brochure

Marlborough's East Coast is renowned for its isolation, rugged beauty and plant and animal life that call the area home.

Since the Earthquake of 14 November 2016 and the associated coastal uplift, much has changed.

Cape Campbell before the earthquakes

Cape Campbell after the earthquakes.

We understand that you will want to visit the area and discover what has changed but ask that you respectfully share the environment with nature and other beach users.

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Did you know the East Coast is a hotspot of New Zealand's Biodiversity?

Coastal currents from the north and south converge to bring a unique assemblage of species to these shores. Fur seals use beaches and headlands for pupping and basking. Many sea birds have nesting colonies here and the coast is a known migration route. All of these are under threat of being damaged by increased usage of the coastal strip.

Banded Dotterel nesting on the beach

Canterbury University scientists have been monitoring this area for over 20 years. After recent events they are visiting the area more often to monitor the affected coast and the recovery process. Prof David Schiel and his Marine Ecology team have informed the community that the health of the near-shore zone has undergone massive disruption and needs time to restore itself. It is obvious that rocky habitats have been propelled upwards, but less obvious is the extensive loss of 'biological habitat', including the seaweeds and small organisms that sustain and feed through the coastal food web, such as paua, fish and birds.

Uplifted beach platform - Cape Campbell
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To help protect our coastal environment for future generations

We ask that:

- No fires
- Please be careful where you go. Avoid all vegetation/dune-lands and tidal rock pools.
- Give the ecology, birdlife and animals space and time to recover.
- Whatever you take with you, bring it back! Rubbish is becoming an increasing problem.
- Please remove craypots from the beach when they are not being used.
- Dogs must be on-leash
- Leave only your footprints.

Be informed
Help the recovery

The East Coast Protection Group (ECPG) has been formed by traditional users of the area and local residents. Our aim is to protect this unique area and to ensure that human activity treads lightly on the landscape.

VISION STATEMENT

- To create local leadership, and educate coastal users.
- To achieve protection of our coastal environment for future generations,
- To understand the distinctive biological diversity and cultural heritage of this outstanding natural landscape and its values.

For more information on the East Coast Protection Group please email eastcoastprotectiongroup@gmail.com

Marlborough East Coast Protection Group

East Coast Marlborough

Beach & Coastal users

We need your help

Appendix 10: RAwE proposed voluntary code of practice

Provided to Council in March 2020

Marfells Beach Quad Bike Fishing Group

Voluntary Code of Practice

Since establishing our CoP, we have, along with others observed those that have signed up to the CoP are abiding by the CoP to a good level of compliance.

The other observations made is that others that are not associated to our group are now becoming educated and following our track which keeps them from the upper beach area.

The groups position now is that we are encouraged to educate more people to follow a good practice in utilising the beach, we offer the following points to further our responsible practice.

1. All vehicles must travel below the high tide line.
2. NZTA speed limit on beaches is set at 50km, voluntary limit rounding Cape Campbell set at 25kph from 1km north of the lighthouse to 1km on the south side of the lighthouse.
3. Only travel on the beach in day light hours around the period of low tide other than for the purpose of launching a boat.
4. All vehicles must give right of way and allow a maximum separation from all other beach users.
5. No vehicles are to access private land without the permission of the land owners.
6. Vehicles on rock shelves must avoid rock pools and marine growth.
7. Passing birds and seals should be done quietly and carefully with maximum separation.
8. All pots will be removed from the beach after use, these can no longer be stored up in the dunes.
9. All rubbish to be removed and disposed of responsibly.
10. We do not support camping outside of the designated camping area.

A written CoP hand-out along with local history and education on the importance of good vehicle behaviour since the earthquake event.

Over a period of time we have been given a lot of information about the beach, this has been provided by scientists, experts and anecdotal. When assessing this information as to the quad

bike use along the beach we consider our impact as being minor based on our CoP. Every tide will wash away our use.

References Noted:

1. David Shields; "that a storm will do more damage to a beach than quad bikes will ever do"
2. W Parson; Bird numbers are the same as what was observed 50 years ago.
3. NZTA speed limits
4. Sally Neil; *quote points in letter*
5. Utilising below high tide mark does not destroy ecological values. (*quote someone*)
6. Quad bike foot print; a study of a TRX 500 weighs a total of 293kgs, calculations show that a quad bike has less ground pressure than an average 88.67kg male has. Average male has 23 square cm foot print, comparison is a male produces 2.463kgs per square cm, verse a quad bike producing 0.706kgs per square cm.

As the local quad bike fishing group, we are seeing our CoP being abided to, we would like ECPG to acknowledge that the CoP that we have introduced is now adopted by the ECPG as an acceptable CoP which will be further developed as the management strategy for along the Eastcoast is developed. Having this CoP endorsed by ECPG will give our group recognition in what they have achieved which in turn will give better compliance all round and followed by others.

With the adoption of the CoP we can put our concerns aside and participate in an open process with out the thoughts that we are being targeted as the bad guys that are not wanted.

The CoP we have provided is for the local recreational fishermen to access and utilise the fishery, this CoP is not for 4x4 vehicles nor two-wheel motor bikes or other forms of transport i.e. horses. We understand our access along the beach is to fish and provide sustenance, 4x4 and two-wheel bikes are seen utilising the beach as either a recreational activity or sightseeing. We are willing to share or CoP with others so they to can set their own best practice.

Appendix 11: Technical experts

Presenters at the Technical Advice Workshop in 2018

Area of expertise	Expert	Organisation	Topic
Biodiversity and ecosystems.	Simon Moore.	DOC.	Overview of values and impact from vehicle access on flora and fauna.
	Chris Wootton.	DOC.	Overview of values and impact from vehicle access on flora and fauna.
	Peter Hamill.	Council.	Advice on Ecologically Significant Marine site and SNA sites.
Coastal/Marine systems.	Professor David Schiel, Tommaso Alestra, Shawn Gerrity.	UC.	Advice on the functioning of the east coast marine system and any threat posed by public access including vehicle (4WD and quad) use on beaches and rocky reefs.
Dune systems.	Peter Williams.	Landcare.	Advice on rare ecosystems, values and potential/actual impacts from public access (4WD and quad).
Entomologist.	Ian Millar.		Advice on invertebrates.
Herpetologist.	Marieke Lettink.		Advice on lizards.
Marine Mammals.	Mike Morrissey.	DOC.	Seal counts.
Public access.	Penny Wardle, Geoff Holgate.	Walking Access Commission.	Advice of walking access legal entitlements for beach access.
Statutory Obligations and Legal.	Kaye McIlveney.	Council.	Advice and legal overview of land tenure and jurisdiction including Council policy options.
	Chris Wootton.	DOC.	DOC's vision, Iwi as Treaty Partner.
Wildlife.	Mike Bell.	Ornithological Society.	Overview of threatened and endangered fauna (coastal birds), breeding and feeding habitats, spatial locations and risks/impacts from public access.

Appendix 12: Key values underpinning the ONL

22. The Limestone Coastline	
Biophysical Values	- Geomorphology of limestone coastline includes several coastal geopreservation sites: Needles Point Cretaceous-Tertiary boundary, Flaxbourne River folds and thrusts, and the Chancet Rocks. - Broad and deeply incised mudstone shore platforms and offshore reefs characterise the marine environment around Cape Campbell. - Colonies of New Zealand fur seals at Chancet Rocks and the Needles. - Coastal platforms and ecological values of importance, with Marlborough endemic flora common, rocky areas (including the Marlborough rock daisy) and gullies. - All of these features are interlinked by beaches, cliffs and back dunes and hill country, which share the same geology and erosional and tectonic forces, culminating in an extremely impressive and legible coastline that clearly expresses its formative processes.
Perceptual Values	- Unencumbered, predominantly pastoral land retains a high level of visual coherence. - Highly expressive coastline from the slender Cape Campbell to Waima/Ure River. - Complex geology creates spectacular landforms and features that are particularly scenic along the coastline.
Associative Values	- A number of Māori archaeological sites are associated with this area, including two ancient pa sites on the coast, as well as a number of ovens and middens. - Possible European associations relating to the limeworks at Chancet. - High recreational values, particularly at Marfells Beach and Ward Beach.
Overview	Based on the above values, The Limestone Coastline has been identified as an ONL due to the exceptional biophysical and associative landscape values and very high sensory landscape values. The Limestone Coastline provides the greatest visual drama in the south Marlborough landscape. The spectacular rocky outcrops of the Needles and Chancet Rocks along the Limestone Coastline south of Cape Campbell are extremely memorable and display very high levels of naturalness. The State Highway 1 coastal road from the Waima Bridge to the southern point of the District contains high scenic values. The coastline of this ONL is largely unmodified and very exposed. The area has remote values and access is limited to a few locations, including Ward Beach and a small number of points south of the Waima River. Walks along the sandy shoreline to the impressive limestone outcrops of the Needles and Chancet Rocks are backed by steep terrain where views towards the open ocean are gained. Views from Cape Campbell lighthouse are spectacular, where panoramic vistas of the sweeping curve of Clifford Bay and the southern shores of the North Island are evident. Other than farm-related activity on the land, this coastline is unmodified, with no aquaculture or jetties/ wharves. The area, once visited, is extremely memorable. Prominent reef areas in the north (including Cape Campbell), give way to extensive sand/gravel shores in the south and large offshore *Macrocystis* (kelp) beds are also present off this coastline. The coastal cliffs and escarpments have small low indigenous forest remnants and unusual, highly distinctive herbfields with nationally threatened species. The dunes and coastal flats also contain nationally threatened species. The Canterbury Gully dunefield, located just south of Cape Campbell, contains nationally threatened ecosystem types and plant species. The coastal scarps and flats have nationally significant ecosystems, including dunes and salt turfs, and good sequences of native coastal vegetation. Several areas are set aside for conservation of natural values through QEII National Trust covenants. Modifications include: pastoral land, occasional fences, farm tracks, a gravel road leading to the lighthouse, a lighthouse and collection of small buildings (including a small overhead powerline), an airstrip, a small quarry, and the Ward beach buildings and road end. This area also includes the eastern extent of Marfells Beach Road.

Appendix 13: Acronyms

Acronym	Meaning
ACE	Annual Catch Entitlement
ATV	All Terrain Vehicle
Council	Marlborough District Council
DOC	Department of Conservation
ECPG	East Coast Protection Group
MBIE	Ministry of Business, Innovation and Employment
MERG	Marine Ecology Research Group
MPI	Ministry for Primary Industries
NIWA	National Institute of Water and Atmospheric Research
NZHPT	New Zealand Historic Places Trust
NZAA	New Zealand Archaeological Association
NZTCS	New Zealand Threat Classification System
NZWAC	New Zealand Walking Access Commission
ONL	Outstanding Natural Landscape
RAP	Recommended Areas of Protection
RAwE	Recreational Access with Education
RECOVER	Reef Ecology and Cultural Values Earthquake Recovery
SNA	Significant Natural Area
UC	University of Canterbury

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