## 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.

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

MBER	NAME	DESCRIPTION & PROTECTION	MPORTANO	E FO
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.	Regional Scientific Importance	Geology Culture Nature
	-44:20:22.263 169:43:17.024	Protection: Outstanding Natural Landscape & Conservation Park	MAP 🔗	Education Vista
02	Ōhau Moraines	The Ohau Moraines are some of the most sensitive recorders of ice-age climate change in the Southern Hemisphere. Also containing rare and threatened plants.	International Scientific Importance	Geology Culture Nature
	-44:22:17.089 169:53:41.229	Protection: Outstanding Natural Landscape & Conservation Park	MAP 🔗	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.	Regional Scientific Importance	Geology Culture Nature
	-44:29:20.087 169:52:08.271	Protection: QEII covenant and Outstanding Natural Landscape	MAP @	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.	International Scientific Importance	Geology Culture Nature
	-44:31:14.937 169:50:36.151	Protection: Rural Scenic Zone	MAP 🔗	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.	National Scientific Importance	Geology Culture Nature
	-44:42:16.477 170:22:37.184	Protection: QEII covenant	MAP Ø	Education Vista
06	Wai o Toura Reserve	Rare limestone ecosystem and geological holostratotype. Home to critically endangered plants like Lepidium sisymbrioides. Significant fossil penguins. Archaeological and paleontological sites, and geological reference site.	National Scientific Importance	Geology Culture Nature
	-44:48:20.685 170:31:43.881	Protection: National Scenic Reserve	MAP Ø	Education Vista
07	Takiroa shelter rock drawings	Limestone overhangs offered early travellers shelter along a seasonal route up the Waitak Valley. A variety of rock art is captured here. It is an archaeological treasure.	National Scientific Importance	Geology Culture Nature
	-44:50:34.321 170:38:45.258	Protection: Significant Natural Feature, Archaeological Item (5653)	MAP @	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).	Regional Scientific Importance	Geology Culture Nature
	-44:51:17.168 170:40:59.330	Protection: Heritage New Zealand Pouhere Taonga Act 2014	MAP 🔗	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.	International Scientific Importance	Geology Culture Nature
	-45:28:28.266 170:22:29.977	Protection:Referenced for conservation purposes s62(1)	MAP 🔗	Education Vista
10	Maerewhenua rock art site, untroon Escarpment	Conservation Act 1987:  This escarpment contains multiple rock shelter sites and rock drawings and is an outstanding natural feature.	National Scientific Importance	Geology Culture Nature
	-44:51:33.255 170:41:25.254	Protection: Partial Historic Reserve (Maerewhenua Historic Reserve), Outstanding Natural Feature, Archaeological Items (5655, 5657)	MAP 🔗	Education Vista
W	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.	International Scientific Importance	Geology Culture Nature
	-44:52:10.402 170:43:32.189	Protection: Significant Natural Feature, Geopreservation site	MAP Ø	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.	Importance	Geology Culture Nature
100	-44:52:25.084 170:47:11.788	Protection: Waitaki Catchment Water Allocation Regional Plan	MAP 🔗	Education Vista

13	Waipata	Otekaike Limestone and Kokoamu Greensand, separated from Ototara Limestone by a	International	Geology	<b>✓</b>
	(Earthquakes) -44:52:27.575	regional intra-Oligocene unconformity, form large slumped blocks due to mass movement. <i>In situ</i> Baleen whale bones.	Scientific Importance	Culture Nature Education	✓ ✓
	170:37:24.545	Protection: Significant Natural Feature	MAP Ø	Vista	
14	Anatini	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.	National Scientific Importance	Geology Culture Nature	✓ ✓
	-44:54:05.482 170:39:15.496	Protection: Significant Natural Feature	MAP @	Education Vista	✓
15	Elephant Rocks	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.	Regional Scientific Importance	Geology Culture Nature	✓ ✓
	-44:53:36.131 170:39:22.355	Protection: Significant Natural Feature	MAP @	Education Vista	✓ ✓
16	Valley of the Whales	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.	International Scientific Importance	Geology Culture Nature	✓ ✓ ✓
	-44:55:24.882 170:40:55.012	Protection: Significant Natural Feature	MAP Ø	Education Vista	✓ ✓
17	Prydes Gully Road Quarry	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".	Regional Scientific Importance	Geology Culture Nature	✓ ✓
	-44:55:58.854 170:37:46.967	Protection: Heritage New Zealand Pouhere Taonga Act 2014	MAP Ø	Education Vista	<b>✓</b>
18	Tokarahi Sill	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.	Regional Scientific Importance	Geology Culture Nature	<b>✓</b>
	-44:56:25.663 170:37:06.756	Protection: Administered by Waitaki District Council	MAP Ø	Education Vista	<b>✓</b>
19	Huttons Bridge, Otago Schist	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.	Regional Scientific Importance	Geology Culture Nature	<b>✓</b>
	-44:56:41.918 170:35:22.614	Protection: Administered by Waitaki District Council:	MAP Ø	Education Vista	<b>✓</b>
20	Rakis Table	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.	Regional Scientific Importance	Geology Culture Nature	✓ ✓
The state of	-44:59:46.470 170:44:02.548	Protection: Rural General Zone	MAP @	Education Vista	<b>√</b>
21	Landon Creek bank	Exposures in banks of North Branch of Landon (Boundary) Creek featuring common Duntroonian brachiopods. Hypostratotype of Duntroonian Stage.	National Scientific Importance	Geology Culture Nature	<b>✓</b>
	-45:01:51.391 170:59:44.014	Protection: Rural General Zone	MAP Ø	Education Vista	
22	Devils Bridge Wetland	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.	Regional Scientific Importance	Geology Culture Nature	✓ ✓
	-45:02:17.152 170:56:34.684	Protection: QEII covenant, Significant Natural Feature	MAP Ø	Education Vista	<b>✓</b>
23	<b>Enfield dikes</b> -45:02:40.908	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.	Regional Scientific Importance	Geology Culture Nature	<b>✓</b>
	170:52:14.112	Protection: administered by Waitaki District Council	MAP Ø	Education Vista	
24	Jackson's Paddock	Internationally important site of Eocene diatomite. Oamaru Diatomite type-locality (upper part of stratigraphic sequence) and overlying Totara Limestone containing Eocene-Oligocene boundary.	International Scientific Importance	Geology Culture Nature	<b>√</b>
	-45:05:14.340 170:53:17.212	Protection: Rural General Zone	MAP Ø	Education Vista	✓ ✓
25	Hutchesons Quarry	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.	National Scientific Importance	Geology Culture Nature	✓ ✓
	-45:05:38.583 170:57:56.154	Protection: Scientific Reserve (Hutchinsons Quarry)	MAP 🔗	Education Vista	<b>✓</b>
26	Oamaru Iimestone dikes	In the road cutting on the north side of Chelmer Street is one of the best examples of limestone dikes in New Zealand.	Regional Scientific Importance	Geology Culture Nature	<b>✓</b>
	-45:05:51.531 170:57:39.913	Protection: administered by Waitaki District Council	MAP @	Education Vista	<b>✓</b>
27	Boatman's Harbour	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.	International Scientific Importance	Geology Culture Nature	✓ ✓
	-45:06:46.369 170:58:57.291	Protection: Significant Coastal Landscape	MAP @	Education Vista	<b>✓</b>
28	Makotukutuku (Old Rifle Butts)	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.	National Scientific Importance	Geology Culture Nature	✓ ✓
	-45:07:32.004 170:57:51.513	Protection: Significant Coastal Landscape, Geopreservation site	MAP Ø	Education Vista	<b>√</b>

29	Te Awa Kōkōmuka (Awamoa 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	National Scientific Importance	Geology Culture Nature
-	-45:08:30.327 170:56:06.324	Protection: Archaeological item (5688)	MAP &	Education Vista
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.	Regional Scientific Importance	Geology Culture Nature
	-45:09:13.109 170:55:19.954	Protection: Significant Coastal Landscape	MAP 🔗	Education Vista
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 Kauru River, east foothills of Kakanui Range.	Regional Scientific Importance	Geology Culture Nature
AUR	-45:09:40.892 170:39:41.573	Protection: Heritage New Zealand Pouhere Taonga Act 2014	MAP 🔗	Education Vista
32	Kākaunui River (Kakanui) Mouth	Dark mineral breccia containing material erupted from deep in the Earth's mantle and crust, including lherzolite, pyroxenite as well as megacrysts of garnet, clinopyroxene, kaersutite, and feldspar.	International Scientific Importance	Geology Culture Nature
	-45:10:59.404 170:54:26.974	Protection: Significant Coastal Landscape	MAP Ø	Education Vista
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.	National Scientific Importance	Geology Culture Nature
	-45:11:40.546 170:53:43.488	Protection: Significant Coastal Landscape	MAP 🔗	Education Vista
34	Ōrore (All Day Bay)	The rock pools and geology of All Day Bay make it a favourite attraction. It shows deepwater mudstone of the Mount Harris Formation (Early Miocene, 20 Mybp) with fossil molluscs	National Scientific Importance	Geology Culture Nature
-	-45:12:34.430 170:53:05.929	Protection: Significant Coastal Landscape	MAP &	Education Vista
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.	International Scientific Importance	Geology Culture Nature
	-45:13:14.051 170:52:57.026	Protection: Significant Coastal Landscape	MAP Ø	Education Vista
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 between 55 and 35 million Mybp.	International Scientific Importance	Geology Culture Nature
	-45:20:50.824 170:49:33.972	Protection: Scenic Reserve (Moeraki Boulders Scenic Reserve), Outstanding Natural Feature, Geopreservation Site, Scientific reserve	MAP Ø	Education Vista
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.	Regional Scientific Importance	Geology Culture Nature
	-45:21:24.143 170:51:32.080	Protection: Recreation Reserve (Moeraki), Significant Coastal Landscape, Geopreservation site	MAP &	Education Vista
38	Kātiki	Home to many species of wildlife including hoiho (yellow-eyed penguins) and kekeno (fur seals). A special place of cultural and historical signifiance to Ngai Tahu.	Regional Scientific Importance	Geology Culture Nature
	-45:23:28.176 170:51:57.913	Protection: Significant Coastal Landscape, Site of Natural Significance, Archaeological Items (5697, 5696, 5695, 5698)	MAP Ø	Education Vista
39	Trotters Gorge	Greywacke-breccia conglomerate of Cretacous age. Landscape including cliffs and caves formed after the last ice age 12 - 15,000 years ago. See and hear many of New Zealand's bush birds.	Regional Scientific Importance	Geology Culture Nature
	-45:24:10.363 170:46:32.968	Protection: Scenic Reserve (Trotters Gorge Scenic Reserve)	MAP &	Education Vista
40	Matakaea (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.	International Scientific Importance	Geology Culture Nature
	-45:28:25.050 170:49:53.096	Protection: Recreation Reserve (Matakaea Recreation Reserve), Significant Coastal Landscape	MAP Ø	Education Vista
	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.	Regional Scientific Importance	Geology Culture Nature
41		Protection: Significant Natural Feature, Heritage Item Cat B (108),	MAP 🔗	Education Vista
41	-45:29:26.583 170:43:52.540	Archaeological Items (5703,5705)	_	Viola
42		Archaeological Items (5703,5705)  Wonderfully preserved stamper battery and the only authentic working example in Otago it will leave you in awe of the determination of early miners.	National Scientific Importance	Geology Culture Nature