



WAITAKI
WHITESTONE
ASPIRING GLOBAL
GEOPARK
AOTEAROA NEW ZEALAND

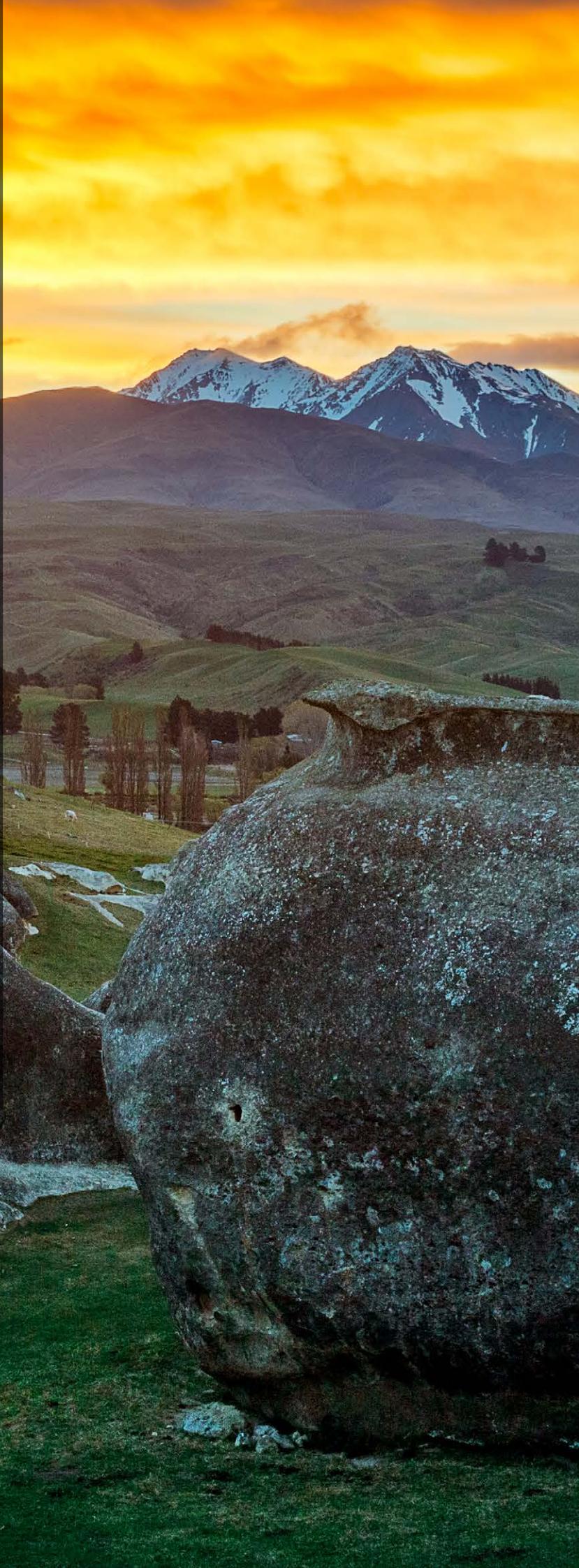
ASPIRING UNESCO GLOBAL GEOPARK
APPLICATION 2019

DOSSIER

DEDICATION

The proponents of the Waitaki Whitestone Geopark wish to acknowledge the enormous contribution that the volunteer members (present and past) of the Vanished World Incorporated Society have made to the knowledge and enjoyment of the current Vanished World Centre and Trail, and to the geoscience education activities through which numerous school children and university students have derived benefit.

But for the efforts of these extraordinary volunteers, the dream of a UNESCO Global Geopark in the Waitaki, Te Waipounamu, Aotearoa, would not have been possible.



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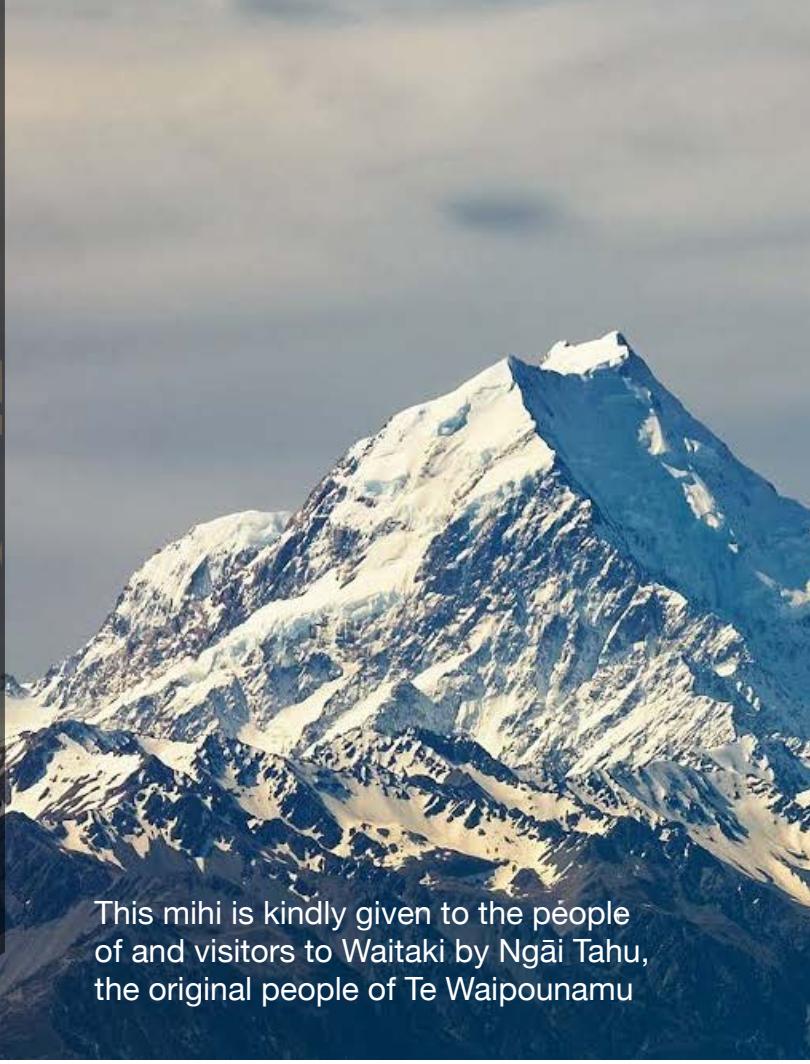
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"Ka titiro ake ki te tīhi o
Aoraki,

Heke atu ki te awa tapu
o Waitaki,

Huri ki te Moana
o Araiteuru,
Tēnā koutou katoa"

*"Look up to the top of Aoraki,
and back down the
Waitaki River,
to the Coast of the ancient
canoe of the Gods, Araiteuru,
Greetings to you all"*



This mihi is kindly given to the people of and visitors to Waitaki by Ngāi Tahu, the original people of Te Waipounamu

INTRODUCTION

Welcome to the Waitaki - formed under an ancient sea and built on the remains of prehistoric creatures from a vanished world. Shaped by volcanoes and glaciers, our district is bordered by the mighty Waitaki River, an early super-highway for New Zealand's first people who left traces of their lives along its banks. In the 19th century a bustling town rose up, carved out of 'whitestone' and trading with the world. Written in the stone and in the earth is the story of the Waitaki - a geological wonderland, steeped in history and waiting to be explored.

The Vanished World Centre and Trail in the rural Waitaki village of Dunroon have been in operation since 2001, introducing thousands of visitors to the unique geology, culture and history of our district. We aim to celebrate and build on the work of the Vanished World Society as we develop the Waitaki Whitestone aspiring Geopark into a UNESCO Global Geopark.

The Waitaki Whitestone Geopark Trust alongside Waitaki District Council, Ngāi Tahu, Vanished World Incorporated, the New Zealand National Commission for UNESCO, Tourism New Zealand, the University of Otago, the North Otago Museum, Tourism Waitaki, Otago Regional Council, Environment Canterbury, the Waitaki Tourism

Association, the Otago Museum, the Department of Conservation and the people of the Waitaki are pleased to submit our application to become New Zealand's first UNESCO Global Geopark.

Mike Gray - Co-chair

Helen Jansen - Co-chair

Waitaki Whitestone Geopark Trust

A

GENERAL INFORMATION



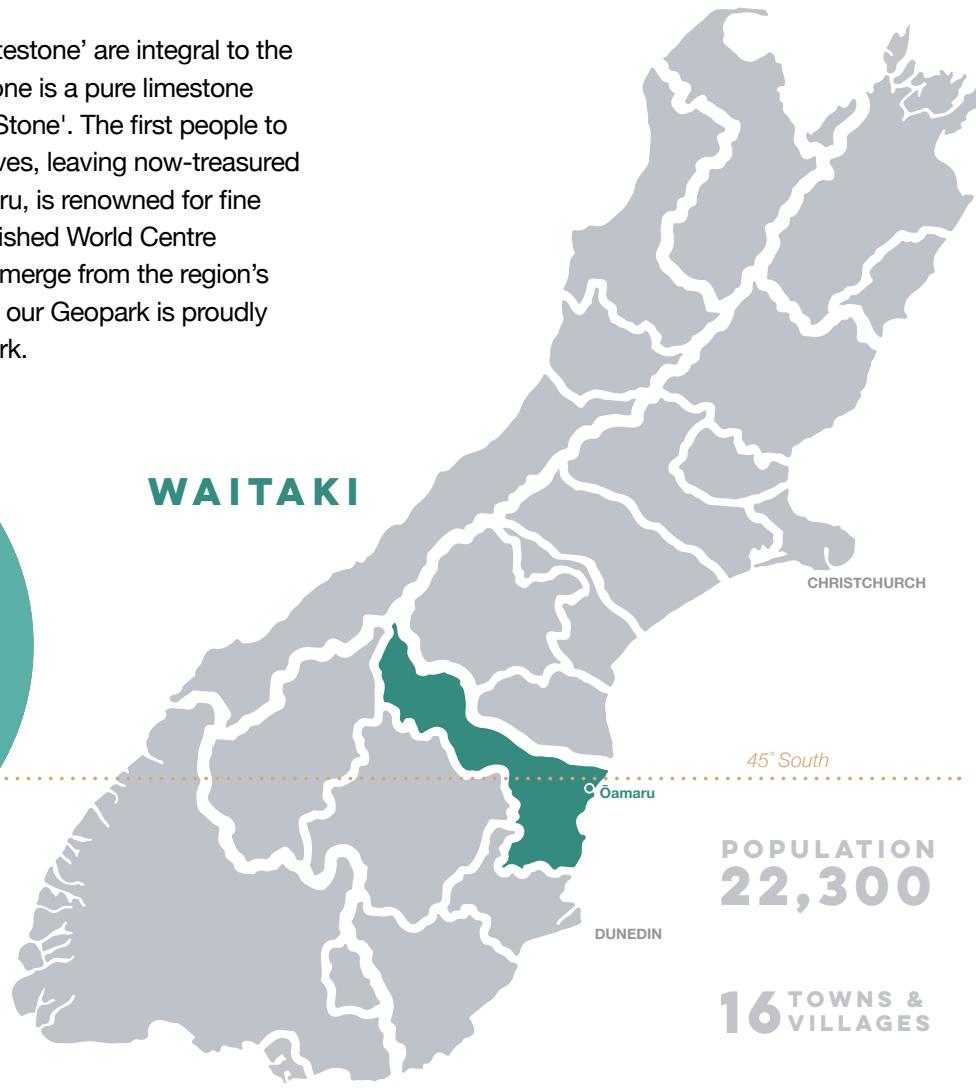
**WAITAKI
WHITESTONE**
ASPIRING GLOBAL
GEOPARK
AOTEAROA NEW ZEALAND

A.1 NAME

A.2 LOCATION

WAITAKI WHITESTONE GEOPARK

The geological landscape and its 'whitestone' are integral to the identity of the Waitaki region. Whitestone is a pure limestone and is commonly known as 'Ōamaru Stone'. The first people to the area found shelter in limestone caves, leaving now-treasured rock art. Waitaki's largest town, Ōamaru, is renowned for fine limestone architecture. Today, the Vanished World Centre celebrates the wondrous fossils that emerge from the region's whitestone. It is for these reasons that our Geopark is proudly named the Waitaki Whitestone Geopark.



The centre of the Geopark is located at:
Latitude -44:40:49.768
Longitude 170:11:14.063

**A.3 SURFACE AREA
7,214 KM²**

A.4

PHYSICAL & HUMAN GEOGRAPHY CHARACTERISTICS

The Geopark reaches from the coast up the Waitaki Valley to the base of the Southern Alps. Built by dynamic tectonic forces and sculpted by fire, ice, and the powerful braided Waitaki River, the Geopark has a land area of 7,214km², in which a population of 22,300 people live in 16 towns and villages.

Within the Geopark there are many examples of rocks and landforms that illustrate the various glacial, tectonic, igneous, fluvial and marine processes that have shaped the Geopark's physical character. These geological features offer a window on the geographic evolution of Zealandia, from its deep-past origins in Gondwana through to the modern day. The karst landscape and its 'whitestone' are integral to the identity of the Geopark. Many years ago the Waitaki River and Valley was a seasonal hunting and fishing ground for New Zealand's indigenous people, the Māori.

HIGHEST PEAK
MT HUXLEY
2505M
ELEVATION

LARGEST TOWN
ŌAMARU
POP 13,715

LONGEST RIVER
WAITAKI RIVER
110KM

The limestone caves and overhangs gave shelter on cold nights and made a canvas for charcoal and red ochre drawings. They provide an early record of the first travellers along the banks of the Waitaki River, which today nourishes a wide range of flora and fauna across the District. Waitaki's largest town, Ōamaru, is renowned for outstanding 19th century limestone architecture. The Geopark offers a home for local wine and food producers, which is reflected in the emerging range of geogastronomy offerings available. Tourism is a significant and growing contributor to the local economy.

A.5

ORGANISATION IN CHARGE AND MANAGEMENT STRUCTURE

Organisation name:

The Waitaki Whitestone Geopark Trust.

Management structure:

The Geopark is governed by The Waitaki Whitestone Geopark Trust. It receives advice from an independent Advisory Group which includes all key stakeholders and relevant experts. The Trust is the sole shareholder in Waitaki Whitestone Geopark Ltd, a limited liability company which will hold commercial contracts and delivers on the Trust's commercial objectives. The Trust is supported by a wide range of local, regional and national partners who provide financial and in-kind contributions to the Geopark.

A.6

CONTACT PERSON

Name: Gerard Quinn Position: Geopark Manager

Telephone: +64 3 433 1607 (day) +64 27 280 3882 (mobile & A/H)

Fax: +64 3 433 0301 Email: manager@whitestonegeopark.nz

Postal Address: Private Bag 50058, Ōamaru, New Zealand, 9444

A.7**WEBSITE**www.whitestonegeopark.nz**A.8****SOCIAL MEDIA****1600+ FOLLOWERS**

@waitakiwhitestonegeopark

We use Facebook primarily to connect with, educate and inform our local community.

**1400+ FOLLOWERS**

@whitestonegeopark

We use Instagram primarily to inspire our followers and promote our Geopark internationally.

B**DOCUMENTS
CHECKLIST**

Expression of interest sent to the New Zealand National Commission for UNESCO on April 30 2018



Application dossier



Self evaluation form

Annexes to the application dossier:



Annex 1: Self-evaluation document

Annex 2: An additional and separate copy of section E 1.1

Annex 3: An explicit endorsement of any relevant local and regional authorities and a letter of support from the National Commission for UNESCO

Annex 4: A large-scale map of the aUGGp

Annex 5: One-page geological and geographic summary

Annex 6: Selected bibliography of the area in Earth Sciences highlighting international publications

Supplementary Annexes:

Annex 7: Our Story

Annex 8: Detailed site information

Annex 9: Site assessment

Annex 10: Interpretation plan

C

LOCATION

Geographic coordinates:

UNESCO area: Oceania

Country: New Zealand, South Island

District: Waitaki

The Waitaki Whitestone Geopark is located at:

Max Longitude: 171°10'46.01"

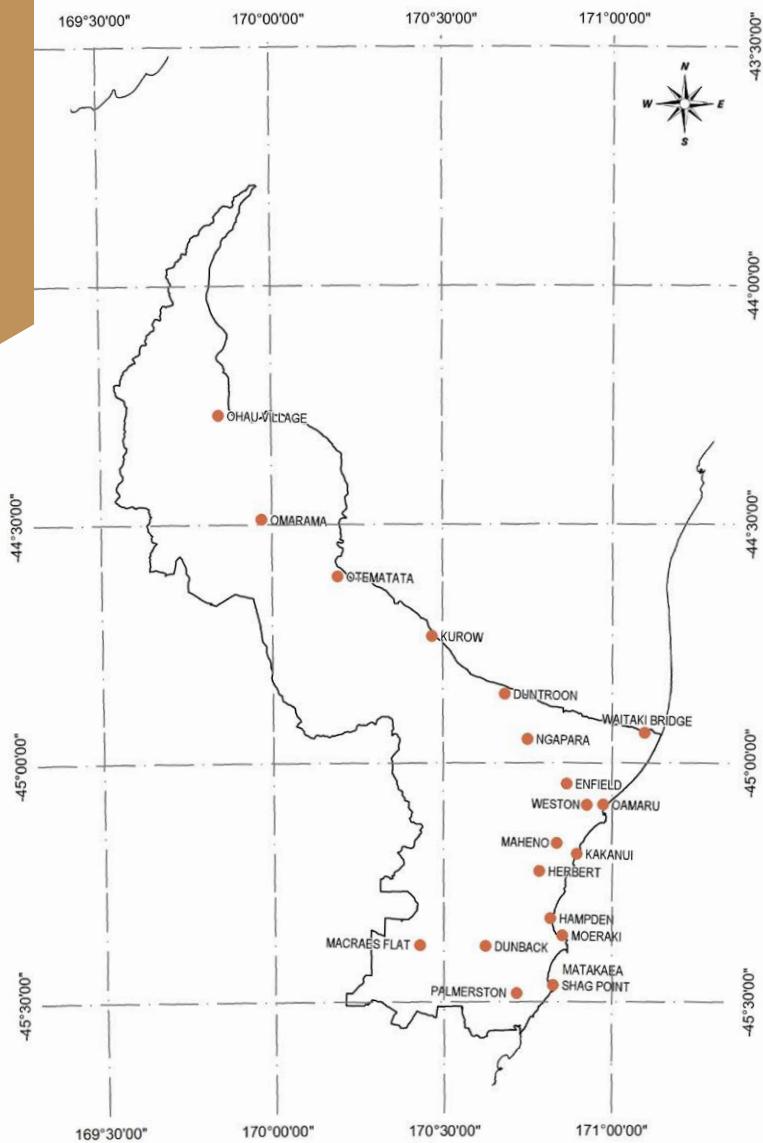
Min Longitude: 169°27'43.09"

Max Latitude: -45°35'07.32"

Min Latitude: -43°46'40.08"



Shape file included with submission:
[Waitaki_whitestone_Geopark_Boundary_EPSG4326.zip](#)



D

MAIN GEOLOGICAL HIGHLIGHTS AND OTHER ELEMENTS

What are the most important geological highlights and other elements, sites, activities of the Waitaki Whitestone Geopark? Why should people visit us?

The over-arching focus of the Whitestone Geopark is Zealandia: almost all of the localities within it reveal evidence of the unique ‘voyage’ of Zealandia, the continental fragment, some 5 million square kilometres in area, that broke away from the ancient supercontinent of Gondwana with the formation of the Tasman Sea floor. From a geological perspective, the Waitaki district offers an exceptionally coherent and comprehensive record of this extraordinary event in time and space.

Not only is the story of Zealandia’s geologic history clearly revealed in the landscapes of the Waitaki region, but the rocks contain fossilised remnants of an ancient marine world. The presence of these past inhabitants of the Waitaki district makes our story unique and brings our geologic heritage to life.

The Waitaki Whitestone Geopark offers unique and diverse insights into the history of Zealandia — Earth’s



Photo: Elephant Rocks, © Riley Baker

‘8th continent’. Zealandia’s story begins at the edge of the Gondwana supercontinent during the Mesozoic Era about 200 million years ago, when ocean-crust rocks were being subducted under the continental crust of Gondwana. Ocean-floor sands and muds scraped off during subduction piled up in an accretionary wedge and were compacted into greywacke rock, and in places metamorphosed to schist. Subduction ended about 105 million years, during the Cretaceous Period, followed by a major change in tectonics that saw Gondwana start to break up. Rifts propagated into the supercontinent, with ocean crust forming within the spreading rifts. Two large fragments of Gondwana continental crust became Australia and Antarctica, with a third fragment (Zealandia) being pushed out into the Pacific Ocean as sea-floor spreading progressively created the Tasman Sea and the Southern Ocean. An isolated block of continental crust surrounded by thin ocean crust, Zealandia began to subside. By the middle of the Cenozoic Era (about 25 million years ago) it was largely submerged, with small land areas surrounded by shallow seas. A new tectonic boundary then propagated through Zealandia, creating a fracture between the Pacific and Australian plates. Compression along the plate boundary began to uplift a small part of Zealandia (only 5% by area of the submerged continent), resulting in the New Zealand landmass as we know it today.

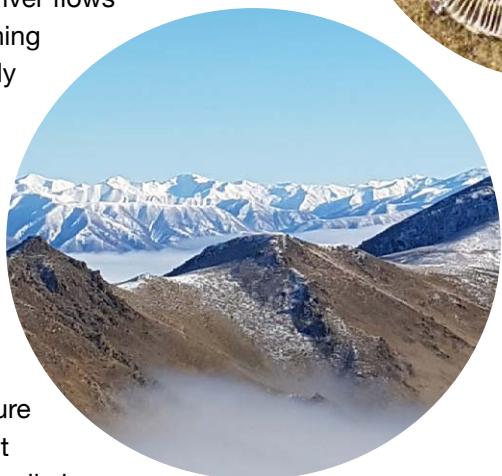
The continental crust of Zealandia is of Gondwana origin, including the greywacke and schist of eastern New Zealand, and the granites and gneisses of the southern and western South Island. This foundation



Photo: Karst outcrop © Capture8 Photography

of older rock was blanketed by the Zealandia Megasequence, a succession of sedimentary and volcanic rocks formed during Zealandia's separation from Gondwana and its tectonic journey out into the Pacific. The oldest part of the sequence accumulated in isolated rift valleys, with examples preserved today near Matakaea (Shag Point). The ensuing succession of sedimentary layers was laid down over a generally flat landscape, sometimes called a peneplain, during Zealandia's submergence. Quartz-rich coal measures are overlain by marine sandstones and mudstones. At maximum submergence, the available sediment was mainly the shells and skeletons of marine organisms, which formed limestone. At the same time episodes of 'hot-spot' volcanism produced a variety of volcanic deposits.

The new plate boundary initiated uplift of the main fault-block mountains, with ensuing erosion of the sedimentary sequence off the uplifted blocks, the concentration of river flows along the intervening basins, and latterly the ongoing uplift and erosion of the Southern Alps in the hinterland. Lake and river sediments are the main geological signature of the most recent evolution of Zealandia in the Waitaki district.



At the break-up of Gondwana, Zealandia lay close to the South Pole. Sea-floor spreading left Antarctica centred on the pole while the other continental fragment shifted northwards, creating the Southern Ocean and, of fundamental importance to global climate, the Antarctic Circumpolar Current.

Resulting global cooling and growth of Antarctica's ice cap saw southern marine life thrive and diversify in highly productive cooler ocean waters. The Oligocene-age shallow-water limestones and sandstones of the Waitaki district contain some of the most diverse marine vertebrate fossils yet described, including the remains of shark-toothed dolphins, giant penguins, mega-toothed sharks, ancient baleen whales and the earliest known modern toothed whales. These fossil discoveries preserved in the "whitestone" of our Geopark have proven critical to our understanding of the evolution of modern whales and dolphins.

During episodes of ice-age climate, Southern Alps glaciers advanced into the Mackenzie basin, depositing moraines there, while trains of outwash gravel extended down the Waitaki valley. Lake Ōhau lies in the trough of an ice-age glacier with spectacularly-preserved

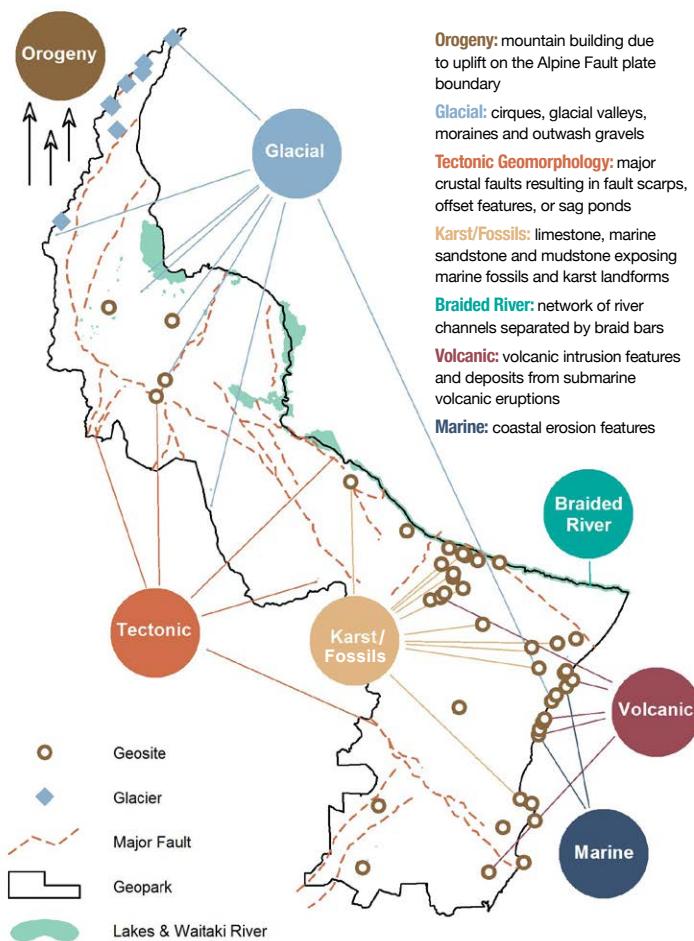




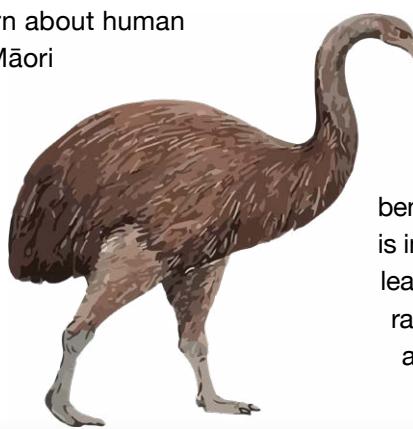
Photo: Otago University students studying Waitaki Fossils © R Ewan Fordyce

glacial landforms around its perimeter. All of the Waitaki district mountain ranges are the product of fault movements, accrued over several millions of years – the most recent movements are registered by offsets of geologically-young landforms, notably on the Ostler Fault in the Mackenzie basin. Other landforms are the products of erosive forces, including the limestone karst features, and tabular hilltops developed on hard layers in the geological strata.

The Waitaki Whitestone Geopark contains premier examples and exposures of these geological features that illustrate the ancient to modern geological history of Zealandia. A visit to our Geopark teaches people about our natural and cultural heritage as well as the area's geology. Our Geosites are complemented by natural heritage sites and cultural heritage sites like the Ōamaru Blue Penguin Colony and the North Otago Museum. Whitestone sits at the heart of our Geopark. We have used whitestone as the central element in the relationship diagram on page 12 to illustrate the links with other places, facilities and activities within the Geopark that help us tell the richer story.

The limestone supports unique plants which are protected at sites such as Wai o Toura Reserve (Geosite 06). Crevices in the limestone at places like Earthquakes/Waipata (Geosite 13) have been used to study the faunal remains of recently extinct birds including the moa. Along the coast visitors can see penguins, contrasting with the ancient fossil penguins discovered in the limestone.

Our Geopark allows people to learn about human interactions with this landscape. Māori used the limestone overhangs as sites of artistic expression and for shelter such as at Takiroa shelter rock drawings (Geosite 07). Māori cultural heritage is present throughout the Geopark area. The Waitaki River (Geosite 12) was a primary ara tawhito (traditional travel route).



The Geopark also provides locals, domestic visitors and tourists to the district with insight into the more recent history. The European settlers in the 19th century used the limestone to build the whitestone city of Ōamaru. These historic buildings are recognised as an Otago Landmark. The human history stories interweave with the geology. The architect of many of these buildings, Thomas Forrester, was also a diatomist, studying the microscopic fossils that make up the local diatomaceous earth.

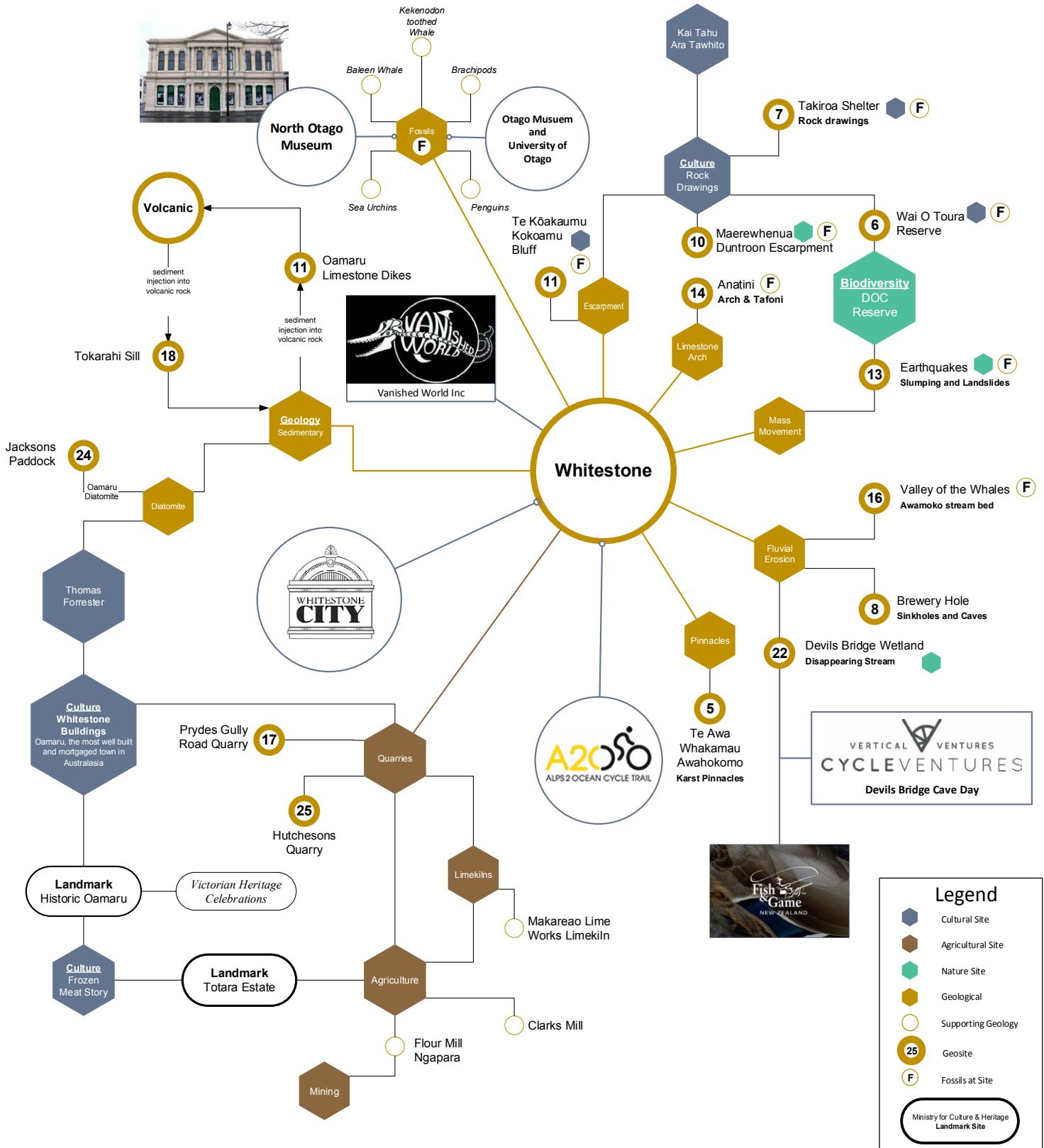
The limestone was also quarried to provide nutrients for agriculture. Cultural heritage site Totara Estate showcases the beginning of New Zealand's frozen meat export business. Other human stories include gold mining at Golden Point Battery (Geosite 42) and Nenthorn Goldfield (Geosite 09). Sections E2.1, E2.2 and E2.3 more fully document the natural heritage, cultural heritage and intangible cultural heritage of this area.

The geology of our Geopark has generated a range of educational activities such as field trips and camps. The Alps 2 Ocean cycle trail wends its way through the Geopark, allowing people to experience the area at close quarters. There are historic homesteads to visit, geogastronomy restaurants and wineries to take refreshment at, and museums and galleries to enjoy.

In an area absent of subduction but flanked by the collision of oceanic and continental crust, Waitaki is compressed within a very small geographic area, but with plenty to see. And Zealandia is the glue that brings all 42 geosites together. Visitors to the Waitaki Whitestone Geopark will have a unique opportunity to be exposed to layers of stories about the region's distinctive geology, culture, its people and their place. During their travels and interactions with our community they will listen, learn, explore and appreciate the Geopark's natural environment from the memories stored beneath the surface to the heritage formed above it. It is intended that every visitor entering our Geopark will leave with lasting memories of our outstanding and rare geological sites, as well as an understanding and appreciation of the values of what a UNESCO Global Geopark stands for.

Waitaki Whitestone Geopark - Whitestone Story

World class Geology, Geosites, Cultural, Agricultural and Natural Site relationships



Whales, dolphins and penguins of Awamoko-Duntroon district

[fossils]

Our proposed global geopark has yielded ample evidence of the diverse species that once thrived here. Important bony fossils have been discovered in local marine limestones, including the giant extinct *Kairuku* penguins that stood 1.3 metres high; the "dawn" baleen whale *Tokarahia*; dolphins, such as *Waipatia*; as well as larger shark-toothed *Squalodon* dolphins.

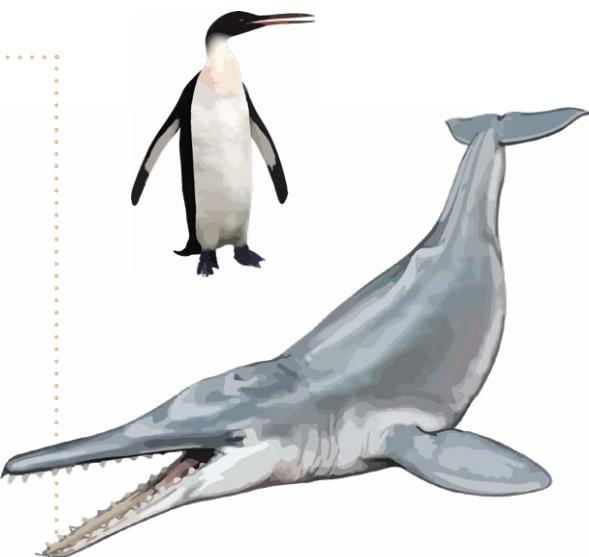
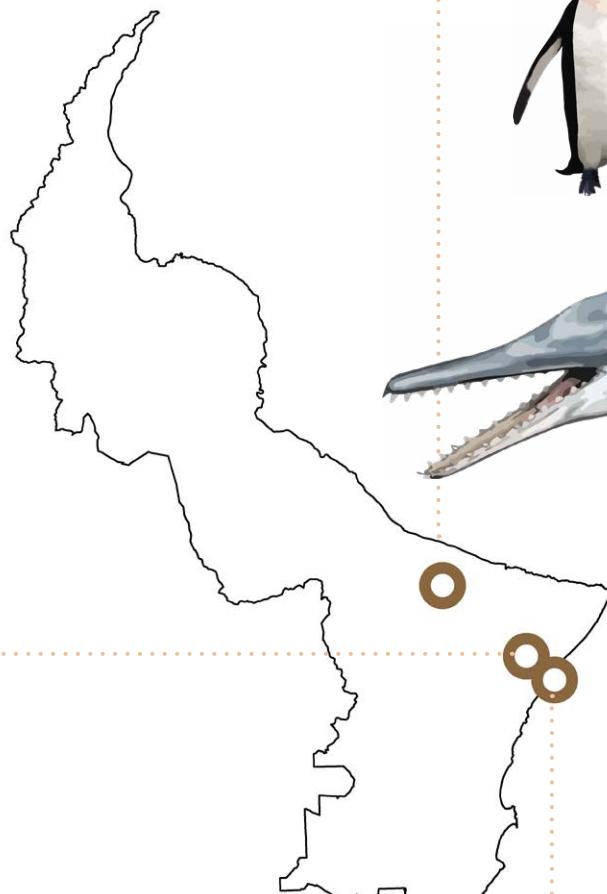
Photo: © R Ewan Fordyce



Whitestone

[geology]

Ōamaru stone gives a unique character to many beautiful buildings but it is geologically interesting too—the stone was once alive! A combination of the passage of 20-30 million years and burial have transformed the remains of seashells into Ototara Limestone. The local stone is very pure, being mainly made from microscopic sea creatures called bryozoans.



Pillow lavas and associated volcanics

[geology]

Around 34 million years ago the coast from Moeraki to Ōamaru included volcanoes erupting in shallow shelly-bottomed seas. A significant trace of the region's volcanic past are the world-class examples of pillow lavas located at Boatman's Harbour, Cape Wanbrow. Pillow lavas form when molten lava is chilled quickly in seawater. This volcanic activity also created the "gem gravels" found along the Kakanui coast, technically mineral breccias, which erupted from deep in the earth.

Elephant Rocks

[geomorphology]



The Elephant Rocks locality has many distinctive large hummocky or elephant-shaped limestone outcrops.

The “elephants” are formed from Otekaike Limestone, which originated as a fossil-rich marine sand 25 million years ago. The thick and flat-lying limestone has many joints (cracks) caused by uplift of the area. These joints, which cross each other, are readily eroded by water.

Eventually, enough limestone is eroded away to leave the “elephants” exposed and isolated from each other.

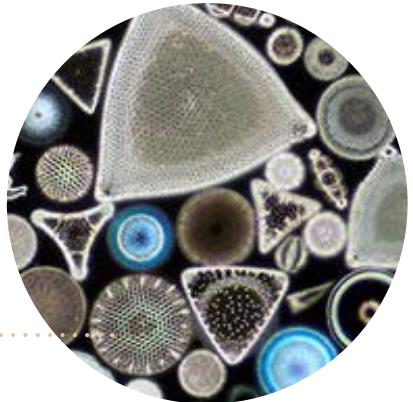
Photo © Tamsin Gorman



Paritea (Clay Cliffs)

[geomorphology]

This stunning landscape of high, eroded, spectacular “badland” outcrops encourages people to wonder how this landscape was formed. The Clay Cliffs are formed in a sequence of lake and river sediments deposited in an inland basin several million years ago, and later tilted and uplifted along the active Ostler Fault. The Ahuriri River has cut in along the line of the fault, steepening the edge of the uplifted ground and promoting the formation of classic ‘badlands’ box-canyon gullies.



Diatoms

[fossils]

Our district is world-renowned for its diatoms. Diatomite is a light powdery substance that appears unassuming to the naked eye but under the microscope is full of microfossils, primarily diatoms. The Geopark includes the famous Ōamaru diatomite sites. Ōamaru diatoms have been studied all over the world and are important due to the diversity of species present.

Photo: © Wayne Barrar

Moeraki Boulders & Matakaea (Shag Point) Boulders

[geomorphology]

Te Kaihīnaki (the Moeraki Boulders) are a popular scenic destination for a reason. These striking spherical rocks reach over 1 metre in diameter, and have formed a spectacular backdrop to photographs for over a century. Beyond the immediate visual appeal is an interesting geological story.

The boulders at Moeraki and Matakaea (Shag Point) formed within sedimentary rocks that had been deposited on ancient seafloor between 50 and 70 million years ago. At the heart of each boulder is a pebble or fossil, around which calcite slowly crystallised, cementing the surrounding sand or mud to produce hard concretions surrounded by uncemented sand or mud. Spherical boulders may have formed around something of a regular shape, like a shell, while more irregular boulders may have formed around something much more unique, like the complete 70 myr-old plesiosaur skeleton found at Matakaea (Shag Point)!



VERIFICATION OF UNESCO GLOBAL GEOPARK CRITERIA

E.1 TERRITORY

E.1.1 GEOLOGICAL HERITAGE AND CONSERVATION

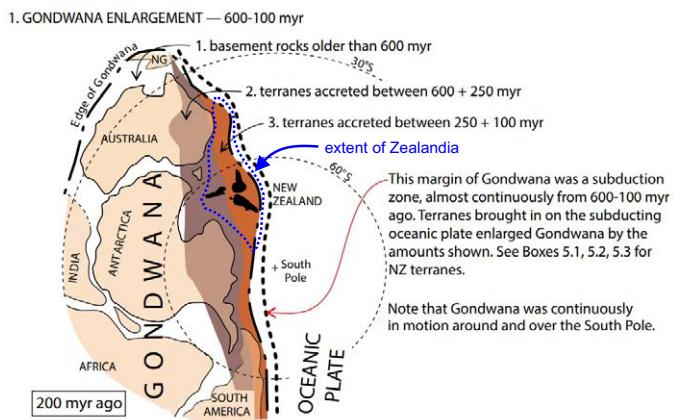
Bordered by the growing Southern Alps to the west, the internationally significant braided Waitaki River plains to the north, and spectacular sea cliffs and volcanic headlands of the eastern coast, the diverse geology of the Waitaki district preserves the key components of Zealandia's geologic history (Fig. 1 - overpage).

The foundations of Zealandia are hard rocks of Paleozoic to Mesozoic-age, represented in the Waitaki district by greywacke sedimentary rock, accreted at the margin of Gondwana and locally metamorphosed into schist. The overlying sedimentary sequences document the break-up of Gondwana, and the tectonically-facilitated journey of Zealandia out into a remote oceanic location. All these events coincided with fundamental global changes in the arrangements of continents and ocean circulation, that led to the Quaternary Period glaciation, with cooler southern seas, and profound imprints of glacial-interglacial cycles in the Southern Alps and adjacent forelands, through which meltwater rivers transferred glacially-derived sediments seawards.

Geological Foundations

The basement rocks of this district form the fundamental crust. They underlie the entire area at depth, and are exposed in the mountain ranges. They record New

Zealand's deeper geologic origins from the Gondwana supercontinent. The eastern margin of Gondwana represents one of the most extensive and long-lived subduction margins on Earth. During the Paleozoic to Mesozoic eras (about 540–100 million years ago), sedimentary material and geologic terranes—discrete fragments of the crust—were scraped off the paleo-Pacific plate as it subducted beneath Gondwana. Zealandia is composed of an assemblage of these terranes that accumulated at the Gondwana margin (Fig. 2). Much of this material underwent regional metamorphism as it was accreted, producing the metamorphic basement rocks of New Zealand.



By 100 myr ago, India and Africa had separated and moved away. The remaining four continents began to break apart 100 myr ago.

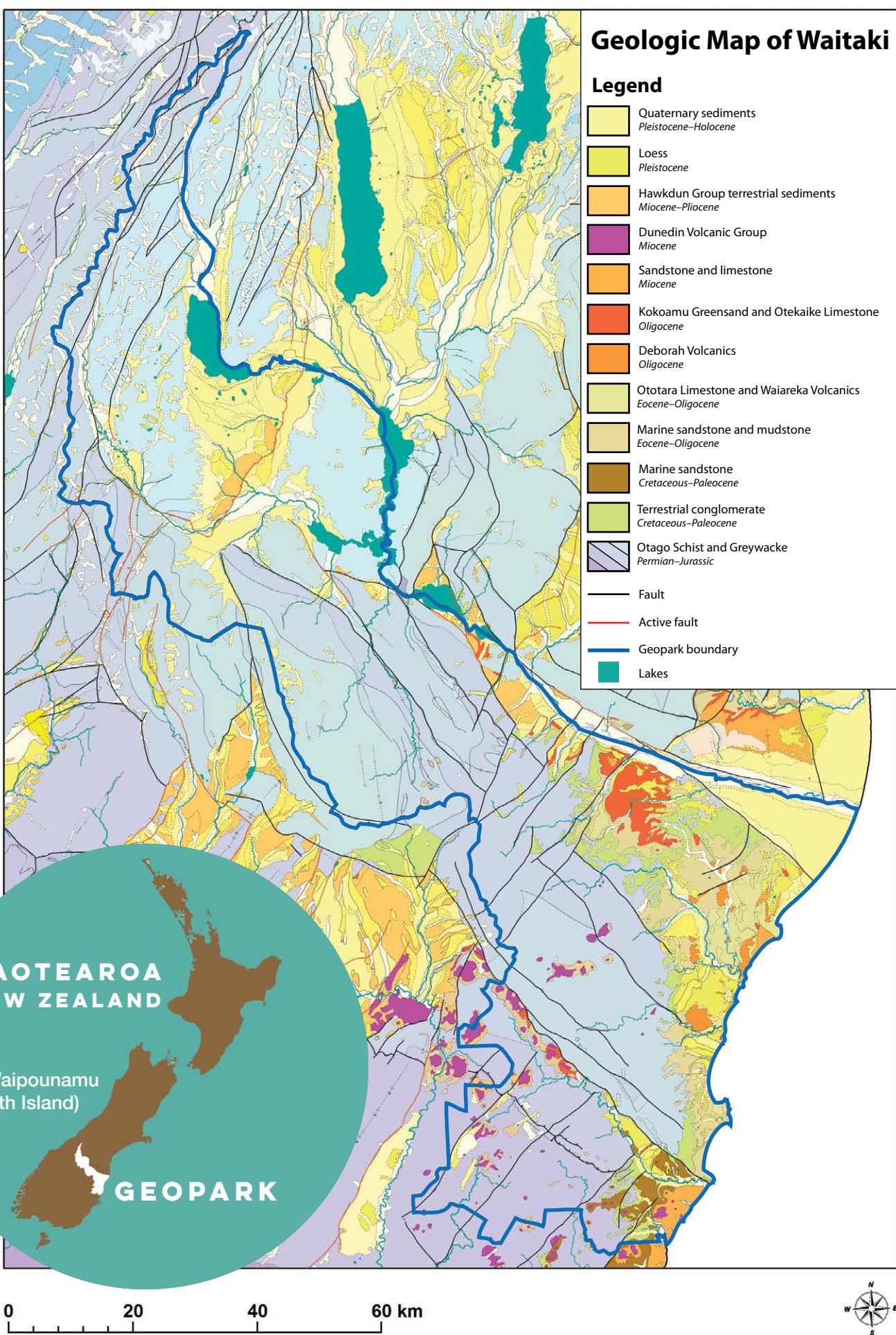
Figure 2: Gondwana margin showing the location of Zealandia (Aotearoa New Zealand) with respect to other Southern Hemisphere continents. From Ballance (2009)

The basement rocks of the Waitaki district belong to the Rakaia terrane, which comprises quartzofeldspathic sandstones and mudstones, as well as their regionally metamorphosed equivalent, the pelitic and psammitic Otago Schist. The degree of metamorphism in the Waitaki area varies from non-metamorphosed greywacke through to high-grade schist that has experienced 'greenschist-facies' metamorphic heat and pressure. During the final stages of metamorphism, hydrothermal fluids circulated through faults, fractures and shear zones in the schist, precipitating gold and other metallic minerals.

Progressive uplift and erosion of gold-bearing schist resulted in the accumulation of gold-bearing sediments throughout Otago. The discovery of gold-bearing quartz veins in the Otago Schist and concentrated alluvial gold deposits in the overlying sedimentary rock and glacial gravels prompted a gold rush in this region in the late 19th century. Historic gold workings from this time are preserved at Golden Point Battery and Nenthorn.

Geosite examples: 42 Golden Point Battery, 09 Nenthorn, 01 Ahuriri, 19 Hutton's Bridge, 31 Mt Dasher (Otepopo) Slate.

Figure 1: Simplified geologic map of the Waitaki district.
Geologic units are from <http://data.gns.cri.nz/>.



Birth of a Hidden Continent

The widely accepted estimate for the end of subduction along this section of the Gondwana margin is ~105 million years ago. A subsequent rift within Gondwana resulted in separation of the Zealandia continent. Formation of the Tasman Sea floor occurred over a 30 million-year interval of Cretaceous to Paleogene time, between 85 and 55 million years ago. A second ocean-forming rift commenced about 35 million years ago between Australia and Zealandia (locked together) and Antarctica to produce the Great Southern Ocean, and this process is still active (Fig. 3).

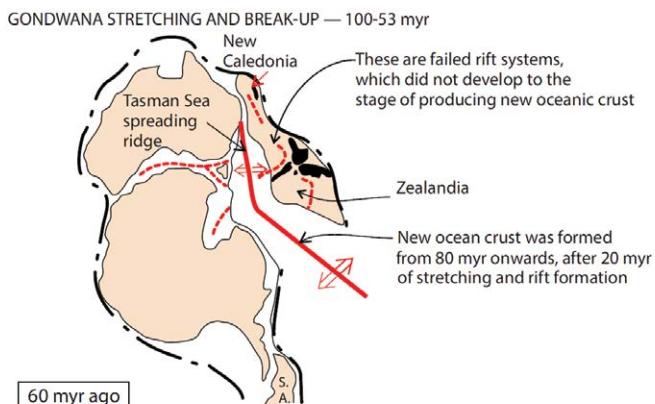


Figure 3: Breakup of Gondwana via rifting along the Tasman Sea spreading ridge. From Ballance (2009)

As Zealandia was stretched and rifted from Gondwana, its continental crust was thinned. Isostatic adjustment resulted in the subsidence of >95% of the original Zealandia landmass. Consequently, the geological record is one of widespread marine transgression from about 100–30 million years ago (Fig. 4).

Cenozoic Marine Transgression

During the marine transgression the encroaching sea cut a conspicuous erosion surface across the basement rock (Fig. 4). Referred to as the Waipounamu Erosion Surface, or simply ‘peneplain’, this feature represents an unconformity, or discontinuity in the geologic record. It is visible in today’s landscape as broad, low-relief, planar to gently rolling topography. This semi-planar surface is an important reference for discerning subsequent tectonic deformation. Fault-uplifted ranges such as the Kakanui Mountains and Hawkdun Range have notably flat range tops, which are remnants of the erosion surface. In areas of schist terrain, the erosion surface is commonly studded by tors, 1–3 m high outcrops of resistant schist that have remained after the surrounding schist was removed by erosion. Low-relief topography and schist tors are important characteristics of the southern Waitaki landscape, and can be viewed from geosites in the southwestern part of the Geopark and at lookout geosites.

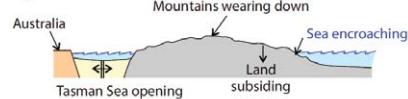
Geosite examples: 42 Golden Point Battery, 09 Nenthorn, 31 Mt Dasher (Otepopo) Slate, 13 Earthquakes, 41 Puketapu.

The Great New Zealand Unconformity

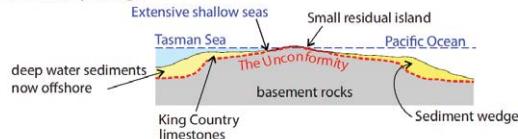
A 100 million years ago



B 70 million years ago



C 30 million years ago



25 million years ago - a major change took place, to the present tectonic regime of earthquakes, volcanoes and rising mountains.

D Today

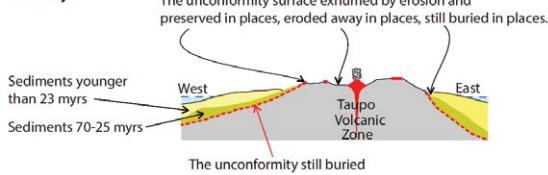


Figure 4: Schematic summary of the subsidence of Zealandia’s basement rocks below sea level (A), (B) the formation of the Waipounamu Erosion Surface (erosional unconformity), (C) marine transgression and deposition of a sedimentary sequence, and (D) uplift and exhumation of the crust above sea level from 25 million years ago. From Ballance (2009)

Sedimentary Cover Strata

A Cretaceous to Cenozoic (100 million years ago–present) sedimentary sequence has been deposited on the basement rock (Fig. 4). This sedimentary cover, known as the Zealandia Megasequence, documents the transition from terrestrial sedimentation (e.g. Matakeea Shag Point) to marine sedimentation (e.g. Valley of the Whales) and sporadic igneous activity (e.g. Boatman’s Harbour, Bridge Point) (Fig. 5). Marine transgression transformed the Waitaki region into a wide shallow sea, with scattered islands and explosive submarine volcanic centres, building a nutrient-rich marine habitat ideal for harbouring species of shark-toothed dolphins, giant penguins, mega-toothed sharks, ancient baleen whales and a diverse flora of marine diatoms.

The carbonate and silica shells and bony remains of this ancient marine ecosystem were buried with the seafloor sediments, capturing them in the fossil record. The seafloor deposits were lithified over time to become limestone, diatomite, and greensand. These distinctive rock types typify the Waitaki district and it is after the limestone ('whitestone') that the Waitaki Whitestone Geopark is named. Quarrying of the whitestone began in the late 1800s and continues today, and has resulted in Ōamaru’s distinctive stone architecture. Important fossil discoveries within the limestone and greensand deposits in the Waitaki area have proven critical to our understanding of the evolution of modern whales and dolphins.

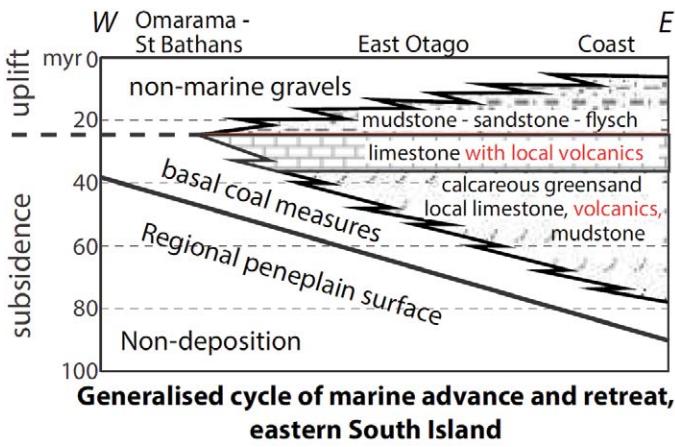


Figure 5: Simplified stratigraphic section showing the location and type of sediments deposited during the Cretaceous–Neogene marine advance (transgression) and retreat (regression). From Ballance (2009)

Geosite examples: 05 Awahokomo Karst Pinnacles, 06 Wai o Toura Reserve, 07 Takiroa Shelter Rock Drawings, 08 Brewery Hole, 10 Duntroon Escarpment, 11 Kokoamu Bluff, 13 Earthquakes, 14 Anatini, 15 Elephant Rocks, 16 Valley of the Whales, 17 Prydes Gully Road Quarry, 20 Rakis Table, 21 Landon Creek Bank, 22 Devil's Bridge Wetland, 24 Jackson's Paddock, 25 Hutcheson's Quarry, 26 Ōamaru Limestone Dikes, 28 Old Rifle Butts, 29 Awamoa Creek Fossils, 33 Campbell's Bay, 34 All Day Bay, 36 Moeraki Boulders and Scenic Reserve, 40 Matakaea/Shag Point.

Volcanism

Cenozoic sedimentary strata are punctuated by two distinct periods of volcanic activity: the Waiareka-Deborah Volcanics erupted during the late Eocene to early Oligocene (40–32 million years ago) and the Dunedin Volcanic Group erupted during the Miocene (21–10 million years ago). The Miocene volcanism occurred on dry land whereas the Eocene-Oligocene eruptions occurred in a shallow-marine setting and were often highly explosive due to the interaction of magma with water. The products of the volcanism include pyroclastic deposits, mineral breccias, feeder dikes, pillow lavas and extensive lava sheets. Outcrops of these volcanic rocks are distributed throughout the Geopark, forming prominent headlands along the coast and volcanic peaks dotting the skyline along the southern border of the park (e.g. Puketapu). Studies of the volcanic deposits throughout the Waitaki district have contributed to our understanding of the interaction of magma with water, explosions in unconsolidated substrates, and submarine eruption-fed density currents.

Geosite examples: 18 Tokarahi Sill, 23 Enfield Dikes, 27 Boatman's Harbour, 32 Kakanui Mineral Breccia, 35 Bridge Point, 37 Moeraki Peninsula, 38 Kātiki, 41 Puketapu

A New Plate Boundary: Uplift, Mountain Building and Active Tectonics

According to plate reconstructions, a new plate boundary between the Australian and Pacific plates propagated through the centre of Zealandia between ca. 30 and 20 million years ago, due to rapid migration of the rotation pole of the Pacific plate to the southeast. The transcurrent strike-slip plate boundary bisected Zealandia, with the northern portion of Zealandia being incorporated into the Australian plate and the southern portion on the Pacific plate (Fig. 6). Subsequent displacement on this plate boundary has played a large part in shaping the Waitaki region. While the majority of plate motion has been strike-slip – offsetting basement rocks laterally by ~460 km – displacement on the plate boundary became increasingly oblique over the past 10 million years or so.

NEW PLATE BOUNDARY — 45 myr to present

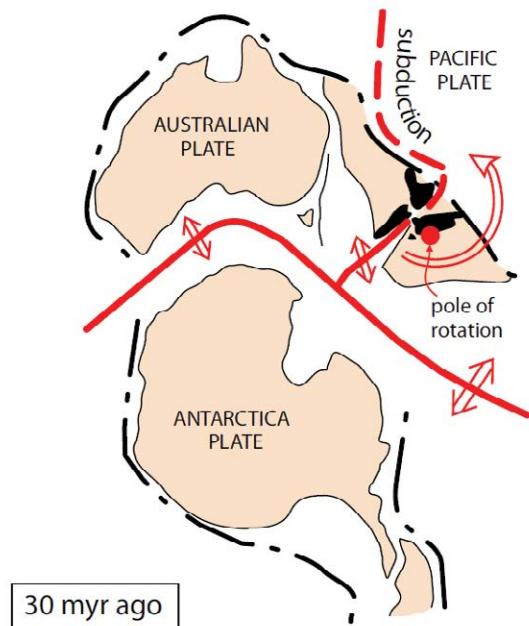


Figure 6: A new plate boundary bisected Zealandia from 30 million years ago. Northern Zealandia was incorporated into the Australian plate while southern Zealandia became part of the Pacific plate. From Ballance (2009)

This oblique plate motion resulted in marine regression, or the retreat of the shallow sea that had covered Zealandia for much of the Cenozoic. Approximately ~5% of Zealandia emerged above sea level as a result of this uplift. Although 50–90% of the plate motion between the Australian and Pacific plates in the South Island is accommodated on the Alpine Fault (Fig. 7), subsidiary faults throughout the Waitaki district have experienced occasional large earthquakes, as registered by offset landforms of geologically-young age. Mountain building along the plate boundary produced the Southern Alps, which occupy the northern sector of the Geopark. These

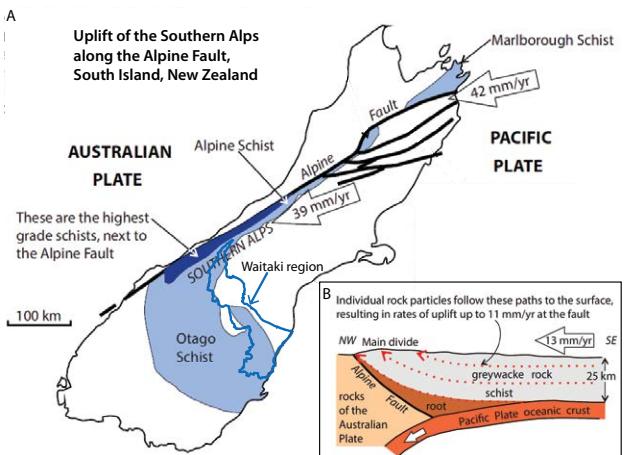


Figure 7: (A) Location of the Alpine Fault plate boundary. The direction and magnitude of relative plate motion is indicated by the arrows. (B) Cross section perpendicular to the Alpine Fault showing the interaction of plates at depth, trajectory of rock uplift and 13 mm/year of convergent relative plate motion. From Ballance (2009)

mountains contain remnants of glaciers that in their retreat from extended ice-age positions have left behind stunning glacial landform features. Sediment from the Southern Alps is transported to the ocean by the braided Waitaki River. Braided rivers only occur in parts of the world with young, rapidly eroding mountains such as the Southern Alps. The operation of hydroelectric-dams on the Waitaki River has made it an ideal location to study how river morphology changes with changing discharge.

Geosite examples: 01 Ahuriri, 02 Ōhau Moraines, 03 Clay Cliffs, 4 Ostler Fault Zone/The Knot, 12 Waitaki River.

Geomorphology

Waitaki's landscape is dominated by mountains, basins and valleys. Quaternary glaciations have left cirques, glacial stairways and spectacularly preserved moraine belts in the Southern Alps sector of the district. The central regions of the Geopark are characterised by rolling downlands bound by the braided Waitaki River to the northeast and the Kakanui Mountains to the southwest. Limestones and sandstones form flat-topped mesas in inland regions, while less resistant mudstones and siltstones create a more subdued, rolling topography (Fig. 8). Resistant volcanic centres and basalt flows form prominent hills and headlands jutting out from the coastline. Chemical weathering of limestone along joints and beds has created karst topography and features throughout the region, such as the animal-like monoliths at Elephant Rocks and numerous cave shelters containing treasured rock art left by early human inhabitants (Fig. 8).

Geosite examples: 02 Ōhau Moraines, 07 Takiroa Shelter Rock Drawings, 10 Duntroon Escarpment, 12 Waitaki River, 15 Elephant Rocks, 20 Rakis Table, 38 Kātiki, 41 Puketapu.

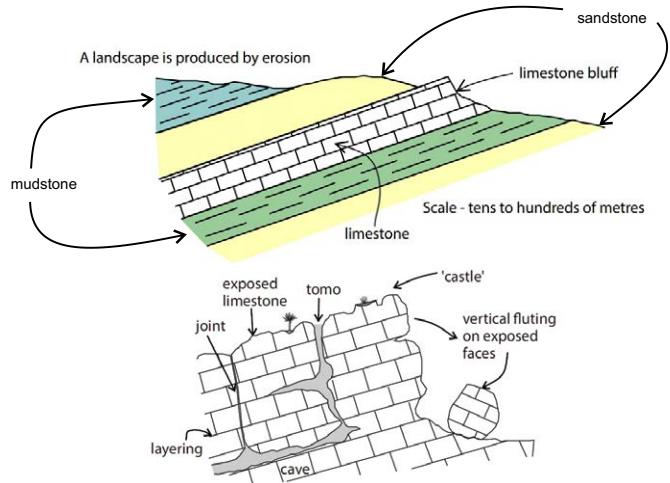


Figure 8: Cross section through a sedimentary sequence showing the relative resistance of limestone layers that form escarpments and flat-topped mesas in the Waitaki region. Percolation of water along joints in exposed limestone causes dissolution and can lead to caves and karst erosion. From Ballance (2009)

Loess and Coastal Erosion

Layers of windblown loess were deposited throughout the Waitaki district valleys and downlands during glacial periods. The loess was sourced from river and stream floodplains. Sponge spicules within the loess deposits progressively decrease in abundance inland from the coast, indicating that some loess was blown inland from the continental shelf during glacial periods when sea level was relatively low. The Waitaki coastline is characterised by river estuaries separated by sea cliffs and volcanic headlands. Although the Waitaki coastline is tectonically relatively stable, active marine erosion of softer sedimentary rocks and loess within sea cliffs is extensive. Remnants of higher beach deposits provide an indication of paleo sea-level along the Waitaki coast at Old Rifle Butts, Shag Point and Boatman's Harbour.

Geosite examples: 27 Boatman's Harbour, 28 Old Rifle Butts, 30 Beach Road Erosion, 40 Matakaea/Shag Point.

References:

- Ballance, P. (2009). New Zealand Geology: an illustrated guide. Retrieved from <http://www.gsnz.org.nz/zealand-geology-p-632.html>.

List and description of geological sites

Following a series of site assessments as part of the self-evaluation process, forty two have been selected as the geosites of the geopark. For more in-depth site information please see Annex 8. For more site assessment results please see Annex 9.

The table below gives a short description of the site, geographic coordinates, levels of protection, scientific importance, map links and the characteristics of the site:

Table 1: List and description of the Geosites of the Waitaki Whitestone Geopark
Maps can be found at <https://maps.waitaki.govt.nz/GMSC/Public/GeoparkGIS.html>

NUMBER	NAME	DESCRIPTION & PROTECTION	IMPORTANCE	FOCUS
01	Ahuriri 	The Ahuriri area is widely recognised for its outstanding landscape -mountains provide a snapshot of the Southern Alps, evidence of past glaciations and active faults in the landscape. Protection: Outstanding Natural Landscape & Conservation Park	Regional Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
02	Ōhau Moraines 	The Ōhau Moraines are some of the most sensitive recorders of ice-age climate change in the Southern Hemisphere. Also containing rare and threatened plants. Protection: Outstanding Natural Landscape & Conservation Park	International Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
03	Paritea (Clay Cliffs) 	Spectacular “badland” outcrops first formed as gravels, sand and silt, in fresh-waters. Sediments buried and compacted, then uplifted and extensively eroded by wind and water. Protection: QEI covenant and Outstanding Natural Landscape	Regional Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
04	Ostler Fault zone, 'The Knot' 	A major 90 degree bend in an active reverse fault. Surfaces c.20000 years old. Cutting across glacial moraines, makes it an ideal site for monitoring strain caused by plate boundary movement. Protection: Rural Scenic Zone	International Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
05	Te Awa Whakamau (Awahokomo) karst pinnacles 	Karst pinnacles are the eroded remnants of thick sheets of Otekaike Limestone, which formed about 25 mybp, when the low land was surrounded by wide shallow seas. Protection: QEI covenant	National Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
06	Wai O Toura Reserve 	Rare limestone ecosystem and geological holostратotype. Home to critically endangered plants like Lepidium sisymbrioides. Significant fossil penguins. Archaeological and paleontological sites, and geological reference site. Protection: Scenic Reserve	National Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
07	Takiroa shelter rock drawings 	Limestone overhangs offered early travellers shelter along a seasonal route up the Waitaki Valley. A variety of rock art is captured here. It is an archaeological treasure. Protection: Significant Natural Feature, Archaeological Item (5653)	National Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
08	Brewery Hole 	The Maerewhenua river disappears into sink holes and travels 4.5km underground to emerge at this sunken limestone cave known as Brewery Hole. Once known as Waikoakoa (happy waters). Protection: Heritage New Zealand Pouhere Taonga Act 2014	Regional Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
09	Nenthorn Goldfield 	You can barely see any trace of what once was a gold boom town. The roadside features an example of well exposed gold-bearing quartz veins that created this boom. Protection: Referenced for conservation purposes s62(1) Conservation Act 1987:	International Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
10	Maerewhenua rock art site, Duntron Escarpment 	This escarpment contains multiple rock shelter sites and rock drawings and is an outstanding natural feature. Protection: Partial Historic Reserve (Maerewhenua Historic Reserve), Outstanding Natural Feature, Archaeological Items (5655, 5657)	National Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
11	Te Kōakaumu (Kokoamu Bluff) 	This escarpment exposes a mid Oligocene unconformity representing the period of maximum marine inundation, below brachiopod-rich Kokoamu Greensand and Otekaike Limestone producing fossils. Protection: Significant Natural Feature, Geopreservation site	International Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
12	Waitaki River 	Geological uplift, erosion and alluvial transport continue to maintain the Waitaki (waterway of tears) which is characterised by broad gravel beds, numerous channels and variable flows. Protection: Waitaki Catchment Water Allocation Regional Plan	International Scientific Importance 	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓

	13 Waipata (Earthquakes) -44:52:27.575 170:37:24.545	Otekaike Limestone and Kokoamu Greensand, separated from Ototara Limestone by a regional intra-Oligocene unconformity, form large slumped blocks due to mass movement. <i>In situ</i> Baleen whale bones. Protection: Significant Natural Feature	International Scientific Importance MAP	Geology Culture Nature Education Vista
	14 Anatini -44:54:05.482 170:39:15.496	Easily accessible and one of few natural limestone arches in New Zealand, Anatini has baleen whale bones on display nearby as part of Vanished World trail. Protection: Significant Natural Feature	National Scientific Importance MAP	Geology Culture Nature Education Vista
	15 Elephant Rocks -44:53:36.131 170:39:22.355	Set in a stunning rural vista these elephant shaped outcrops formed by chemical and wind erosion of Otekaike Limestone, which originated as a fossil rich marine sand 25 million years ago. Protection: Significant Natural Feature	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	16 Valley of the Whales -44:55:24.882 170:40:55.012	The Valley of the Whales earned its name from the exciting discovery of whale and dolphin fossils in the surrounding Otekaike Limestone and in the underlying Kokoamu Greensand. Protection: Significant Natural Feature	International Scientific Importance MAP	Geology Culture Nature Education Vista
	17 Prydes Gully Road Quarry -44:55:58.854 170:37:46.967	Adze marks remain in an old quarry which produced "Waitaki Stone" (Otekaike Limestone) for building. This is a different stone than the more widely known "Oamaru Stone". Protection: Heritage New Zealand Pouhere Taonga Act 2014	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	18 Tokarahi Sill -44:56:25.663 170:37:06.756	The cutting exposes a spectacular section of columnar-jointed basaltic sill or lava flow, formed when molten rock ran across the seafloor, about 40 mybp. In places, pillow lavas occur near the sill. Protection: Administered by Waitaki District Council	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	19 Huttons Bridge, Otago Schist -44:56:41.918 170:35:22.614	The oldest local rock type, formed 150-180 Mybp. Metamorphism of sandstones and siltstones resulted in gold-bearing schist, the source of the gold-bearing sediments found in this region. Protection: Administered by Waitaki District Council:	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	20 Rakis Table -44:59:46.470 170:44:02.548	Rakis Siltstone from the Eocene epoch. A significant feature in the landscape and the location of rain making efforts in the late 19th century when dynamite was set-off to 'seed' the clouds. Protection: Rural General Zone	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	21 Landon Creek bank -45:01:51.391 170:59:44.014	Exposures in banks of North Branch of Landon (Boundary) Creek featuring common Duntroonian brachiopods. Hypostratotype of Duntroonian Stage. Protection: Rural General Zone	National Scientific Importance MAP	Geology Culture Nature Education Vista
	22 Devils Bridge Wetland -45:02:17.152 170:56:34.684	This wetland is a habitat for many species and is an area of Natural Significance in this Karst landscape. Caves surrounding the wetland contain solution holes and a shell bed layer. Protection: QEII covenant, Significant Natural Feature	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	23 Enfield dikes -45:02:40.908 170:52:14.112	This is one of the best inland exposures of igneous dikes in the Oamaru region. The sequence of several near-vertical sheets of basalt formed by multiple injections of lava. Protection: administered by Waitaki District Council	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	24 Jackson's Paddock -45:05:14.340 170:53:17.212	Internationally important site of Eocene diatomite. Oamaru Diatomite type-locality (upper part of stratigraphic sequence) and overlying Totara Limestone containing Eocene-Oligocene boundary. Protection: Rural General Zone	International Scientific Importance MAP	Geology Culture Nature Education Vista
	25 Hutcheson's Quarry -45:05:38.583 170:57:56.154	One of NZ first geological reserves. Tuffs and Ototara limestone at the base are overlain by a fossil cobble-beach and an important fossil brachiopod location in the Gee Greensand. Protection: Scientific Reserve (Hutchinsons Quarry)	National Scientific Importance MAP	Geology Culture Nature Education Vista
	26 Oamaru limestone dikes -45:05:51.531 170:57:39.913	In the road cutting on the north side of Chelmer Street is one of the best examples of limestone dikes in New Zealand. Protection: administered by Waitaki District Council	Regional Scientific Importance MAP	Geology Culture Nature Education Vista
	27 Boatman's Harbour -45:06:46.369 170:58:57.291	Spectacular pillow lavas formed 34-36 Mybp when masses of molten lava solidified on the sea floor. White limestone between the pillows represents original limey sediment. Protection: Significant Coastal Landscape	International Scientific Importance MAP	Geology Culture Nature Education Vista
	28 Makotukutuku (Old Rifle Butts) -45:07:32.004 170:57:51.513	The sea cliffs show a section through Eocene pyroclastic volcanic debris, rare rhodolith deposits of the MacDonald limestone, Pleistocene penguin remains and a raised Pleistocene beach. Protection: Significant Coastal Landscape, Geopreservation site	National Scientific Importance MAP	Geology Culture Nature Education Vista

			National Scientific Importance	Geology ✓ Culture ✓ Nature ✓ Education ✓ Vista ✓
29	Te Awa Kōkōmuka (Awamoia Creek fossils) 	An archaeological site of middens/ovens. This site is also important for diverse early Miocene (Altonian Stage) macrofauna occasionally exposed on the beach -45:08:30.327 170:56:06.324	Protection: Archaeological item (5688)	MAP 
30	Beach Road Erosion 	Coastal erosion is evident on this section of road, closed 2008. Layers of high-class volcanic topsoil, loess and gravels with minimal vegetative cover erode easily. -45:09:13.109 170:55:19.954	Protection: Significant Coastal Landscape	MAP 
31	Otepopo (Mt Dasher) slate 	A disused slate quarry and the only site in NZ where roofing slate has been produced, near Mackerras Creek, tributary of Kauri River, east foothills of Kakanui Range. -45:09:40.892 170:39:41.573	Protection: Heritage New Zealand Pouhere Taonga Act 2014	MAP 
32	Kākaunui River (Kakanui) Mouth 	Dark mineral breccia containing material erupted from deep in the Earth's mantle and crust, including Iherzolite, pyroxenite as well as megacrysts of garnet, clinopyroxene, kaersutite, and feldspar. -45:10:59.404 170:54:26.974	Protection: Significant Coastal Landscape	International Scientific Importance MAP 
33	Campbells Bay 	Ancient shrimp burrows in Ototara Limestone. Younger Otekaike limestone was deposited over the eroded surface about 25 Mybp, and was overlain by Gee Greensand and Mt Harris Formation. -45:11:40.546 170:53:43.488	Protection: Significant Coastal Landscape	National Scientific Importance MAP 
34	Ōrōre (All Day Bay) 	The rock pools and geology of All Day Bay make it a favourite attraction. It shows deep-water mudstone of the Mount Harris Formation (Early Miocene, 20 Mybp) with fossil molluscs -45:12:34.430 170:53:05.929	Protection: Significant Coastal Landscape	National Scientific Importance MAP 
35	Bridge Point 	Coastal outcrop of Waiareka Volcanics pyroclastic debris flows and marine sediments form a natural bridge. In places, abundant dead skeletons accumulated to form the Ototara Limestone. -45:13:14.051 170:52:57.026	Protection: Significant Coastal Landscape	International Scientific Importance MAP 
36	Te Kaihīnaki (Moeraki Boulders) and Scenic Reserve 	A popular tourist attraction, boulders at Moeraki (Paleocene) and Shag Point (Cretaceous) formed within mudstone underlying the ancient seafloor. -45:20:50.824 170:49:33.972	Protection: Scenic Reserve (Moeraki Boulders Scenic Reserve), Outstanding Natural Feature, Scientific reserve	International Scientific Importance MAP 
37	Moeraki Peninsula 	The peninsula is composed of basaltic volcanics overlying mudstone. Volcanic rocks have produced good examples of zeolite (such as erionite and phillipsite), and barite. -45:21:24.143 170:51:32.080	Protection: Recreation Reserve (Moeraki), Significant Coastal Landscape, Geopreservation site	Regional Scientific Importance MAP 
38	Kātiki 	Home to many species of wildlife including hoiho (yellow-eyed penguins) and kekeno (fur seals). A special place of cultural and historical significance to Ngai Tahu. -45:23:28.176 170:51:57.913	Protection: Significant Coastal Landscape, Site of Natural Significance, Archaeological Items (5697, 5696, 5695, 5698)	Regional Scientific Importance MAP 
39	Trotters Gorge 	Greywacke-breccia conglomerate of Cretaceous age. Landscape including cliffs and caves formed after the last ice age. See and hear many of New Zealand's bush birds. -45:24:10.363 170:46:32.968	Protection: Scenic Reserve (Trotters Gorge Scenic Reserve)	Regional Scientific Importance MAP 
40	Matakea (Shag Point) 	Features coal mining history, fossils (plesiosaur), and large round boulders (of Arai Te Uru legend) embedded in the soft sandstone of the rock shelf, interpreted as a tsunami deposit. -45:28:25.050 170:49:53.096	Protection: Recreation Reserve (Matakea Recreation Reserve), Significant Coastal Landscape	International Scientific Importance MAP 
41	Puketapu 	This prominent peak east of the town of Palmerston is a volcanic centre belonging to the widespread Dunedin Volcanic Group. A monument to Sir John McKenzie, a former Waihemo MP, stands at the top. -45:29:26.583 170:43:52.540	Protection: Significant Natural Feature, Heritage Item Cat B (108), Archaeological Items (5703,5705)	Regional Scientific Importance MAP 
42	Golden Point Battery 	Wonderfully preserved stamper battery and the only authentic working example in Otago it will leave you in awe of the determination of early miners. -45:21:06.455 170:25:31.673	Protection: Historic Reserve (Golden Point), Heritage Item (129)	National Scientific Importance MAP 

Preservation and protection status of geosites

Pressures, preservation & maintenance

Inevitably there will be interactions and potential conflicts between the protection of sites within the Geopark and human activities, particularly those seeking to utilise natural resources for human use. Areas of geological importance are subject to a range of threats that may degrade or destroy them. Threats and pressures on the sites within the Geopark include built development, infrastructure, mining and mineral extraction, agriculture, forestry, recreation, increased tourism, fossicking, coastal and flood protection, climate change and natural hazards.

It is acknowledged that increasing pressures from tourism and recreation will also need to be considered as the Geopark develops. Visitor pressures include potential physical damage to geological features and increased demand for visitor facilities such as footpaths, public toilets, visitor centres, signage, car parking etc.

Protection

The entire territory of the Geopark is managed/administered under the legal protection of the Resource Management Act 1991 (the purpose of which is to promote the sustainable management of natural and physical resources). Many sites within the Geopark are also protected by a range of additional legal mechanisms more specifically focused on their geological, cultural, heritage and landscape values. Table 1 (pp.20-22) provides a full schedule of the specific legal protection status of each Geopark site.

The sites are identified, protected and managed primarily under the provisions of the Resource Management Act 1991 (RMA) by regional and district authorities. The Geopark also includes sites that are managed and protected under the Reserves Act 1977, the Conservation Act 1987, the Heritage New Zealand Pouhere Taonga Act 2014 and through legal covenants with the Queen Elizabeth II National Trust. Alongside these statutory controls, there are other local by-laws which offer further protection for sites such as avoiding nuisance effects on reserves land, freedom camping, vegetation removal and the keeping of animals and stock.

The Waitaki Whitestone Geopark recognises that a small number of sites within the Geopark do not currently benefit from specific protection for their geological interest through existing statutory mechanisms, (these being sites 04, 20, 21 and 24). In such cases, the Geopark will work closely with landowners to discuss protection of the site through private covenant agreements, for example, with the Queen Elizabeth II National Trust, or through the creation of a Memorandum of Understanding between the landowner and the Geopark Trust.

Stronger legal protection under the provisions of the Resource Management Act 1991 (RMA) is being sought for each Geopark site through the Waitaki District Plan Review process. Each Geopark site will be proposed as an Outstanding Natural Feature (ONF). GNS Science are working closely with Waitaki District Council to provide advice on the identification of the Geopark sites as ONF. ONF status will ensure that the protection of each Geopark site becomes a matter of national importance. It is anticipated that the District Plan Review will become a statutory document by the end of 2020 with every Geopark site protected as an ONF.

The Geopark Trust is continuing to meet with individual landowners (e.g. of geosite 02 - Jackson's Paddock) to discuss on-site improvements and ensure the physical protection of key values and the enhancement of visitor access/facilities.

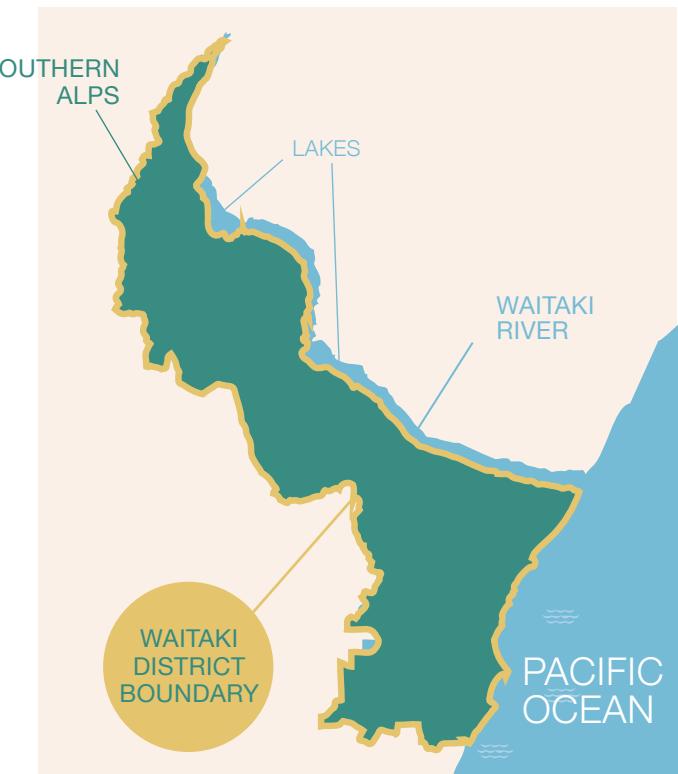
Key to protection terms used in Table 1.

Archaeo-logical Item	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Heritage New Zealand Pouhere Taonga Act 2014.
Geo-preservation Sites	Areas considered to be of regional importance under section 7 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from building, and earthworks activities.
Heritage Item	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from demolition, alterations or additions.
Historic Reserve	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Conservation Act 1987.
Outstanding Natural Area	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from building, earthworks and exotic tree planting activities.
Outstanding Natural Feature	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from building, earthworks and exotic tree planting activities.
QEII Covenant	Land is protected by legal agreement between the Queen Elizabeth II National Trust and the landowner to protect the area in perpetuity.
Recreation Reserve	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Reserves Act 1977.
Rural General Zone	These areas are protected under the Waitaki District Plan from inappropriate subdivision and development. These areas have high class soils and arable farming areas.
Rural Scenic Zone	These areas are protected under the Waitaki District Plan from inappropriate subdivision and development and are considered to be of a high landscape and scenic value.
Scenic Reserve	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Conservation Act 1987.
Scientific Reserve	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Conservation Act 1987.
Significant Coastal Landscape	Areas considered to be of national importance under section 6 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from building, earthworks and exotic tree planting activities.
Significant Natural Feature	Areas considered to be of regional importance under section 7 of the Resource Management Act 1991. These areas are protected under the Waitaki District Plan from building, earthworks and exotic tree planting activities.

E.1.2 BOUNDARIES

Located on the 45th parallel south, on the east coast of Te Waipounamu (the South Island) of Aotearoa (New Zealand), the Geopark is bounded by the Southern Alps and other mountain ranges, the Pacific Ocean, and the powerful braided Waitaki River. These geomorphological features help define the boundary and encapsulate an area with abundant geological treasures.

The boundary of the Geopark is aligned with the boundary of the Waitaki District Council, the Territorial Local Authority for the district of Waitaki. This boundary was defined by the Local Government Commission with considerable weight based on ‘communities of interest’. Though spread over 7,214 square kilometers, it is this humble and tight knit community, whose identity is so deeply rooted in the geology of the area, that also contributes to the choice of boundary.



E.1.3 VISIBILITY

Our Geopark works to raise awareness of the significant features and social and economic objectives of the Geopark to locals, domestic visitors and the growing number of international tourists to the district. Its visibility is enhanced through signage, interpretive material, publications, social media, education programmes and community engagement.

Interpretive labelling of exhibits within the Vanished World Centre has been provided by Professor Ewan Fordyce of the Department of Geology, University of Otago. Outside of the Vanished World Centre, trail signs and interpretive display panels are distributed at 16 of the 42 geosites, along the (currently) self-guided Vanished World Trail, and in the wider Waitaki district. These signs and interpretation panels explain the significance of sites and their relevance to the geology of the district. Other sites are marked with ‘Heritage Trail’ signage and ‘finger’ pointers which lead visitors along the trail. Trail signs and interpretation panels are accompanied by printed brochures and trail maps that allow visitors to take a self-guided tour through the Geopark. These brochures are distributed by the Vanished World Centre and i-SITES around the Waitaki district. Supplementing of Vanished World interpretative material with Waitaki Whitestone Geopark collateral is

underway and additional language options are being added. New materials produced use the new Waitaki Whitestone Geopark label, for example, the booklet ‘Limestone Escarpments of North Otago’ available at the Vanished World Centre.

Vanished World, Ōamaru i-SITE and Ōmārama Information Centre, and some of our sponsors and stakeholders have tear-drop banners or flags displaying our logo. At the information centres there is a purpose designed wall display of the territory with the key geosites identified.

Advertisements on the radio, in newspapers and magazines, as well as leaflets, newsletters and newspaper articles are used to assist in communicating with supporters and the general public. The first newsletter was sent out in September 2019 and will be sent monthly to the subscribers and is available on the website.



Interviews have recently been conducted with Geopark team members and Trustees on the local radio station Real Radio 104 and a fortnightly "Meet the Park" column is published in the local newspaper "Ōamaru Mail".

Local schools are also contributing to our visibility by including the Geopark in specific school activities. For example, Duntroon School entered an advertisement that they filmed for the Geopark in a popular nationwide competition, the 'Fair Go Kids Ad Awards', which is uploaded to YouTube, promoted through social media, and was nationally televised in October 2018.

The Waitaki Whitestone Geopark website is in English, with Te Reo Māori place names where available. Ngāi Tahu have installed signs in English and Te Reo Māori at culturally significant sites. Our future intention is to offer Chinese, Spanish and French translations of the website. The Geopark and Tourism Waitaki websites, which offer visitor information about the Geopark and

our district and attractions, are planned to be translated into Chinese, French and Spanish by November 2020. We have the district's Official Visitor Guide and information brochures available in our i-SITE and Information Centres.

The Geopark App (available on both the Apple and Android platforms <https://www.whitestonegeopark.nz/tours-and-trips>) is equipped with proximity capability which generates automated information on points of interest along the provided tourist route information. It can be downloaded and used where there is no mobile phone coverage. The Waitaki Whitestone Geopark website, social media and app are updated regularly to further increase visibility.



E.1.4 FACILITIES AND INFRASTRUCTURE

Current facilities include the Vanished World Centre which has been in operation for 18 years, and all Vanished World Trails branch out from this site.

Additional information centres are situated at the Ōmārama Information Centre and the Ōamaru i-SITE. Staff interact daily with tourists supplying information about what there is to do and see in the district, pointing tourists to the existing well-known geological trails of Vanished World and offer additional trails created from the Geopark project such as Food & Wine Trails and Heritage & Culture Trails.

Both Ōamaru and Ōmārama are situated on two heavily used State highways, Ōamaru (State Highway 1) on the eastern coast of the South Island and Ōmārama (State Highway 8) on the inland highway. Vanished World is situated on highway 83 which connects these two main routes.

The Management Plan explains our plans for adding to and enhancing the facilities and infrastructure of the Waitaki Whitestone Geopark over the coming years. A significant capital raising programme has been started to create number of world class visitor experiences within the Geopark.

The area's geological, natural and cultural heritage is interpreted for visitors through the activities of local museums and galleries. The North Otago Museum and Forrester Gallery are currently being redeveloped. They are due to reopen early in 2020. Their exhibitions, events and education programmes promote local heritage for the community and visitors.

Considerable effort has been invested in the last 17 years to produce high quality brochures and interpretive panels. This has been done in conjunction with

Professor Ewan Fordyce of the University of Otago. High quality information is also readily available about the geology of geosites themselves thanks to the wealth of scientific study that has been carried out.

The Geopark has a formal branding and signage strategy which ensures that interpretation is provided in a consistent manner, and which is also integrated with the signage protocols of the local Council, the New Zealand Transport Agency and conservation agencies. As part of the self evaluation process an audit of facilities at 39 of the geosites was undertaken by multiple subject matter experts (Planning, Recreation, Culture, Science and Education, Tourism and Roading), gathering extensive information. More in-depth results and a summary table of these site assessments can be seen in Annex 9.

Annex 9 shows the sites where we will focus on improvements to the facilities and infrastructure. This programme has been input into the Management Plan. These projects include a higher provision of toilets, rubbish bins and removal, car parking, signage and roading improvements for visibility, safety and improvement of the visitor experience.

This increase in the quality of facilities and service infrastructure will increase the quality of the visitor experience. Already, new industries are emerging to support the Geopark and its activities – for example: 3-D photography for providing information and marketing, app development to guide visitors, 3-D printing for developing merchandise. All suppliers to the Geopark will be able to seek endorsement through our 'ParkMark' provided they meet our sustainable development requirements.

E.1.5 INFORMATION, EDUCATION AND RESEARCH

Information and Interpretation

For the past 18 years Vanished World Inc has been a strong promoter of the geological importance of our region, providing exhibitions and displays at the Geopark's Fossil and Geology Centre in Duntroon. Members have helped spread the word through hosting visitors and school groups, guiding field trips, and giving talks in libraries and schools, while cultivating close links with universities and research organisations.

Interpretation for Vanished World has been primarily carried out by Professor Ewan Fordyce of the Department of Geology, University of Otago. Professor Fordyce has been Vanished World's geology/palaeontology advisor and has compiled information and images for printed materials, interpretive labelling of exhibits within the Vanished World Centre, and trail signs at geosites. Interpretation display panels are distributed throughout the (currently) self-guided Vanished World Trail, and the wider Waitaki district, to explain the significance of geosites and their relevance to the geology of the district. Printed brochures and trail maps for self-guided tours through the Geopark are distributed by the Centre and at i-SITES around the Waitaki district. These contain short descriptions of the geological features observed at iconic geosites, illustrated with annotated photos.

More detailed information is available at the Centre in the form of fossil, rock and mineral exhibits, exhibit text panels, videos showing the extraction of fossils from their surroundings or interviews with New Zealand geologists, and interactive displays where visitors can examine microfossils under a microscope, solve a giant penguin fossil jigsaw puzzle, or have a go at fossil excavation in the 'Dig Room'. Also available at the Centre are a series of booklets published on some of the geologic highlights of the Geopark (e.g. 'Limestone Escarpments of North Otago'), and a variety of geology books, GNS Science geological maps and posters, and children's books with a geology theme.

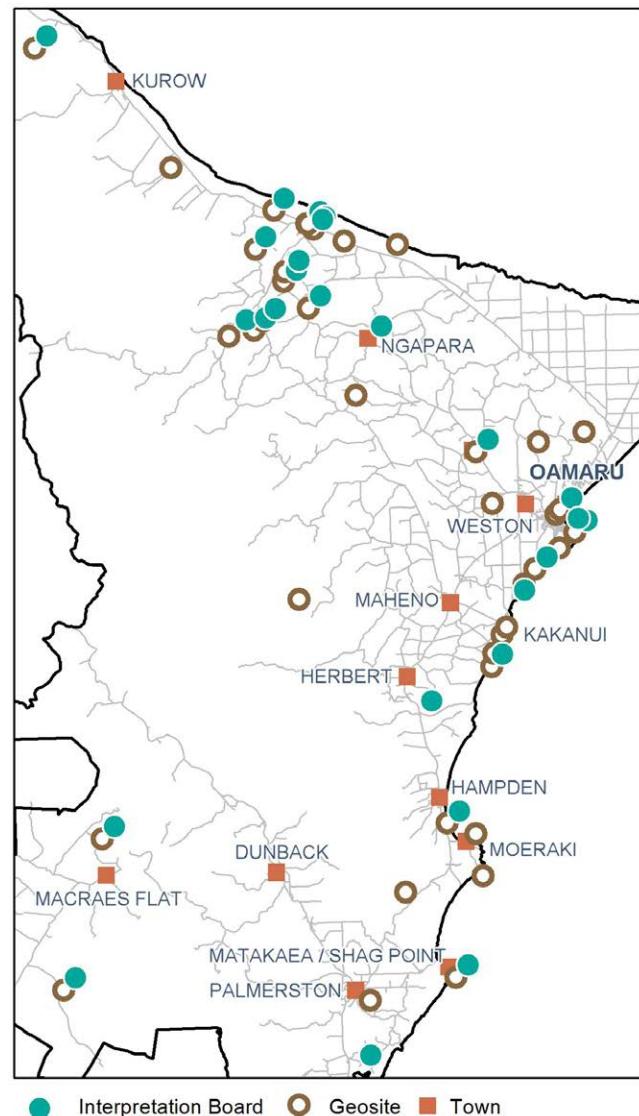
Advertisements in newspapers and magazines, as well as newsletters and newspaper articles have been used to assist in communicating with supporters and the general public. The Waitaki Whitestone Geopark website and social media are also being heavily utilised to further increase engagement and encourage people to learn more about the Geopark's geologic heritage. Within the website is a link to a Geographical Information System

searchable map which locates individual geological, cultural and heritage sites along with supporting content about the geological and geomorphological features in the Geopark.

Information for non-specialists

The interpretation panels and brochures for the Geopark have been specifically designed to effectively communicate key information about the sites using photos, diagrams, and a minimum of text. The use of technical terminology in explanations has been avoided in order for this information to be understood by a general audience.

Interpretation Panel locations



Educational Programmes

School visits are a regular occurrence at the Vanished World Centre and teachers are given the option of a guided tour of the Centre at Duntroon and/or a guided tour of the Vanished World Trail. At the Centre school groups can learn about rocks, minerals, fossils, New Zealand geology, and the more recent moa history. School programmes are focussed on hands-on activities such as examining microfossils under a microscope, solving a giant penguin fossil jigsaw puzzle, using a rock detective kit to identify rocks, going on a scavenger hunt around the fossil and rock collection, or having a go at fossil excavation in the 'Dig Room'. Activity worksheets are available, covering concepts such as the rock cycle, fossilisation, what we can learn from fossils, and natural hazards and how to be prepared for them. Bus tours of iconic geosites including an experienced guide are also available for both school groups and special interest groups.

In 2019 the Geopark delivered its first year long educational programme – the 'School of Rocks', led by the Geoparks's own Dr Sophie Briggs. The aim of this programme is to enable Waitaki pupils to explore local geology using spatial technology, raise community awareness of their local geologic heritage, and become 'kaitiaki' (stewards) of special geosites. A Geoeducator was employed by the Trust in October 2019. Sasha Morris has a geology background with a strong focus on education and will develop education and engagement programmes for the following years.



Education programmes will continue to be developed and expanded in order to provide more innovative educational experiences and improve the diversity of the subjects and education levels that we offer. These programmes will encompass a broader range of earth science themes than previous programmes, including a specific module on geohazards common to this region. Refreshing the displays in the Vanished World Centre is also on-going.

Scientific research

Many of the members of Vanished World Inc. are landowners who have provided access and facilities to visiting University of Otago scientists carrying out research at sites on their land. Examples of national and international scientific publications that have resulted from this field assistance are listed in the selective bibliography (Annex 6). In addition, the Geopark has participated in research conducted by members of the Department of Tourism at the University of Otago, which is investigating sustainability in destination management in nature-based tourism, from the perspective of leading destination managers. This is a comparative analysis of the Waitaki Whitestone Geopark, other tourism providers in the South Island of New Zealand, and the Tyrollean Oberland in Austria. Furthermore, Waitaki Whitestone Geopark has signed a Memorandum of Understanding with researchers at Lincoln University to collaborate on a future project focussed on areas of sustainable tourism.



Above: Professor Ewan Fordyce with a fossil discovery from the Waitaki region photo © Otago Daily Times
Left: Vanished World trail interpretation panel board compiled with Professor Fordyce's research.
Middle: Geopark geologist Dr Sophie Briggs with kids from School of Rocks

E.2 OTHER HERITAGE



Photo: Hoiho (Yellow Eyed Penguin) © Riley Baker

E.2.1 NATURAL HERITAGE

The Waitaki Whitestone Geopark contains outstanding natural heritage and is well known for its wildlife. Together the local plant and animal species add to the distinct character of this area.

Along the coastline, visitors can observe coastal bird species including kororā (little blue penguins), hoiho (yellow-eyed penguins) and the Otago shag (previously known as the Stewart Island shag). The coast is also home to kekeno (New Zealand fur seals). Geosite 40, at Matakaea showcases local coastal wildlife. People can also visit the Ōamaru Blue Penguin Colony Visitors' Centre to view penguins.

Braided rivers are a distinctive feature of Te Waipounamu (the South Island). These rivers are rare world-wide. The wide 'barren' beds of shingle that flood and readily change course provide habitat for a range of unique species that have evolved to exploit this productive aquatic environment. The Waitaki Lowland Longjaw Galaxias fish (*Galaxias cobitinus*) has adapted to the floods and dries of braided channels by wriggling down into the shingle. The current range of this threatened species is confined to the Kauru River and the Hakataraamea River.

The Waitaki River, Geosite 12, is fed by the alpine lakes of the Waitaki Basin. The Lower Waitaki River is home to New Zealand's largest breeding colony of the nationally endangered tarapiroē or black fronted tern (*Chlidonias albostriatus*). The Waitaki River and its tributaries are also important habitat for the nationally vulnerable ngutu pare or wrybill (*Anarhynchus frontalis*), the only bird in the world with a bill that is curved to the right. As with tarapiroē, ngutu pare breed exclusively on braided river beds, but as monogamous pairs rather than in colonies.



Matakaea Shag Point Scientific Reserve (Geosite 40), features unusual biological species including the snow tussock (*Chionochloa rigida*) grassland at what is probably this species' lowest altitude most coastal occurrence. The large alpine daisy (*Celmisia hookeri*) also grows at this site. The presence of these typically alpine species so close to the coast is an example of how native flora can respond and adapt to fire and landslip disturbances.

The Grand skink

(*Oligosoma grande*) and the Otago skink (*Oligosoma otagense*) are two of New Zealand's most distinctive and impressive lizards. The strongest numbers of both

these species are found in the Geopark area, particularly the Macraes area. These skinks are well adapted to the cold climate associated with their habitat of upland tussock and tor.



Middle: *Gentianella calcis* - Photo © John Barkla
Above: New Zealand Fur Seal

Evolution in isolation

The geographical isolation of Aotearoa New Zealand supported the evolution of many unique bird species that fill the niches occupied by mammals in other countries. The arrival of humans and other land

mammals has had an impact on many of these species. Some species, once found in the Geopark area, are now extinct including moa and Haast eagle. The geosite at Earthquakes has been used to study the paleofaunas in this area.

The lowland limestone flora of the Geopark area is notable to botanists for its diversity of endemics. For example there are several species of Gentians: one at Geosite 13, Earthquakes (*Gentianella* with an affinity to *G. calcis*) and another at nearby Awahokomo (*Gentianella calcis* subsp. *calcis*) (there is a third at Taiko in South Canterbury, *Gentianella calcis* subsp. *taiko*). All are distinct from the widespread *Gentianella montana* of the surrounding hill country. The Lower Waitaki has its own species of native broom (*Carmichaelia hollowayi*). The limestone cliff crest sites where *Carmichaelia hollowayi* grows are very droughty and very hot, but free of the frosts of the flats immediately below. There is no longer enough native forest to understand how this distinct shrub came to be here but perhaps the cliff crests were just too hard for large tree species. As with the gentians, the native broom provides more evidence for understanding how our region has changed over time and what the pre-human flora and fauna might have been like.

The area's natural heritage is valued by the local community and is integrated in to our Geopark experience. Many people spend their leisure time enjoying the natural heritage of the area while hiking, biking or boating. Local school and community groups often contribute to community revegetation projects.

Interpretation for the area's natural heritage includes the Ōamaru Blue Penguin Colony centre, interpretation boards at sites, public talks, guided visits to sites, information brochures, published books and online sources. These interpretation outputs also promote the area's natural heritage. Annual Celebrations like Conservation Week in September are also promoted to highlight our natural heritage.

A number of groups including the Department of Conservation/Te Papa Atawhai, Ngai Tāhu, the Otago Regional Council, Environment Canterbury/Kaunihera Taiao ki Waitaha, Waitaki District Council, the Yellow-eyed Penguin Trust, Forest and Bird and the Ōamaru Blue Penguin Colony work together to ensure the ongoing promotion and maintenance of local natural heritage. The maintenance work undertaken includes controlling invasive species, maintaining protective measures such as fencing, revegetation projects and cultivating rare plants.

The area's natural heritage is valued at local, regional, national and international levels. At a local level, the Waitaki District Council's District Plan includes 19 areas

of significant nature conservation value and a further 18 areas of conservation merit within the Geopark. As part of the District Plan review process, an Indigenous Biodiversity Strategy was completed in 2017. This strategy facilitated the completion of a district-wide ecological survey of indigenous vegetation/habitats, and the identification of 'Significant Natural Areas'(SNA's). Approximately 125 SNA's have been identified and will be incorporated into the District Plan review.

At a regional level, the area is administered by two regional authorities: Otago Regional Council and Environment Canterbury. The Otago Regional Council has identified 15 sites as Regionally Significant Wetlands. Within the area administered by Environment Canterbury there are 29 areas that have been identified as Wetlands of Ecological and Representative Importance totalling 24,878 hectares. (Note some of these wetland areas extend beyond the Geopark's boundaries).

At a national level, the Waitaki Whitestone Geopark contains areas of public conservation managed by the Department of Conservation/ Te Papa Atawhai. This includes scenic reserves, scientific reserves and conservation parks.

At an international level there are four International Bird Areas and one Endemic Bird Area that overlap with the Geopark area. These international designations are from Birdlife International.

No areas of the Geopark are currently recognised as UNESCO protected areas nor are there any areas designated under other UNESCO programmes.



ngutu pare (wrybill)
and the braided
Waitaki River



Early Māori rock drawings at Takiroa



The Forrester Gallery

E.2.2 CULTURAL HERITAGE

The area of the Waitaki Whitestone Geopark provides a microcosm of the cultural heritage story of Aotearoa New Zealand, from the beginning of human occupation to the present day.

Our area includes some of the first sites of human occupation in New Zealand, the last major landmass on earth settled by humans. These sites, and the Mātauranga Māori (knowledge) surrounding them, reveal the story of arrival and settlement in this place.

Stories of New Zealand's first peoples

The local iwi (tribe) are Ngāi Tahu. Kā Huru Manu/ the Ngāi Tahu cultural atlas states: ‘Ngāi Tahu whānui is the collective of the individuals who descend from the primary tribal groups described as Waitaha, Ngāti Māmoe, and Ngāi Tahu. Ngāi Tahu also acknowledge our whakapapa to earlier iwi who occupied Te Waipounamu prior to the Ngāi Tahu migration to Te Waipounamu, including Kāti Hāwea, Kāti Wairaki and Te Rapuwai.’

Geosites 36 and 40 at Moeraki boulders and Matakaea/Shag Point convey the story of Ārai-te-uru, the waka (boat) that brought the ancestors of Ngāi Tahu (local tribe) to the area. Matakaea (Shag Point), located immediately north of the Waihemo (Shag River) on the Otago coastline, is where the famed Ārai-te-uru waka capsized. The Ārai-te-uru waka came from the ancient homeland of Hawaiki, bringing kūmara to Aotearoa. After reaching Te Ika-a-Māui (North Island), the waka then travelled down the east coast of Te Waipounamu. The journey was reasonably smooth until the waka encountered heavy seas at the Waitaki River mouth. Here the round food-baskets and water-carrying gourds were lost overboard forming the Moeraki boulders; the waka then continued down the coast before capsizing at Matakaea. Many of the passengers went ashore to explore the land, but did not return to the waka before daylight, and instead turned into many of the well-known geographical features of Te Waipounamu. [From Kā Huru Manu/ the Ngāi Tahu cultural atlas entry for Matakaea

<http://www.kahurumanu.co.nz/atlas>. Other places in the landscape were created and named by Rākaihautū, a Waitaha ancestor who arrived on the waka Uruao.

The life of local Māori, prior to European arrival, as well as the time of first contacts between these peoples, can be observed at geosites 07 Takiroa and 10 Duntroon Escarpment on the Maerewhenua. These rock shelters are along an ancient pathway that follows the Waitaki River from the mountainous interior to the coast. The rock art preserved in these shelters includes ancient work by the earliest habitants as well as work by their descendants which reflects European arrival with depictions of horses and sailing ships.

In the 1830s European whalers set up a shore-based whaling station in the area at Moeraki following successful operations further south. From the 1840s onward more European settlers arrived to both the North and South Islands. In response to increased settlement, requests from some Māori for intervention in inter-tribal disputes and the possibility that the French at Akaroa might make sovereignty claims, the British Crown sought to enter into a treaty with Māori.

Te tiriti o Waitangi (the Treaty of Waitangi) was signed between Māori and the British Crown in 1840. Not all Māori leaders signed, but many Ngāi Tahu chiefs did. As early as 1849, Ngāi Tahu leaders had become disenchanted with the Treaty process as promises to Māori for land and resources were not being kept. Ngāi Tahu honour the actions of Moeraki leader Matihia Tiramōrehu as the beginning of Te Kerēme – the Ngāi Tahu claim against the Crown, which was settled in 1998.

The story of the Treaty, how it was breached, Ngāi Tahu’s campaign for redress and their contemporary



Stone sawing competitions at the Victorian Fete Day



Local participants in the Steampunk NZ Festival 2018

expressions of kaitiakitanga (stewardship) and rangatiratanga (leadership) are central to understanding the area's cultural heritage.

A city of whitestone, drawing people from around the world

During the 19th century more Europeans settled in the area. They mostly came from the British Empire as part of formally organised waves of colonisation. These people generally came with the intention of permanent emigration and engaged in farming, mining and all of the necessary supporting industry and activities required by these new settler communities.

Local agriculture initially focused on growing grain and producing wool. Local innovations led to the development of New Zealand's frozen meat industry and the creation of the Corriedale sheep breed. Gold mining was also undertaken between the 1860s and 1880s, OceanaGold mine for gold at Macraes Flat today. Miners from all over the world migrated to the Waitaki in search of gold. The riches from the mining and farming provided the finance for the quarrying of high quality limestone for the building of the district's infrastructure and opulent estates and town buildings. This economic activity supported the founding of the township of Ōamaru and a port was constructed in the 1870s which used at that time the world's largest full-slewing steam crane. The town is now recognised for these grand neo-classical buildings. The choice of building material reflected a local lack of trees as well as the aspirations of new immigrants to build an impressive town.

Chinese heritage in our area also dates to the 19th century. This heritage includes gold mining and market gardening activity. From the 1860s Chinese men started immigrating to New Zealand to work as gold miners. The majority of immigrants came from Guangdong province. Most of these immigrants hoped to make their fortunes and then return to China. At gold fields across New Zealand the Chinese miners typically lived together in 'Chinatowns'. These Chinese immigrants faced anti-Chinese prejudice from other goldminers and from the

New Zealand government. The Nenthorn Goldfield (Geosite 09) was one area where Chinese miners lived and worked locally. As gold mining activity declined Chinese families found other work. In the twentieth century Chinese people in our area often worked as market gardeners, especially around the Totara area.

The richest earth

Throughout the 20th century and into the 21st century the area continues to be an important hub for agricultural production. While the early settler stock was predominately British, recent immigration trends are more diverse including a large influx of peoples from across the Pacific, including Tonga, Samoa, Nuie, Tuvalu and Fiji.

This area continues to be a hub of primary production with recent emphasis on dryland beef and sheep farming and dairy production. Local industry relates primarily to processing these products and continuing to provide the support infrastructure required for primary production. Increasingly tourism also contributes to the area's livelihood as visitors come to admire the historic buildings, appreciate local food and wine and the natural heritage of the area.

Valuing our heritage and celebrating our culture

Two of the area's main events celebrate the cultural value of the area's built heritage. The Waitaki community actively appreciates its past while looking to the future. The Ōamaru Victorian Heritage Celebrations in November celebrate life in the area in the 19th century. The Steampunk weekend in June uses Victorian architecture as a backdrop for science-fiction imaginings of a different world inspired by combining futuristic technology with aesthetics and ideas from the Victorian era.

The area's cultural heritage is valued through the activities of local museums and galleries. The North Otago Museum and Forrester Gallery are currently being redeveloped. They are due to reopen early in 2020. New displays at the museum include a permanent exhibition



Wayne Barrar 'The Glass Archive' Diatom photo exhibition at Forrester Gallery



Totara Estate receiving Landmarks status from Tohu Whenua

called 'Our Land' that interprets the stories of a number of Geosites. Their exhibitions, events and education programmes promote local cultural heritage. The North Otago Museum includes the 'Willetts' Collection', one of the most extensive collection of first settlement artefacts in New Zealand. This collection is the focus of a research project being spearheaded by Professor Richard Walter, Head of Archaeology and Anthropology at Otago University/ Whare Wānanga o Otago. The Forrester Gallery contains many examples of artworks recording or responding to sites within the Geopark. Most notably the North Otago Series works by internationally renowned modernist artist Colin McCahon, which specifically respond to the geology of our place. These collections are available to support interpretive, educative and knowledge development related to the Geopark.

Recent education deliveries include Te Kaihīnaki, a collaborative programme with Te Rūnaka o Moeraki which teaches the cultural and scientific stories of the Moeraki Boulders. Other museums in the area focus specifically on local stories and cultural heritage (for example Kurow Museum) or specific subject areas (for example the New Zealand Pipe Organ Museum in Herbert).

Cultural heritage is interpreted within the Geopark using exhibitions, interpretation boards at sites, public lectures, guided heritage tours, plaques and monuments, self guided trails, dramatic re-enactments, information brochures, published books on local heritage and online via heritage websites. This work is carried out by a mix of local volunteers with cultural knowledge and trained heritage professionals employed locally.

The richness and significance of local cultural heritage is promoted and maintained by local groups. These include the area's museums and galleries, organisations such as the Ōamaru Whitestone Civic Trust and Heritage New Zealand /Pouhere Taonga and the Department of Conservation/ Te Papa Atawhai.

Protection

Heritage is also valued by site protection. Physical protection at some sites, such as fencing, is used to maintain the integrity of some cultural heritage sites. At other sites signage is used to ensure visitors behave in ways that prevent the site being degraded or damaged.

All archaeological sites are protected under the Heritage New Zealand Pouhere Act 2014. This protection covers any place, site or feature where evidence of pre-1900AD human activity is tangibly present from any culture. This means the majority of cultural heritage sites within the Geopark already have legal protection. Another avenue of protection lies with cultural heritage sites listed on the Waitaki District Council's District Plan heritage schedule. This listing ensures cultural heritage sites of significance which post-date 1900AD receive legal protection governed by rules in the Plan.

At a regional level, two places within the Geopark are included in the Landmarks *Tohu Whenua* Otago scheme; Totara Estate and Historic Ōamaru. Many sites in the area have also been recorded by Ngāi Tahu as part of Kā Huru Manu/ the Ngāi Tahu cultural atlas.

At a national level, there are 191 places in our area included in the New Zealand Heritage List managed by Heritage New Zealand/ Pouhere Taonga. Fifty of these places are Category 1 places meaning that they are of national importance due to their special or outstanding historical or cultural significance or value.

Currently no heritage from the area is inscribed at an international level, nor recognised as part of other UNESCO Programmes.





Tongan Language week at Waitaki District Libraries



Interpretive signage at Maori rock art site

E.2.3 INTANGIBLE HERITAGE

The diverse population of our area includes Māori, Chinese and Pacific peoples. In 2019 there are people from 50 different ethnicities signed up to the Newcomers Network and Migrant Support in the Waitaki area. This means many cultural traditions are present here. Local people value their intangible heritage as it is the wellspring of their cultural identity.

Intangible heritage is valued as part of everyday family and community life; and at occasions like weddings and funerals. Financial grants and the provision of venues promotes and maintains intangible heritage. This support enables language weeks, cultural performances and festivals.

The interpretation of local intangible heritage tends to be informal. At events participants may explain their practices and observers may have the opportunity to ask questions. Interpretation boards at geosites including Matakaea, Duntroon Escarpment and Takiroa rock shelter convey information on the Mātauranga Māori (knowledge) around these sites.

The Waitaki Multicultural Council promotes intangible heritage by organising and supporting arts and cultural concerts, hui (meetings), shared meals, festivals and exhibitions. The Multicultural Council also organises annual celebrations for Race Relations Day and International Language Week. The Waitaki District Libraries promote language week events for many of the languages spoken in our area.

The people who hold the relevant knowledge maintain their intangible heritage. They share their knowledge and practices with the next generation. The preservation of related tangible heritage such as sites of significance, important objects and archives supports this sharing.

Events like the Ōamaru Victorian Heritage Celebrations, Sustainable Skills Summer School, local Chinese New Year celebrations or Tongan Language week allow people to

show how they value their heritage by sharing it with the broader community. The Waitaki District Archive collects oral history recordings from members of our community. People use the Ōamaru Opera House as well as community halls throughout the area for performing arts.

Regionally, local iwi (tribal group) Ngāi Tahu are active in protecting their cultural heritage. The creation of Kā Huru Manu/The Ngāi Tahu Atlas of place names and histories is one way this has been done. Ngāi Tahu recorded this information as part of a cultural mapping project. This online atlas provides information on Mātauranga Māori (knowledge), oral traditions and practices, such as food gathering, in this area - www.kahurumanu.co.nz

Nationally, the New Zealand government values the promotion and maintenance of intangible heritage. This value is shown via support for organisations including Archives New Zealand/Te Rua Mahara o te Kāwanatanga, Te Taura Whiri i te Reo Māori/the Māori Language Commission) and Creative New Zealand - Arts Council of New Zealand

Toi Aotearoa. Te Reo Māori (the Māori language) is an official language in New Zealand. The intangible heritage related to the area of the Waitaki Whitestone Geopark is not currently recognised as part of other UNESCO Programmes.



E.2.4 CLIMATE CHANGE AND NATURAL HAZARDS

The impacts of climate change will be wide ranging and include an increase in the frequency of storm events, extremes in weather including droughts and flooding coupled with sea level rise. A changing climate will present critical challenges to the environment, local economy and people within our Geopark.

An understanding of where these hazards may occur is essential to our understanding of their impacts and for the management of risk, minimisation of damage and building resilient communities.

Within New Zealand, the Ministry of Civil Defence and Emergency Management is responsible for providing leadership and support around national, local and regional natural hazards and risks. The Ministry also promotes nationwide civil defence emergency management and public awareness about how to prepare for, and what to do in an emergency.

Within the area of the Waitaki Whitestone Geopark, the Otago Civil Defence Emergency Management Group¹ is a partnership of local authorities, emergency services and other organisations that is tasked with ensuring the effective delivery of civil defence and emergency management to our community. They promote and enable communities to be aware of, and resilient to natural hazards by providing training, education and awareness, facilities and equipment for emergency response and the co-ordination of responses to and recovery from emergency events. National and regional preparation drills of how to respond to natural disasters such as earthquakes and tsunamis are held annually within New Zealand. A Civil Defence and Emergency Management alert and warning system operates throughout New Zealand to issue national or regional warnings and alerts about natural hazards through media outlets, text message, sirens and other hazard-appropriate emergency alert systems.

Living on a faultline

The Geopark contains a number of active geological faults². Whilst this has in the past created spectacular landscapes such as the Paritea (Clay Cliffs) (Geosite 03) and 'The Knot' (Geosite 04) on the Ostler Fault, it also makes the area susceptible to earthquakes and liquefaction. Alpine fed rivers such as the Waitaki

River and coastal areas are exposed to flooding and coastal inundation, with coastal areas also exposed to tsunami. Many of the dams in the upper Waitaki are within 50km of the Alpine Fault and could be affected by seismic activity. The Waitangi Fault has been very closely studied as the Aviemore Dam is built across the fault³. Some areas of the Geopark are populated on alluvial fans where flooding can be particularly damaging with steeper gradients than river floodplains. Areas of the Geopark have a long and extensive history of land instability caused by large, slowly creeping landslips in the underlying mudstone. The Moeraki area is particularly vulnerable to landslip risk. Steep mountain slopes surrounding Lake Ōhau also have the potential to generate large scale landslides resulting in impact waves or tsunami that could put at risk populations around the lake shores. It is recognised that climate change has the potential to affect active geomorphological, hydrological and soil systems such as erosion or the depositional burial of geological sites.

Understanding the past to help predict the future

Geological processes and the impacts of historic climatic change and natural hazard events have shaped the Geopark. The landscape of the Waitaki Whitestone Geopark tells a story that shares with us the earth's history of geological hazards – these stories will be used through our educational programmes and site interpretation to raise awareness and assist in disaster mitigation strategies among local communities and visitors. The Geopark provides the research community with opportunities for a better understanding of geological hazards and the impacts of climate change providing a valuable contribution towards risk management policies at a local and national level. An understanding of past and present natural processes and features can help identify what has happened to the environment within the Geopark in the past and what may happen to the environment in the future. This understanding is crucial to assisting populations to

1. <https://www.otagocdem.govt.nz/> Emergency Management Otago

2. <https://www.ecan.govt.nz/your-region/your-environment/natural-hazards/earthquakes/earthquake-faults/> Environment Canterbury Regional Council

3. https://securepages.co.nz/~gsnz/siteadmin/uploaded/fieldtrips/MP128B_FT5-6.pdf

adapt to the effects of climate change and the impacts of natural hazards.

Impacts on Geosites

The predicted increase in intensity and frequency of severe weather events could have a significant impact on sites within the Geopark. The Otago Regional Council provide a Natural Hazards Database⁴ that holds information on natural hazards within the Otago area of the Geopark, such as alluvial fans, flooding, areas at risk from storm surges, tsunami, landslides and seismic activity. Environment Canterbury provide a coastal erosion map which identifies erosion hazard zones within the Canterbury areas of the Geopark⁵. The Otago Regional Council has recently published a report on 'Waitaki District Council Hazards' which discusses the potential impacts of sea level rise⁶.

A number of sites within the Geopark are located within identified areas subject to coastal erosion, flooding, tsunami, landslides and seismic activity. Geosite 30 Beach Road Erosion has been specifically identified for the purpose of being able to illustrate and educate about coastal erosion. It is recognised that the entire territory of the Geopark is to some extent threatened by the effects of climate change. Human responses to climate change also pose a threat to sites within the Geopark (eg. in the form of 'hard' flood protection and coastal defences).

Managing the effects of climate change

Regional and territorial authorities are responsible for the management of natural hazards and the effects of climate change. The Waitaki District Plan contains rules on subdivision to control development along the coast and in areas that are at risk from natural hazards. The District Plan seeks to ensure that development is carried out in a manner that avoids or mitigates against the potential adverse effects of natural hazards and that risks are not exacerbated. The Waitaki District Council works closely with the Otago Regional Council and Environment Canterbury to monitor how long term trends in land use practices and patterns may increase the vulnerability of communities to natural hazards and climate change.

The Waitaki District Plan Review (currently in progress) will incorporate updated data from the regional authorities to ensure that natural and physical resources in the Geopark are protected from natural hazards and the effects of climate change.

It is recognised that individual sites within the Geopark will need further consideration on the best ways to manage and protect them from natural hazard risk. A sound understanding of the underlying physical processes for each site is needed first to ensure that any management or protection measures work with, rather than against natural processes⁷.

Keeping people safe

As signage and interpretation information is updated throughout the Waitaki Whitestone Geopark, warnings about natural hazards will be added as appropriate for the site. The Waitaki Whitestone Geopark website and brochures provide information for visitors and residents about what to do in an earthquake and if a tsunami warning is issued. An education programme on geohazards targeted at school students is currently being developed.



Coastal erosion affecting nature and infrastructure near Kakanui Beach



4. <http://hazards.orc.govt.nz/intramaps/mapcontrols/nhdb/index.html>
Otago Regional Council

5. <https://mapviewer.canterburymaps.govt.nz/>

6. <https://www.orc.govt.nz/media/6610/waitaki-district-coastal-hazards-niwa-jan-2019.pdf>

7. <http://press-files.anu.edu.au/downloads/press/p312491/pdf/CHAPTER18.pdf> Geoconservation in Protected Areas, R. Crofts and JE Gordon (2015)

E.3 MANAGEMENT

The Geopark is governed by The Waitaki Whitestone Geopark Trust. It receives advice from an independent Advisory Group and a Community Management Group which include all key stakeholders and relevant experts.

Legal Form of the Geopark

The Geopark is a contiguous area of both public and private land, the boundaries of which are the same as the boundaries of the Waitaki District, which is administered as a territorial local authority established under the Local Government Act 2002. The primary statutes with an effect on land use within the Geopark include the Local Government Act 2002; Land Act 1948; Crown Pastoral Land Act 1998; Conservation Act, 1987; Queen Elizabeth II National Trust Act 1977; Reserves Act 1977; Crown Minerals Act 1991; Walking Access Act 2008; Heritage New Zealand Pouhere Taonga Act 2014; and the Resource Management Act 1991.

Management Structure

The Patrons of our Geopark are, the Right Honourable Helen Clark, ONZ (Order of New Zealand), and Emeritus Professor Richard Sibson. Helen Clark has strong ties to the district and will provide the Geopark with invaluable international connections, profile and energy. Ms Clark is a former Prime Minister of New Zealand (1999–2008), and former Administrator of the United Nations Development Programme (2009–2017). In 2006 Ms Clark was named as the world's 20th most powerful woman by Forbes Magazine. Also patron of Vanished World Inc., Ms Clark has enthusiastically extended her patronage to the Waitaki Whitestone Geopark as the Geopark commences its journey towards accreditation as a UNESCO Global Geopark. Prof. Richard (Rick) Sibson is a celebrated structural geologist who has made numerous distinguished contributions to the field of structural geology and tectonics throughout his career, both in New Zealand and abroad. His research focuses on the structure of crustal fault zones and shallow crustal earthquakes, and he has authored or co-authored over

100 research papers. Rick is a Fellow of the Royal Society of London, the Royal Society of New Zealand, and the Geological Society of London. In 2010 he was awarded the Wollaston Medal of the Geological Society of London and in 2011 he received the Structural Geology & Tectonics Career Contribution Award from the Geological Society of America.

Governance – the Waitaki Whitestone Geopark Trust

The Geopark is established under the auspices of the Waitaki Whitestone Geopark Trust. This Charitable Trust is responsible for setting the Mission and objectives of the Geopark, ensuring that it meets UNESCO requirements, and enabling the raising of funds to achieve the Park's objectives. The Trustees are David Higgins, upoko (leader) of the local indigenous people (Te Rūnanga o Moeraki), Helen Jansen, Melanie Jones, Gerald Carter, and Mike Gray, the Chair of Vanished World Inc. Society. The Trust owns the brand of the Geopark, and could be a partner in any future large- scale facility development plans. The Trust approves the Management Plan for the Geopark.

The Trust is the 100% shareholder of Waitaki Whitestone Geopark Ltd. This company structure has been established to conduct any commercial activities which the Trust may enter into in order to fund its charitable purposes (e.g. generating income through the sale of merchandise and licencing of the Geopark brand to selected, qualifying businesses).

Advice – the Advisory Group

The Trust is advised by an Advisory Group whose members are senior and respected practitioners across all the domains relevant to the Geopark – Māori cultural and spiritual matters, education, geology, archaeology, geohazards, conservation, regulation and preservation, cultural and natural heritage, tourism and business. New members are added or co-opted to advise on specific development plan activities. Observers are invited to attend Advisory Group meetings where relevant – for example, corporate supporters with interests ranging from geology to hydro- electricity generation attend so that their knowledge can be included in the Geopark offering. Renowned New Zealand geoscientists Dr Ian Graham (author of 'A Continent on the Move') and Prof Ewan Fordyne of Otago University, are geoscience advisors to the Geopark.

PATRONS



The Right Honourable
HELEN CLARK ONZ
NEW ZEALAND
PRIME MINISTER
1999 - 2008



Emeritus Professor
RICHARD H SIBSON
FRS, FRSNZ
Department of Geology
UNIVERSITY OF OTAGO

WAITAKI WHITESTONE GEOPARK TRUST



Community – the Community Management Group

The Community Management Group is a representative group comprised of key stakeholders and Action Group leaders. Action Groups are multi stakeholder groups with a common interest that work together to design, fund and deliver geopark projects. They are responsible for raising external funding for their projects. Each group has a strategic direction and purpose (e.g. tourism, education, geology, geogastronomy). Group membership may fluctuate as projects are undertaken and completed. The Community Management Group meets monthly to report against strategic goals and progress on projects.

It shares and disseminates relevant information to its members and externally to the wider stakeholder community.

Operations – Executive Manager and Community Coordinator

The Trust engages an Executive Manager to manage the operational side of the geopark, to ensure that legislative and UNESCO requirements are met on a day to day basis, and to coordinate the members of the Community Management Group. The Community Coordinator facilitates the work of the Action Groups which collectively comprise the Community Management Group.

Staffing

The following Table staff associated with the Geopark. Extensive use is made of secondments and arrangements with partner organisations, who hold both talented and qualified people and also extensive resources to contribute to the achievement of Geopark objectives.

name	function	status	gender
Sasha Morriss (MSc)	Geoeducator	Employed by Trust	F
Lisa Heinz	Community Coordinator	Employed by Trust	F
Gerard Quinn	Geopark Manager, Exec Manager for Trust	Seconded from Waitaki District Council	M

A project team which worked on the Geopark establishment and development projects has been in existence since 2018. It is made up of people from the Waitaki District Council, Vanished World Inc. Society, North Otago Museum, Tourism Waitaki, and Trustees. Additional project team members from organisations such as the University of Otago, Ōamaru Blue Penguin Colony and GNS Science are brought on for specific projects.

New Zealand is a society in which women have equal standing with men and gender-based discrimination is illegal. The table shows how involved women are at all levels of the Geopark operation.

Sasha Morriss, our geo-educator is a geologist and science educator committed to connecting people with

their natural surroundings through teaching, educational outreach, and field-based interpretation. Sasha holds a B.Sc and M.Sc in Geology from the University of Otago in New Zealand. Her experience includes field research in South Canterbury New Zealand, regulatory Resource Management at Environment Canterbury New Zealand, outdoor and nature education at primary and high school level in Virginia USA, and Planning and Manager roles at the Cambridge City Council (UK).

Lisa Heinz, our Community Coordinator holds a bachelor and master degree in tourism management, from Cologne Business School, Germany and the University of Otago. She is passionate about creating a better and sustainable Waitaki through community engagement and a holistic, bottom-up approach.

Management Plan

The Management Plan is the strategic document guiding the activities, operation and development plans of the Geopark. The initial Geopark Management Plan (2019-2022) has largely been shaped by the self evaluation process. This Management Plan for the Geopark will be further developed through community participation and input from the Advisory Group and Community Management Group.

It sets the purpose and vision of the Geopark, defines its goals and confirms its values.

Purpose / Vision

The Vision of the Geopark Trust

Waitaki Whitestone Geopark - Where people come together as kaitiaki [Guardians] of the land and its stories.

Ultimately we want to develop a generation of people who care for the planet and its people.

This requires understanding the stories of the land and ocean we live with. ***Understand it, Appreciate it, Protect it*** for future generations.

Goals

To achieve its purpose, the Geopark will strive to:

1. Increase the protection of and access to the geological, cultural and heritage sites within the Geopark
2. Enhance the identity and increase the social capital of the Waitaki district by providing a unifying platform for stories of our land, culture and heritage
3. Share the story of the Geopark through education and by providing experiences and activities within the Geopark, with a focus on youth engagement
4. Promote environmental protection and sustainable economic activity

These goals align with UNESCO Sustainable Development Goals.

The Management Plan outlines four work programmes which seek to deliver on these goals, and to enhance the value, outputs and client experience of the Geopark. Each programme and its resultant projects are aligned to the goals and values of the Geopark. The headline programmes are:

Preservation of and the access to geological and other sites

- Secure private land geosite protection covenants
- Work with Waitaki District Council to schedule all geosites as 'Outstanding Natural Features' in the revised Waitaki District Plan
- Improve roading and community infrastructure
- Trail development
- Biodiversity initiatives

Identity and Social Capital

- Community Engagement
- Visibility – marketing and promotion
- Social Licence to Operate (SLO) policies

- Events
- Cultural projects with iwi (tribal groups)
- Youth engagement

Education

- School science programmes
- Tertiary Research
- Community education
- On line resource portal
- The Global Geopark Network

Promotion of environmental protection and sustainable economic activity

- Develop tourism products
- Develop a 'ParkMark' for sustainable products and services
- Geogastronomy
- App Development
- Improve visitor facilities and experiences
- Visitor centre facilities redevelopment
- Lincoln University project sustainable tourism work

Budget

The Trust will raise income for the Geopark through applying for public grants, and by seeking the support of government, corporate sponsorships and philanthropic donations. It will pursue funding contracts with (primarily) public agencies to deliver education activities and public outreach programmes.

The Geopark will seek funding to enhance the facilities of the park primarily through national and local government infrastructure funds – such as the Provincial Growth Fund and Tourism Infrastructure Fund. In October 2019 the Trust commenced a \$9 Million capital raising initiative to develop a range of visitor experiences across the Geopark. These experiences are designed not only to reach a large number of residents and visitors to advance the educational and social capital goals of the geopark, but to drive revenue for the Trust so that it becomes self-funding. Other centralised funding exists for improvements to roading and environmental protection.

The actual and forecast budget for FY2018/9 to FY-2021/22: (right)

	actual \$		forecast \$		
	2017/18	2018/19	2019/20	2020/21	2021/22
INCOME					
Waitaki District Council		45,600	79,000	18,600	40,200
WDC Grant			190,000		
Corp sponsorship			40,000	80,000	80,000
Partner & Licence Fees			5,000	10,000	10,000
Merchandising		200	10,000	20,000	20,000
MBIE Project Income		120,000			
Carried Forward		85,000		20,000	
Total Income	0	165,800	324,000	148,600	150,200
EXPENDITURE					
Staff			94,000	118,000	118,000
WDC Grant projects			96,000		
Marketing & Engagement			3,000	10,000	10,000
Project initiation		45,600	79,000		
Cost of merchandise			4,000	8,000	8,000
MBIE Project Expenditure		120,000			
Global Geopark Network			8,000	8,000	8,000
Carry Forward			20,000		
Total Expenditure	0	165,600	304,000	144,000	144,000
Nett Position		0	200	20,000	4,600
					6,200

Personnel costs include allowance for overheads



OVERLAPPING DESIGNATIONS

The Waitaki Whitestone Geopark area does not overlap with another UNESCO designated site.

E.5

EDUCATIONAL ACTIVITIES



Since Vanished World Inc. was established in 2001, education has been a cornerstone of its philosophy and as it progresses along the path to UNESCO Global Geopark status, education programmes will continue to be developed and expanded.

Vanished World Centre

The current Vanished World Centre in Dunroon houses an impressive collection of fossils, rocks and minerals detailing the geology of the district. The displays have been put together under the guidance and assistance of Professor Ewan Fordyce from the Geology Department of the University of Otago, with the aim of educating visitors (children and adults) about the unique geology of the district. It contains many significant and unique fossils found in the area, both original fossils and casts of fossils held at the University of Otago Geology Museum or on loan to Otago Museum.

These are accompanied by interpretation panels and supporting videos showing the extraction of fossils from their surroundings. A secondary display area at the Centre promotes other local stories and topics of interest to educate people about the Waitaki District. These include Māori rock art, the moa, locally collected rocks and minerals, special geological features and gold mining.

Refreshing the displays in the Dunroon Centre is ongoing and there are plans for the University's geology students to work in the Centre preparing fossils for display. The Centre in Dunroon is open daily with experienced local volunteer guides telling the story of the district's whitestone (limestone) and its early geological history as a marine wonderland. Vanished World's guides are in many instances intimately familiar with the sites, being landowners of geosites or local community members living within the Geopark.

School Visits

School visits are a regular occurrence at the Centre and teachers are given the option of a guided tour of the Centre at Dunroon and/or a guided tour of the Vanished World Trail. While visiting the Vanished World Centre, school groups are led on a guided tour of the Centre where they learn about rocks, minerals, fossils, New Zealand geology, and the more recent moa history. Students can work on activity worksheets or participate in hands-on activities such as examining microfossils under a microscope, solving a giant penguin fossil jigsaw puzzle, using a rock detective kit to identify rocks, going on a scavenger hunt around the fossil and rock collection, or having a go at fossil excavation in the 'Dig Room'. Bus tours are available for both school groups and special interest groups, and range from 2 hours to a full day.

The Centre offers a guided field trip specifically for secondary school groups, focused on identifying and describing surface features in the Waitaki Whitestone Geopark and linking them to the internal and/or external processes that have formed them. This exercise is part of the NZ curriculum and contributes towards the National Certificate of Educational Achievement (NCEA) Standard 90952.

University Students

Geology students from the University of Otago are regular visitors to the area to take part in field trips and excavations. The Geology Department at the University of Otago runs their field school programme, 'GEOL252: Introduction to field mapping Maerewhenua', within the Geopark every year.



Junkjam

In October 2018, Waitaki Whitestone Geopark participated in the Live Global Junkjam, an online jam session between 9 UNESCO Global Geoparks, to creatively raise awareness of the importance of collectively caring for our planet. Waitaki Girls High School teamed with the Waitaki Whitestone Geopark to make musical instruments from recycled materials and come up with an eco-chant to recite during the jam.

School of Rocks

School of Rocks has been delivered fortnightly to four classes (93 students) at Duntroon School through a series of hands-on exercises and experiences and are usually held at the Vanished World Centre in Duntroon.

Our principal learning outcome is for students to gain the skills they need to become responsible kaitiaki (stewards) of the geologic heritage within the Waitaki Whitestone Geopark. To meet this goal, we have worked on building students' understanding of key earth science concepts and local geology to the point where they are confident enough to help others engage with the local geology.

During the first half of the year (February – July), learning objectives focused on building the core skills of 1) making good observations; 2) understanding different spatial scales; 3) gaining perspective on deep time; and 4) using the scientific method. Activities included making fossil descriptions and plaster casts, constructing Foldscope microscopes, sample collecting, making and communicating microscopic observations, carrying out a fossilisation experiment, making plate boundary models, and collecting and analysing micrometeorites.

During Term 3 (August – September) activities were focused on developing these core skills while introducing local geology. Students applied their knowledge of the rock cycle to identify unknown rocks, learned how to read and use geologic maps, made



predictions about the rock types present at home, and formulated a set of questions and hypotheses about their local geologic setting.

These hypotheses will provide the foundation for action projects which will be completed during Term 4 (October – December). Projects will address local issues relating to geologic heritage or hazards, and could include adoption of a geological site for geoconservation purposes, communication of earth science and/or mātauranga Māori (Māori knowledge/wisdom), and/or creation of tools to assist with visitor monitoring and geosite management. We hope that the commitment to an action project will allow students to draw on these skills while developing a sense of ownership of their geologic heritage, and thus taking up the role of kaitiaki of sites of their choice within the Waitaki Whitestone Geopark.

Right: the Vanished World Centre in Duntroon

Below: Department of Conservation Rangers give a public talk on South Canterbury Long-tailed Bats at Ōamaru Library for Conservation Week 2018



E.6 GEOTOURISM



The Waitaki Whitestone Geopark has lifted the tourism profile of the district, highlighting the spectacular geological features and landscapes of the district, and integrating the stories of our natural, cultural and intangible heritages.

The Geopark has its genesis in the eighteen years (so far) of work undertaken by the members of the Vanished World Society. Based in the Waitaki, Te Waipounamu, Aotearoa, the Waitaki Whitestone Geopark brings together the foundations of the geological work and collections of Vanished World, the stories from our local iwi, heritage stories from our early European settlers, to the current interactions with our land through agriculture, the arts and education to become an encapsulating portfolio of what is unique and special about our Geopark.

Tourism in the Geopark is managed by Tourism Waitaki, the local Regional Tourism Office based in Ōamaru. Working under a new Statement of Intent (revised January 2019) Tourism Waitaki has adopted the Geopark as an umbrella brand for the District. A revised tourism vision, purpose and marketing plan have all been produced and implemented with the direct aim of lifting visitation numbers to the Geopark.

Tourism Waitaki's Vision is that "By collaborating with our neighbouring regions, visitors are drawn year-round to the Waitaki Whitestone Aspiring Global Geopark, its rich heritage and unique geology and geography". Its purpose is to "Make a lasting and positive contribution to our communities, national and international visitors".

The Regional Tourism Data Estimates (RTEs) conservatively project that the district received 1,718,437 visitors in 2018 (1,414,230 domestic and 304,206 international). Monitoring systems to record visitor numbers are in place at some of the more popular geosites (Paritea Clay Cliffs, Anatini, Elephant Rocks), and we have conducted demographic surveys with visitors at various sites to better understand the nature of our current visitor set. Vanished World Centre records daily visitation numbers.

The uniqueness of being the first UNESCO Global Geopark in New Zealand allows us the opportunity to have a point of difference; marketing the Geopark off-shore and domestically will naturally attract attention.

The New Zealand Government has developed a new Tourism Strategy which is intended to support increasing tourist numbers to the regional parts of New Zealand (3.9 million visitors to NZ in 2019, expected to increase to 5.1 million by 2025). Tourism Waitaki will take an active part in feeding into this strategy, to ensure the Geopark project is highlighted and observed by Government as a new,

creative initiative to successfully drive increased sustainable tourism to the Waitaki district - helping channel tourists away from main 'high pressure' routes so that numbers are spread more evenly across the South Island and visitors can discover what wider Aotearoa New Zealand has to offer.

There has been great support from stakeholders locally and nationally. There is great appreciation of the fact that if the Waitaki Whitestone Geopark is successful in being accepted by UNESCO then it will be the only UNESCO Global Geopark in Australasia. Engagement with communities in the Waitaki district has resulted in full support and optimism around becoming a UNESCO Global Geopark, especially for what it would mean in adding greater sustainability to many of the small tourism businesses throughout the district. Tourism across New Zealand has large seasonal highs and lows and these have traditionally caused economic issues with managing staffing and opening hours across quieter periods. The fact that the Geopark products such as Vanished World and self-drive trails are not weather dependent means visitor numbers will be less affected by seasonality.

The successes to date are shown in the heightened profile of the diverse range of products on offer throughout the district. Expressions of interest have been received from new business propositions based on using the Geopark's resources such as a new 4WD and back country landscape tour, new accommodation lodges, walking tours and Geopark bus tours. Tourism Waitaki actively supports new tourism ventures to explore business opportunities in the Geopark.

Recreation and events are another opportunity to bring visitors into the district. There are a number of community events covering the Arts, Music, Heritage and Culture and Food. Local events traditionally have been well supported and new events and recreation activities are strongly encouraged and supported. The popular Alps 2 Ocean Cycle Trail, Aotearoa's longest cycle trail (301km), winds its way from the Southern Alps, through the Waitaki Whitestone Geopark past a number of geosites, to finish at Oamaru Harbour.

The UNESCO values of incorporating sustainable development and the use of geotourism to bring awareness of the unique geological landscapes along with the economic return which tourism brings to communities align well with the values and mission of Tourism Waitaki. Tourism Waitaki's Statement of Intent includes a commitment to provide a tourism marketing plan for the Waitaki Whitestone Geopark.

E.7.1 SUSTAINABLE DEVELOPMENT POLICY

We are acutely aware of the need to ensure that all development within the Geopark is done in a sustainable manner.

We proudly support the Tiaki Promise, which is a nationwide tourism campaign that aims to educate people about how to care for New Zealand. By following the Tiaki Promise we are making a commitment to New Zealand, that includes caring for land, sea and nature, travelling safely and respecting culture.

The focus on sustainability has resulted in four specific projects to boost sustainable economic development including:

1. Development of a values-driven ‘ParkMark’ to be used on local produce, products and by local tourism and service providers.
2. Development of Sponsor and Partner Agreements which set out the sustainability requirements to which a Geopark sponsor or partner must adhere.
3. Using the Geopark as a ‘living laboratory’ for sustainable tourism development. A Memorandum of Understanding with Lincoln University was signed in November 2018 with the aim of using the Geopark as a ‘living laboratory’ for sustainable tourism development. Lincoln University has recently been made the Centre of Excellence amongst New Zealand universities in the field of sustainable tourism. In July 2019, Dr Helen Fitt started studying geotrails in Waitaki as the first to commence research under the Memorandum of Understanding with Lincoln University. With the title: “Exploring integration opportunities for tourism operators through the creation of geotrails in the

Waitaki Whitestone aspiring global Geopark”, Helen’s project explores opportunities for tourism-related businesses associated with the Waitaki Whitestone Geopark. Particularly, it considers whether there may be opportunities for local businesses to develop closer relationships with each other and the Geopark through the development of ‘geotrails’.

4. Integrating our social licence to operate with the district’s tourism strategy. We have commenced a project to establish a baseline measure of the Geopark’s social licence to operate. Our district’s tourism strategy aims to moderate the impact of increased visitor numbers to the Waitaki District, and will be aligned to the South Island Destination Management Strategy which is currently being developed across regional boundaries. Increased visitation to Waitaki will also serve to reduce the pressures on tourism infrastructure and community tolerance in neighbouring areas such as Mackenzie Basin and Queenstown Lakes. This aligns well with the intent of the New Zealand Tourism Strategy and Canterbury Regional Economic Development Strategy, which aims to encourage a wider seasonal ‘spread’, disperse visitors across the region and South Island, and keep them here longer. Our aim is to integrate the social licence and tourism elements so that we become a world class example of sustainable tourism.

Refer to Annex 7 ‘Our Story’ for examples of businesses flourishing in the Geopark.

E.7.2 PARTNERSHIPS

At the local level, we have developed a Partnership Agreement which details requirements (to at least the standards set by UNESCO) which accredited Geopark partners must meet and maintain before they can advertise a formal partnership with Waitaki Whitestone Geopark. More formal arrangements are conducted under Memoranda of Understanding or contracts for services.

The Geopark has established relationships with academic partners such as GNS Science/ /Te Pū Ao (a Crown Research Institute), and the University of Otago and Lincoln University. As well, we hold relationships with the

regional and national divisions of Government agencies such as the Department of Conservation.

Tourism Waitaki will work directly with the government body Tourism New Zealand to secure their support to assist promoting the Waitaki Whitestone Geopark as a ‘new’ product for the country. It would be expected should the aspiring Geopark become a UNESCO Global Geopark that international interest from media about the addition of Aotearoa New Zealand into the UNESCO Global Network would be substantial. There is confidence that increased tourism will result from branding the district as the ‘Waitaki Whitestone Geopark’.



Geogastronomy

The limestone that underpins our district—and that forms the core of our Geopark—has long had a strong impact on the “taste of the Waitaki”. Throughout the Waitaki district, restaurants have emerged that embrace the “paddock to plate” philosophy, preparing meals using produce grown on-site, from our waterways, and raised on our farms, offering a true Waitaki taste experience.

New Zealand Christmas would not be complete without Ōamaru’s famed Jersey Benne potatoes, nurtured in the volcanic soils that render our produce among the tastiest in the country. Food producers like International Award winners Whitestone Cheese and restaurants like Cucina, Fleurs Place at Moeraki and Riverstone Kitchen on the Waitaki Plains stake their reputations on the high quality of our local produce, and have earned national and international acclaim. The Geopark has established a partnership with Cucina, a well-respected local restaurant to produce the first Geopark-inspired geogastronomy degustation menu, featuring entirely local produce and wines. Other restaurants are coming on board, having seen the exposure created by this initiative.

Ōamaru Whitestone Civic Trust

When the first European settlers arrived in the Waitaki district, there were literally no trees to build shelter and houses from. Instead they turned to a material that was available in abundance - limestone. One hundred and fifty years on, these buildings still stand and nowhere is that more evident than in Ōamaru’s Victorian Precinct of Harbour and Tyne Streets. Thirty years ago the Ōamaru Whitestone Civic Trust began the long process of restoring these grain stores and offices built in the 1800s and they have been repurposed into workshops and retail spaces, while retaining some large spaces for wool storage, a large event space as well as ‘Whitestone City’, where activities, displays, and costumed guides provide a glimpse of what the town would have been like in Victorian times.

Today the Victorian Precinct is a thriving community of artisans and craftspeople making and selling quality arts and crafts, and on Sunday mornings there is the added attraction of the Ōamaru Farmers’ Market, where produce raised in the rich soils of the Waitaki district attract a steady clientele of locals and visitors. Talented and skilled people can be found throughout the Waitaki District. Cottage industries thrive with craftspeople, artists and writers living and working in and around all the small towns of the district.



Case Study: Geogastronomy

Geogastronomy is bringing our local producers and food companies together as a brand, which is clearly showing locals and visitors what we have on offer and where to go to experience it. This is not just about one or two big names, it's about everything that's great in the Waitaki, big and small.

Geogastronomy [noun] ... exploring the unique character of foods, brews and wines resulting from a geopark's special geological character (including soils, environment and climate), artisanal creativity and the sustainable stewardship of the land by growers and producers.

The first Geogastronomy menu was presented by Cucina, a restaurant in Ōamaru. Every item was grown with love in the Geopark, many within 20 kilometres of Ōamaru, infusing food and local wines with the flavours, history and character of the area.

The Trust ran workshops with over 20 local gastronomy businesses on a range of topics such as collaborative production, branding and marketing and a demonstration of the geopark app. The very positive response gave the Trust the mandate to develop the idea further.

A Steering group with dedicated businesses was formed to decide how exactly the ‘Geogastronomy Club’ that Waitaki wants should look like. The group discussed benefits and impacts, criteria, commitments and barriers of belonging to the Club. We are creating a unique, authentic brand that is based on the terrain of the area and the artisanal creativity of our people that is representing the regional taste of Waitaki, and which will be recognised and known worldwide.

This year the Geogastronomy trademark was registered with the Intellectual Property Office of New Zealand (IPONZ).

The Trust released a series of stories under the ‘EAT the Park’ brand showcasing local growers and food providers, and the products special to the Waitaki District.

Local gastronomy star Fleur Sullivan [also part of the Steering group] was a popular panel member at the Major Annual Food Hui of Eat New Zealand. She spoke about Waitaki, the Geopark and Geogastronomy. This assisted Eat New Zealand’s project to extend their digital platform to include producers and local food stories.

The Geogastronomy journey shows how keen businesses are to participate in a partnership like this with the Geopark. It will not only benefit the businesses, but also the wider Waitaki community.

Local branding

We have trademark protection on our Waitaki Whitestone Geopark brand and logo and the word ‘geogastronomy’. We have rules around the use of this logo and other collateral within our Partnership Agreements. A project is under way to develop the ‘ParkMark’ accreditation for use by local producers and service companies across a range of activities (food, wine, guiding, etc) which meet the requirements of the Geopark Partnership Agreement.

Partnership promotion

The Geopark, through its various partner agencies such as the Waitaki District Council and Tourism Waitaki, inspires the creation of new ideas to generate recreational and business-related activities which promote the Geopark.

The trust will build on existing activities such as the Ōamaru Stone Symposium - a bi-annual event providing a forum for sculptors to discuss issues and share carving experiences while also demonstrating the incredible versatility and beauty of the whitestone that forms the soul of the Waitaki district. It has been run in conjunction with the Waitaki Arts Festival, the Food and Wine Festival or the Victorian Heritage Festival since 1998, bringing sculptors, from beginner groups to master craftspeople to Ōamaru for



GEOGASTRONOMY
**PARK
MARK**
FOOD PARTNER

two to three weeks to carve Ōamaru whitestone into a wide variety of sculptures, holding public demonstrations and stone-carving workshops for children and adults. The symposium makes a point of including a near equal mix of male and female carvers and supporting local businesses.

One development concept being investigated is a ‘Whitestone & Vines’ music and local food festival set in a Geosite setting. Such events are promoted through a range of partner channels and the Geopark’s own social media channels. As part of the community engagement strategy, Geopark dedicated personnel set up stands at events such as the Otago Field Days (an agricultural sector industry fair) to educate people about the Geopark, its principles, its impact and the opportunities for partnerships.

E.7.3 FULL AND EFFECTIVE PARTICIPATION OF LOCAL COMMUNITIES AND INDIGENOUS PEOPLES

The Waitaki Whitestone Geopark is built ‘bottom up’ by our local communities and Geopark partners, fostering conservation, education, cultural awareness and scientific study within the Waitaki district.

The Vanished World Trail and Centre was developed by locals, in partnership with the University of Otago, in 2001. The concept of Vanished World arose from local interest in fossils from the district, but aims to take geology in the broadest sense to the public. For the past 18 years Vanished World Inc has been operated by community volunteers. Going forward, the Waitaki Whitestone Geopark Trust will lead a coordinated effort to identify, promote, maintain, and preserve the geologically significant sites of the district.

Involving local communities

Community members play a significant role in the ongoing development of our Geopark. Before participation comes awareness and understanding. A community engagement programme is under way across the breadth of the Waitaki District – talking to local people in their own towns about what the Geopark is, what it stands for, and how they can get involved.

We have a fortnightly column in the Ōamaru Mail newspaper, updates in local newspapers such as the Duntroon Digger, a four times a week interview slot on Real Radio, and in January 2020 we are opening a pop-up shop in Ōamaru to operate as a Geopark ‘drop in’ information centre.



Community members are encouraged to participate in the Action Groups which collectively form the Geopark’s Community Management Group.

As well, people can join the ‘Friends of the Geopark’ and receive information and learn about ways to engage with and contribute to the objectives of the Geopark.

One of our Management Plan objectives is to increase the engagement of young people with the Geopark, in line with the Global Geopark Network Youth initiative.

A concrete way to do this is through our educational programme ‘School of Rocks’. This programme aims to increase local students’ engagement in earth science by exploring local geology using spatial technology. During the final stages of this programme, each class will lead an action project that will either promote engagement from the rest of the community with the Geopark, or address developmental or management issues relating to the Geopark. Projects could include adoption of a geosite for geoconservation purposes, communication of earth science education through social media, or the development of apps to assist with science communication, visitor monitoring, and/or geosite management. These projects will result in a more informed community that is better-equipped to participate directly in all aspects of Geopark development, from planning and management to promotion and public engagement.

Involving indigenous peoples

There are a number of statutes relating to Māori which bind the Geopark and which provide a framework for our indigenous people (mana whenua) and various agencies to work together. Te Tiriti o Waitangi (The Treaty of Waitangi) is the founding document of Aotearoa New Zealand. It provides for the exercise of kawanatanga (governance) by the Crown, while actively protecting tino rangatiratanga, the full authority, status and prestige of iwi in respect of their possessions and interests, including ngā taonga tuku iho (treasures handed down).

The Treaty of Waitangi is a national level piece of legislation which accords Māori rights and access to resources and their taonga (treasures, whether they be physical, spiritual or cultural). Any issues of interpretation of the Treaty are dealt with in the Waitangi Tribunal or through the justice system.

The Resource Management Act 1991 (RMA) contains specific obligations in relation to the Treaty of Waitangi and Māori interests. The RMA identifies, as a matter of national importance, the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.

Geopark partners are working together to establish a respectful and constructive working relationship between the district’s peoples. The Waitaki District Council and Te Rūnanga o Moeraki signed a Memorandum of Understanding on 30 November 2016 to establish the principles of the relationship and how it can guide and support decision-making for both organisations. Mutual

understanding and goodwill are essential elements of a positive working relationship between mana whenua and the Geopark. The Council also holds a Relationship Agreement with Waitaha, which encourages the participation of Waitaha in district activities.

The local indigenous people (tangata whenua) of the South Island (Te Waipounamu) hold a Trustee role within the Trust, which is in complete alignment with their declared values around kaitiakitanga (stewardship) of the land for future generations.

The Trust and Te Rūnanga O Moeraki members have met at Moeraki Marae, the local meeting house, to ensure that the narrative of the Waitaki Whitestone Geopark is underpinned by that of Ngāi Tahu and that both

the WWGT and Te Rūnanga O Waitaki are working in such a way that the involvement of local Iwi follow their traditional processes and procedures.

At a practical level, the Trust holds funding for a tribal (iwi) liaison role or set of projects to engage local Māori in telling their own story within the Geopark project, including to telling the story of how early Māori used myth to relate to the geomorphologic processes they encountered. Geopark signs at cultural sites include significant information in Māori.

The Trust is working with Te Rūnanga o Moeraki to establish Māoritanga presence at the Moeraki Boulders site and to promote a short walk from the DOC car park along the beach to the Boulders and back via a coastal track passing the existing café.

Te Rūnanga o Moeraki Marae are supportive of the work, which will include installing a waharoa (gateway) and palisade fencing, orientation and interpretation panels in the waharoa and collaborating with the café owner to provide cultural and geological interpretative material in the café.

Language barriers

Increasing the level of multiple language use is an objective in the Management Plan. Local indigenous people speak English as well as te reo Māori so local interpreters are not required to ensure good communication. However, Geopark staff are encouraged to learn te reo Māori to better understand tea ao Māori (the Māori world).



Ngāi Tahu representative Te Runanga o Moeraki upoko David Higgins, Trustee of the Waitaki Whitestone Geopark Trust. Photo: © 2017. Te Rūnanga o Ngāi Tahu Collection, Ngāi Tahu Archive, 2017-0271



E.8 NETWORKING

As an aspiring Geopark we and our partner organisations such as Tourism Waitaki and the Waitaki District Council, have engaged directly with a number of Geoparks, and with the Global Geopark Network.

In 2018, Margaret Munro, our Tourism General Manager attended the Intensive Training Course on Lesvos Island, Greece. She also visited Fangshan and Yangtze Geoparks in China. The Geopark Manager, Gerard Quinn, attended the 8th International Global Geopark Network conference in the Adamello Brenta Geopark in Italy.

Mike Gray, Chair of Vanished World Inc., has visited the management of the UK Riveria Geopark. In late 2018, we hosted and shared ideas with Raniero Brandon, who is coordinating the application to UNESCO for a Geopark on the island of Gran Canaria (Spain). The Trust actively and financially supported the Waitaki Enviroschools network to participate in last year's Geopark Junkjam which was run by the UK Riveria Geopark. In 2019 we hosted a visit from the organiser of the Murchison Geo Region - Aspiring Geopark in Western Australia.

In 2019 the Trust engaged the services of Professor Patrick McKeever, recently retired Chief of Earth Sciences and Geohazard Risk Reduction at UNESCO and Special Advisor to the Global Geopark Network, as a consultant on the state of readiness of our aspiring Geopark. In the last year we have addressed the observations and recommendations of Professor McKeever, and are confident that our Geopark is now of a standard suitable for designation as a UNESCO Global Geopark.

Trustees, the Geopark Manager and the geoeducator use video-conferencing to seek ideas and advice from other Geoparks (e.g. The English Riviera and Tumbler Ridge Geoparks).

In addition to our international networking described above, the Geopark has developed a broad and comprehensive network of partners at the national,

regional and local level. Our national and regional partners, including the New Zealand Commission for UNESCO, Geological and Nuclear Sciences, the Ministry of Business Innovation & Employment, the Ministry of Tourism, the University of Otago and Lincoln University provide international reach into the science, education, tourism and sustainable development arenas.

Our geoeducator has established extensive networks into the science, education and research sectors, both regionally and nationally.

Intensive engagement with the indigenous people of Te Waipounamu (the South Island) at both rūnaka and tribal level allows the Geopark to tell an authentic account of the relationship between our earliest settlers and the land and sea.

The Trust intends to work with the Youth Council for Waitaki District, a body associated with the Waitaki District Council, with the aim of involving youth in the Geopark. We also join relevant societies – such as the Geosciences Society of New Zealand - and we are supportive of Geopark and partner organisation staff joining relevant clubs and societies such as the North Otago Rock & Mineral Club.

Many of our local businesses are based on the sustainable use of the land, whether that be through farming, agricultural processing, tourism, or electricity generation. We work directly with these businesses, and through representative organisations such as the Chamber of Commerce and the Waitaki Tourism Association. We extend our reach by establishing a network of networks. Several large businesses are discussing with us how they can provide Corporate support and sponsorship to the Geopark.

E.9 SELLING OF GEOLOGICAL MATERIAL

The Geopark is not involved in the selling of geological material. As part of the education programme for children, Vanished World allows any fossils found in refuse material from local limestone quarries to be kept by the children.

F

INTEREST AND ARGUMENTS FOR BECOMING A UNESCO GLOBAL GEOPARK

The Waitaki District is an area of significant geological importance, world class scenery, a rich settlement heritage from Māori to modern day, and of open, warm, friendly people prepared to share the story and values of the Geopark.

The Geopark had its genesis eighteen years ago in the form of a community group with an interest in local geology and natural heritage. Over that time, the world, our country and our community has become increasingly aware of, and concerned about, the impact we have on our planet and the societal challenges that brings. Not only

are we affected by global issues like climate change, we live in a very geologically active country – we are exposed to current and forecast natural hazards. We need to understand our land to prepare for future geo-hazards.

Our desire to become a UNESCO Global Geopark is rooted in our strong commitment to help build a generation of people who are more resilient and who will care for the planet and its people by addressing the societal challenges related to our geology and our geography. In doing so we offer coming generations a more assured future, and we will increase the social and cultural capital of our district.

This commitment is more than aspiration. It aligns with the principles of UNESCO's Education, Natural Sciences and Conservation programmes which it uses to advance its Sustainable Development Goals.

It aligns with the blueprint of the New Zealand Government which aims, amongst other objectives, to support thriving regions; transition to a clean, green and carbon-neutral New Zealand; ensure everyone is earning, learning, caring or sharing; build closer partnerships with Māori; value who we are as a country, and create an international reputation we are proud of.

The values of the Geopark Trust are in complete alignment with the values of the local indigenous people (tangata whenua) of the South Island (Te Waipounamu), who hold a Trustee role within the Trust. Of prime significance to Māori is the concept of kaitakitanga - stewardship of the land, its culture and its heritage, for future generations.

Whanaungatanga (family)	Maraakitanga (looking after our people)	Takungatanga (expertise)	Kaitiakitanga (stewardship)	Tikanga (appropriate action)	Rangatiratanga (leadership)
We will respect, foster and maintain important relationships within the organisation, within the iwi and within the community.	We will pay respect to each other, to iwi members and to all others in accordance with our tikanga (customs).	We will pursue knowledge and ideas that will strengthen and grow Ngāi Tahu and our community.	We will work actively to protect the people, environment, knowledge, culture, language and resources important to Ngāi Tahu for future generations.	We will strive to ensure that the tikanga of Ngāi Tahu is actioned and acknowledged in all of our outcomes.	We will strive to maintain a high degree of personal integrity and ethical behaviour in all actions and decisions we make.

from the Te Rūnanga o Ngāi Tahu website: ngaitahu.iwi.nz

In line with the approach being taken by many countries to adopt an economic approach that results in increased well-being for its citizens and for the people of the world, the accreditation of Geopark as a UNESCO Global Geopark and the programmes that will enable us to deliver this objective will lead to increases in many of the forms of ‘capital’ required to improve the wellbeing and quality of life for our people.



New Zealanders, from as far back as the first Māori settlement, have always been dependent upon and intimately connected to the land. As a result of the recognition afforded by UNESCO Global Geopark accreditation, we will:

- Be better able to protect the wonderful geology present within the Geopark. We will preserve the Geopark’s social licence to operate by being a responsible steward and custodian of the geological, cultural and heritage sites within the Geopark. The Trust will ensure that the Geopark operates in accordance with the values described above. UNESCO status will provide greater incentive for Government agencies to support the work of the Geopark.
- Develop a heightened sense of local pride and strengthening of our identity as people of Waitaki, people of New Zealand and citizens of the world. The Geopark will be a beacon to attract researchers and visitors to our district. We will be able pass on the knowledge and values of our Geopark to them all.
- Enhance the relationship between the peoples within our district, our country and with visitors to our place. We will better integrate the stories of the land,

Māori, and more recent settlers so that we holistically understand and appreciate the value of our land and what we must do together to care for it.

- Diversify our economy so that we reduce our long-standing reliance on primary production. We will create a platform which grows tourism and other industry sectors such as agriculture, geogastronomy, research and education, and heritage support in a sustainable way that advances the economic wellbeing of our residents and showcases these values to our visitors.
- Contribute to the achievement of UNESCO’s Sustainable Development Goals, and share our learnings with the members of the Global Geopark Network.

LIST OF MANDATORY ANNEXES

Annexes to the application dossier:

Annex 1: Self-evaluation document

Annex 2: An additional and separate copy of section E 1.1

Annex 3: An explicit endorsement of any relevant local and regional authorities and a letter of support from the National Commission for UNESCO or the government body in charge of relations with UNESCO

Annex 4: A large-scale map of the aUGGp

Annex 5: One-page geological and geographic summary

Annex 6: Selected bibliography of the area in Earth Sciences highlighting international publications

Supplementary Annexes:

Annex 7: Our Story

Annex 8: Detailed site information

Annex 9: Site assessment

Annex 10: Interpretation Plan

