

# Te Tai o Arai Te Uru (The Otago Coast)

An environmental education resource kit for schools  
planning a visit to:

- Katiki (Moeraki peninsula)
- Matakaea (Shag Point)
- Huriawa (Karitane peninsula)



Department of Conservation  
*Te Papa Atawhai*



# CONTENTS

Using this resource	4
Tradition of the <i>Arai Te Uru</i>	7
Katiki: site information	10
Matakaea (Shag Point): site information	13
Huriawa: site information	15
Site Activities	17
Activity 1: Charting movements	20
Activity 2: Preserving food	22
Activity 3: All at sea	23
Activity 4: Nature awareness treasure hunt	24
Activity 5: Signs and seals	25
Activity 6: Global threats, local environments	26
Activity 7: Selecting a site	27
Related Resources (including websites)	28

## USING THIS RESOURCE

This resource kit is part of a Department of Conservation and Kai Tahu ki Araituru initiative to encourage teachers to plan exciting and educational learning experiences on three key sites on the Otago coast (Te Tai o Arai Te Uru) that have special cultural and conservation values to all New Zealanders.

The sites are all prominent headlands – **Katiki** (Moeraki peninsula), **Matakaea** (Shag Point) and **Huriawa** (Karitane Peninsula) – strategic strongholds occupied by Maori for hundreds of years. Archaeological evidence of occupation dates back to the 12th Century.

Since the Kāi Claims Settlement Act of 1998, all three sites are managed in partnership between the Department of Conservation and Te Runanga o Kāi Tahu.

The Crown also formally recognised Matakaea's special cultural, spiritual and historic significance of matakaea for Kāi Tahu, by designating it as a topuni.

The concept derives from the Kāi Tahu tikanga (custom) of rangatira (chiefs) extending their mana (power or authority) over areas or people by placing their cloaks over them. The topuni over Matakaea does not alter the existing status of the land but ensures Kāi Tahu values are recognised, acknowledged and respected.

In the southern Kai Tahu dialect, 'ng' is often replaced by 'k'.

## CURRICULUM LINKS

This resource kit offers a selection of pre-visit, on-site and follow-up activities to provide students with a range of experiences in, about, and for the environment. These suggestions can be adapted to any age/level and provide learning experiences that:

- Encourage safe and informed use of conservation sites;
- Cover the seven essential learning areas of the New Zealand curriculum using the relevant achievement objectives listed in the *Guidelines for Environmental Education in New Zealand Schools* (1999, Ministry of Education);
- Include a Māori cultural perspective with particular reference to technology;
- Value the Catlins as part of Otago's environmental heritage.

The *Guidelines for Environmental Education in New Zealand Schools* promote education for the environment. People are encouraged to think about their attitudes, values and life-style choices against the impact on the environment.

An understanding of the construction and use of Māori technology provides valuable insights into the physical properties, adaptations and behaviour of plants and animals in this environment. It also highlights the interconnectedness of this habitat with other sites in the Otago region.

When planning post-visit activities, students are encouraged to use an action-oriented approach that promotes informed action to address environmental issues raised during the visit. See Appendix 5, *Guidelines for Environmental Education in New Zealand Schools*.

Some suggestions are given in post-visit section, but an action-oriented approach is most effective when students take responsibility for their own planning, and carry out their activities in partnership with others.

## OUTDOOR SAFETY

When planning a visit to the Catlins, make sure school policy and the correct procedures are followed. For example, you will need to do a risk analysis management plan for your visit.

### **Points to remember:**

- Brief students on outdoor safety before the visit and remind them again on arrival to take care.
- Groups must remain on marked tracks and should stay together at all times.
- At Lake Wilkie, school groups need to be well supervised on narrow boardwalks along the lake margins.
- Parents and helpers should be well briefed on their responsibilities - mainly to know exactly where their charges are at all times.
- The study sites are all on open land close to the main tracks, so the possibility of getting lost is minimal if tracks are followed.

For further in-depth information on outdoor safety refer to:

- *Education Outside The Classroom: Guidelines For Good Practice* (Ministry of Education, 1995)
- *Managing Risks in Outdoor Activities* (Mountain Safety Manual 27, 1993)
- *Outdoor Safety Management Systems* (EONZ, 1998)
- *Outdoor Pursuits Guidelines For Educators* (Hillary Commission, 1996)
- *Water Safety Across the Curriculum* (Water Safety New Zealand, 2000)

**NOTE: School groups should be aware the sites covered by this resource kit were occupied by Maori for many centuries and may have urupā (burial grounds) and other wahi tapu (sacred) sites that were restricted areas to the takata whenua (local people). Groups should respect cultural protocols by observing tikanga (customs) where possible, for example, not taking food on to such sites.**

Before your site visits you may like to consider DoC's environmental care code on its web site (<http://www.doc.govt.nz/Explore/NZ-Environmental-Care-Code.asp>).

Below is a summary of the main points:



## ENVIRONMENTAL CARE CODE CHECKLIST

- Protect plants and animals
- Remove rubbish
- Bury toilet waste
- Keep streams and lakes clean
- Take care with fires
- Camp carefully
- Keep to the track
- Consider others
- Respect our cultural heritage
- Enjoy your visit

Protect the environment for your own sake, for the sake of those who come after you, and for the environment itself.

# Tradition of the *Arai Te Uru*

The *Arai Te Uru* tradition is important to Otago because this coast (Te Tai o Arai Te Uru) was named after the ancestral waka atua (canoe of the gods) that foundered here in a storm on its return voyage from Hawaiiki.

The legend begins with Rokoitua, an ancestor of southern Kai Tahu, who met the Kāhui Tipua people in the Wairarapa. They gave him mamaku (tree fern) to eat but he preferred the dried kumara he carried in his belt, which he took out and soaked in a bowl of water. When the Kāhui Tipua tasted it they decided to build a canoe to try and obtain this new food from “across the sea”. When the canoe returned with the kumara the crop was planted but it failed.

However, Rokoitua sailed to Hawaiiki on a second canoe, *Arai Te Uru*, and had learned the correct karakia (incantations) and tikanga (customs) connected with growing this plant. The *Arai Te Uru* returned under the command of Pakihiwitahi and Hapekituaraki (Hipo and Te Kohi in some versions) and eventually became waterlogged.

Some of its food baskets (kaihinaki) and water calabashes were washed overboard at Te Kaihinaki (Hampden Beach), where they were preserved in stone as the famous Moeraki boulders. More of its precious cargo of gourds, kumara and taro seed was lost on Katiki Beach and the canoe was eventually wrecked at Matakaea (Shag Point). The hull of the great waka has been preserved as a reef just off the Waihemo (Shag) River mouth. The highest part of the reef (said to represent the sternpost) is known as Hipo, who was navigator and helmsman.

There are many versions of this legend but the essence of the story preserves an oral tradition of the arrival of kumara (sweet potato) in Aotearoa. The names of passengers and crew – including Matakaea, Puketapu, Pakihiwitahi and Hikaroroa – have been preserved in the names of hills and ranges inland all the way to Ka Tiritiri o te Moana (the Southern Alps). Such traditions represent a link between the world of the gods and the present day, reinforcing tribal identity and continuity between generations.

## MAHIKA KAI

This whole coastline offered bountiful mahika kai (food resources) for early Māori. There was an abundance of fish and shellfish on the reefs, plenty of sea birds, eggs and seal pups on the coast and tuna (eels), waterfowl and freshwater fish in the estuaries and rivers.

Rivers were like highways into the interior. Tākata whenua (local people) foraged inland for weka and ducks, harakeke (flax), aruhe (fern root, bracken) and ti kouka (cabbage tree) and lowland forests provided a wide range of timber and forest birds.

Travel by sea was common and much faster than travelling by land. Many settlements were within sight of each other and only hours away in settled weather by waka (canoe) or the double-hulled waka hunua.

Trading of food and resources between villages up and down this coast was an important part of the economy. Pounamu (greenstone) and titi (sooty shearwaters or muttonbirds) were sent north to trade goods in return for kumara, taro, stone and carvings coming south.

Excavation of middens along this coastline show fishing was the main source of food. Barracouta, red cod, ling and blue cod were the key species caught. Barracouta (mataa) accounted for 70 to 85% of the catch at the pā sites at Karitane, Mapoutahi (Goat Island) and Taiaroa Head. Migrating schools were visible from these headlands in calm weather from November through to April.

Baited hooks were used to catch bottom-dwellers like ling and cod but a very clever trolling method evolved for barracouta. A surface lure was thrashed on the surface using a rod and a short line. This technique was so effective commercial fishermen in recent years could catch up to 1150 barracouta a man per day.

## WILDLIFE

This coastline supports a wide variety of wildlife. It is an important breeding area for the endangered hoiho (yellow-eyed penguin) and the shy kororā (little blue penguin). The adult shearwaters of which the titi is the young, are returning to some headlands to breed in ground burrows.

Three species of kōau (cormorants or shags), karoro (gulls), tara (terns), torea (oystercatchers) are often seen while the observant bird watcher may be rewarded with a fleeting glimpse of a takapu (gannet) or kōtare (kingfisher).

The estuaries and salt marshes (waimatitai) attract white-faced herons, pied stilts, spur-winged plovers, ducks, black swans, black-backed gulls, godwits, black shags and banded dotterels.

Land birds that are commonly seen are kāhu (Australasian harrier), riroriro (grey warbler), pīwakawaka (fantail), tauhou (silvereye) and korimakoa (bellbird).

New Zealand fur seals are common along the rocky coast and headlands. Sea lions Rāpoka/whakahou), southern elephant seals and leopard seals occasionally haul out on beaches here. (See following panel).

## SAFETY AROUND WILDLIFE

School groups are quite likely to encounter wildlife at close range on the rocky shores and beaches of this coast. Here are a few general guidelines to keep you safe and to avoid disturbing these animals:

- Keep your distance - avoid disturbing wildlife by approaching too close. If any animal shows signs of disturbance or alarm you should retreat quietly.
- Avoid loud noises or sudden movements that could cause animals to panic.
- Never get between wildlife and the sea, as this is their natural escape route if alarmed.
- Stay away from seal colonies during the breeding season. At this time males are territorial, extremely aggressive and will attack trespassers on their territory.
- Groups of sea lions, particularly young males, can be unpredictable and are likely to charge. Do not approach closer than 20 to 30 metres.
- Dogs and wildlife do not mix so leave Rover at home.
- Avoid using a camera flash around wildlife as the intense light can damage their eyes and night vision.



Te Tai o Arai Te Uru (The Otago Coast)



# Katiki – site information

Katiki, the southern tip of the Moeraki peninsula, is a famous landmark on the Otago coast. It is the site of Te Raka-a-Hineatea pā, one of few defended pā in southern New Zealand. (See history section for details).

Archaeological evidence suggests this peninsula was occupied from at least the 13th Century. Just south of Katiki is the Waimataitai Lagoon, where excavations uncovered the bones of four species of moa and another extinct giant rail dating to this period.

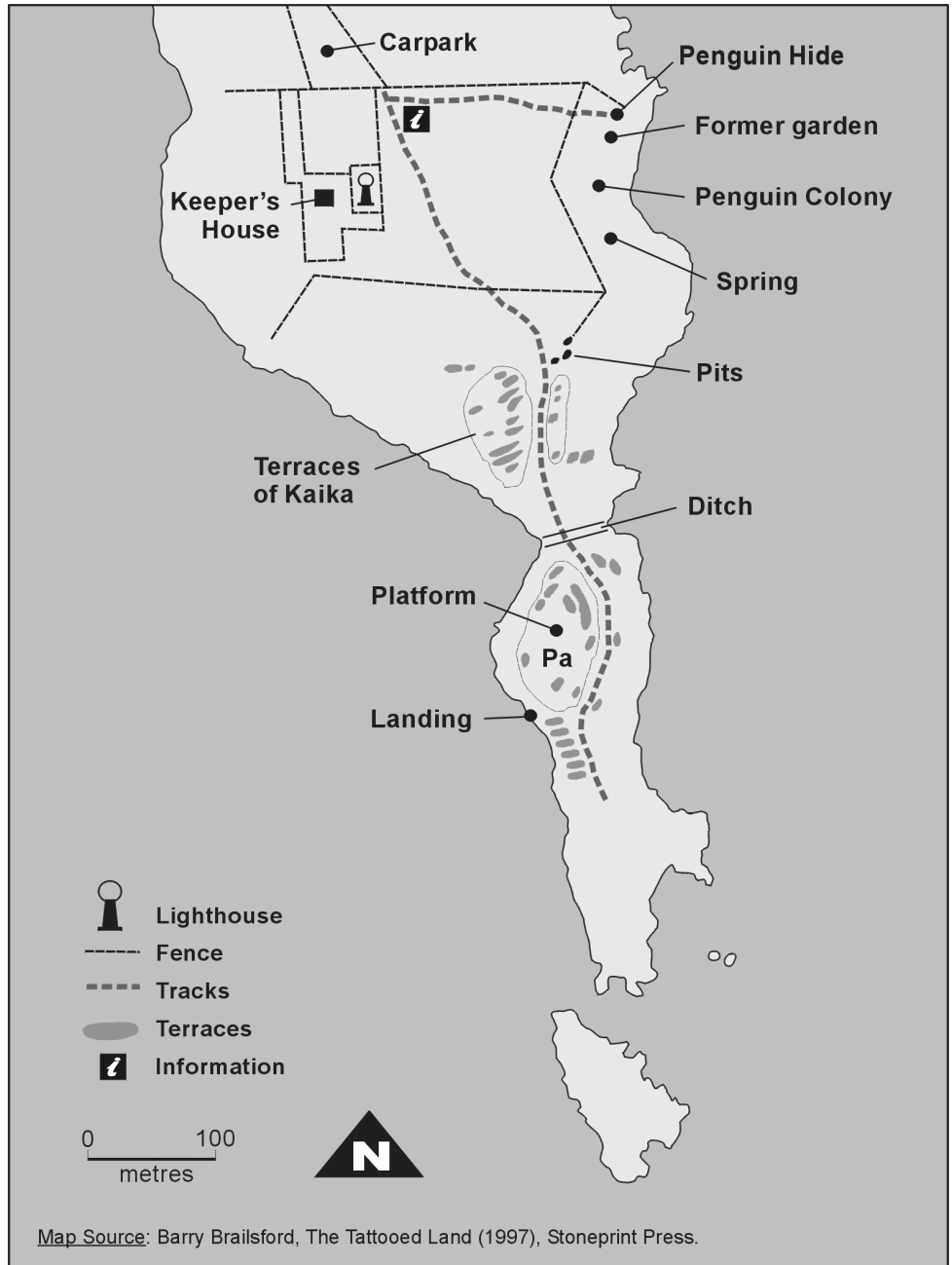
Today the Katiki Point Historic Reserve is vested in Te Rūnanga o Ngāi Tahu and is jointly managed by DoC and Te Rūnanga o Moeraki. The area is popular for walking, wildlife viewing and conservation values, recreational fishing and diving.

## Access

- Katiki is a low, grassy peninsula near Moeraki, about 80km north of Dunedin.
- Turn off State Highway 1 at the “Moeraki” sign at Hillgrove. Follow the “Lighthouse” signs via Tenby Street and Lighthouse Road to Katiki Point Lighthouse, about 6km from the SH1 turn-off.
- Park in the lighthouse carpark.
- Follow the signs and track to the pā site at the end of the peninsula.
- School groups are advised to contact the kaitiaki of Katiki, Te Rūnanga o Moeraki, on (03) 439-4816 or email [Moeraki.Runanga@xtra.co.nz](mailto:Moeraki.Runanga@xtra.co.nz) before a visit. The Rūnanga may be able to provide a kaumatua or guide to escort groups and explain the cultural significance of this site.
- Schools wishing to visit the Katiki Point Penguin Refuge should contact Rosalie Goldsworthy on (03) 4395-033 or email [rosalie.goldsworthy@leadspace.school.nz](mailto:rosalie.goldsworthy@leadspace.school.nz)
- There is a small yellow-eyed penguin colony in the reserve. A short track leads to a viewing hide, where penguins may be seen coming ashore late in the afternoon.

**NOTE: The kaitiaki (guardians) ask that visitors respect these sites. In particular, groups are advised to remain on the formed track between the lighthouse and the pā site.**

Katiki Point



## **History**

Te Raka-a-Hineatea Pā was built about 250 years ago (approximately 1750) by the famous Kai Tahu fighting chief Taoka during a very unsettled period of conflict between hapū (sub-tribe or clans) of the Kāti Mamoe and Kai Tahu iwi (tribes).

There are numerous versions of a major battle at this site. A Canterbury taua (war party) came south to avenge the deaths of people killed at Waihora (Lake Ellesmere) but their chief Matauira, Taoka's half-brother, was killed and they retreated.

This site has the most extensive terracing of any southern pā. These terraces are clearly visible from the narrow neck joining the mainland to the pā site (see map).

Looking back towards the lighthouse, you will see many well-defined terraces (30 in all) on 12 different levels. This was the kaik (village). Small thatched houses once occupied these terraces on either side of the neck. A ditch across the neck was still visible between the kaik and the pā in 1918.

Archaeologists excavated two small house sites, one measuring 3.6 x 3m and the other 3.6 x 2.4m. They found primitive stone tools - sharp flakes of rock from neighbouring headlands that were used for cutting and scraping. They also found partly finished pounamu (greenstone) adzes, a gouge or drill bit, a pendant and whalebone fishhooks.

Excavations of middens show the main foods consumed were seals, dogs, fish (mostly barracouta and ling), mollymawks, shags, penguins and ducks.

A whaling station was established at the nearby port of Moeraki in 1836. The Moeraki lighthouse was built in 1878 to help mariners negotiate this headland and its offshore reefs. In 1975 the light was automated so there was no need for a resident lighthouse keeper to live on site.

## **Conservation issues**

DoC set aside a wildlife management reserve at Katiki in 1983 to encourage the endangered yellow-eyed and little blue penguins to nest and breed here. Volunteers planted native vegetation in an attempt to establish a breeding colony.

The project has been a remarkable success with 13 yellow-eyed penguin pairs nesting here in the 2001-2 breeding season. Good numbers of titi (sooty shearwaters or mutton birds) are also nesting and breeding here again in ground burrows on sloping cliffs.

Dogs are banned from the Katiki reserves because they disturb seals and have killed adult and young penguins. Traps are set to control other predators, particularly wild cats, stoats and ferrets. Rabbits are also a problem, damaging the vegetation.

Bush once covered the whole peninsula, but this has been progressively cleared and the predominant cover now is exotic pasture grasses, which are grazed by livestock. Silver tussock and ice plant are common along with salt-tolerant groundcovers growing close to the sea. Low-growing shrubs cling to some of the steeper slopes.

# Matakaea (Shag Point)

## – site information

Matakaea is an area of special cultural significance for Ngai Tahu, symbolised by its Tōpuni status, public recognition of the mana and rangatiratanga (chieftainship) of Kāi Tahu over the area.

Tōpuni is an enduring symbol of the commitment of Kāi Tahu to conserve areas of high natural, cultural and historic values and ensures an active role in their management. Matakaea is jointly managed by DoC and Te Rūnanga o Ngāi Tahu.

School groups are advised to contact one of the local papatipu rūnanga, Te Rūnanga o Moeraki, on (03) 439-4816 or email [Moeraki.Runanga@xtra.co.nz](mailto:Moeraki.Runanga@xtra.co.nz) before they visit. The Rūnanga may be able to provide a kaumatua (elder) or guide to explain the cultural significance of the site.

**NOTE: Kaitiaki (guardians) ask that visitors respect this site by observing cultural protocols. Visitors are requested to picnic only in designated areas as there are urupā in the reserve that are tapu to the tākata whenua.**

### Access

- Matakaea/

Shag Point is 9km north of Palmerston on SH1.

- Turn right at the sign, drive through the village and the entrance to the DoC reserve. Veer left to the first car park, about 2.7km from the main road.
- Follow the short track out to the DoC display panels on the headland, which explain the legends, history, wildlife and fossils of this area.
- Groups can then walk or drive a few hundred metres to the southern headland. Display panels explain some of the special plants and moa-hunting history.
- Cross the stile and follow a short track overlooking the beach. Yellow-eyed and blue penguins nest in the scrub and flax above the beach.

### History

Just south of Matakaea, at the mouth of the Waihemo (Shag) River, is the Onewhenua Historic Reserve (pictured above), one of the earliest moa hunters' camps found in Otago. This site yielded important archaeological evidence of Ngai Tahu lifestyles dating back to the 12th Century. Moa skeletons and many artefacts found here are displayed at the Otago Museum.

Large round boulders (or kaihinaki of Arai Te Uru legend) can be found embedded in the soft sandstone of the rock shelf along the shoreline. The smooth wave-worn mudstones of this headland also contain well-preserved fossils. A seven-metre marine reptile, a plesiosaur, was found here and is now part of the University of Otago fossil collection.

Whalers discovered the first bituminous coal in New Zealand here in the 1830s. By 1862 the exposed coal seams were found to be commercially viable and were successfully mined through until 1972, when flooding eventually closed shafts that extended under the coast. Evidence of coal mining is still obvious throughout the reserve.

A small natural boat harbour was once a traditional tauraka waka (canoe landing place). Early miners shipped coal from here in sailing and steam colliers. Today the harbour is used by recreational anglers and divers to launch their boats.

## Conservation values

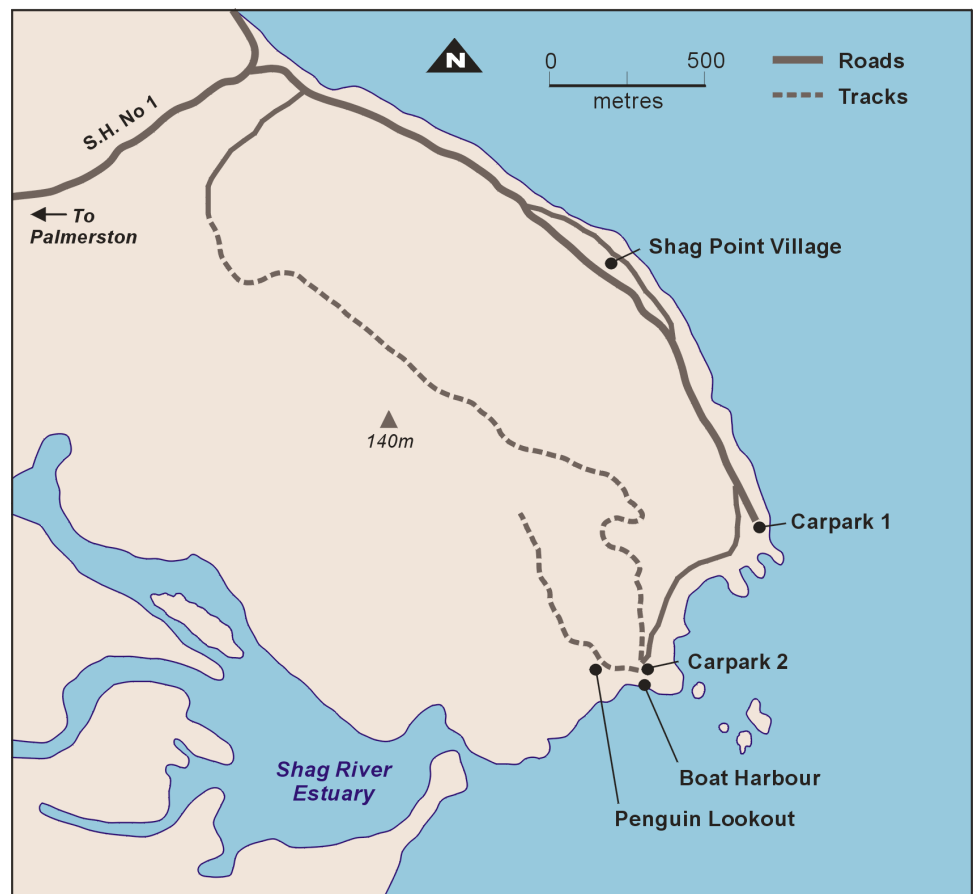
Flat rock platforms provide an easy haul-out site for New Zealand fur seals while sea lions prefer to land on the Onewhenua sand spit, south of the Waihemo (Shag) river estuary.

An unusual feature of this site is snow tussock and other alpine species, such as the large alpine daisy (*Celmisia bookerii*), growing at low altitude and within earshot of the surf. The rare lily *Iphigenia novae-zelandiae* also grows here.

Small colonies of a threatened herb (*Euphorbia glauca*) are found behind Katiki Beach and on cliffs south of the Waihemo (Shag) River estuary. The river estuary has a fringe of salt marsh, the most northerly of a chain of Otago salt marshes. Insects characteristic of Otago salt marshes are present in excellent numbers.

The rocky shore is lined with *rimurapa* (bull kelp). Just offshore are dense forests of giant bladder kelp, which are among the most luxuriant examples of *macrocystis* in New Zealand.

### Matakaea/Shag Point



# Huriawa – site information

Huriawa, or Karitane Peninsula, is a rugged headland that protects the small coastal fishing port of Karitane at the mouth of the Waikouaiti River.

It is famous for its pā, built originally by Kāti Mamoe and known as Pa Katata but strengthened and expanded by the Kāi Tahu fighting chief, Te Wera, about 1750. It was regarded as the strongest defensive structure of its type in Otago and one of the most impressive earthworks in Te Waipounamu (South Island) from pre-European times.

The Crown returned ownership of the reserve to Te Rūnanga o Ngai Tahu as part of the historic Treaty of Waitangi settlement in 1998. Today it is jointly managed by Kati Huirapa Rūnanga ki Puketeraki and the Department of Conservation under a protected private land (PPL) agreement.

## Access

\* Huriawa is at Karitane, about 34km north of Dunedin. Travellers have two options. Turn off SH1 at Evansdale and follow the scenic Coast Road via Warrington, Seacliff and Puketeraki to Karitane. Alternatively, turn off SH1 to Karitane at the Waikouaiti River estuary.

- Access to Huriawa is from the Karitane wharf or via a sealed road from the beach to a carved entrance to the reserve.
- A network of walking tracks circles the peninsula.
- Allow 1–2 hours for a full circuit, depending on activities planned.
- School groups are advised to contact the kaitiaki (guardians) of Huriawa, Kati Huirapa Rūnanga ki Puketeraki, on (03) 465-7300 or email [puketeraki@xtra.co.nz](mailto:puketeraki@xtra.co.nz) before a visit. The Rūnanga may be able to provide a kaumatua or guide to escort groups and explain the cultural significance of this site.

**NOTE: School groups should be well supervised and stick to the main walking tracks. There are many steep cliffs, loose rock and unformed paths that could be dangerous or slippery.**

## History

There were some fortified pā in the south, but the colder southern climate meant that vegetable crops such as kumera, a staple part of the diet in warmer northern areas could not be grown. Thus, Kai Tahu were primarily hunters and gatherers and ranged far and wide to collect mahika kai (food resources).

Te Wera and his people survived a six-month siege by his cousin Taoka thanks to a permanent spring, Te Puna a Te Wera, which supplied the pā with fresh water, and the fact that the pā was well provisioned with preserved food in preparation for an expected attack. They also fished at night to supplement their reserves of dried fish, preserved birds and fern root.

Eventually Pā a Te Wera pā was abandoned and Te Wera went south to Rakiura (Stewart Island), where he died of old age.

A whaling station was sited on the Waikouaiti River estuary shore from 1834 to 1848, although little evidence of this remains.

Soon after the arrival of Europeans in Otago (1840s), the Crown acquired the peninsula under the Public Reserves Act for construction of a lighthouse and a children's playground.

During the 1950s and 1960s, excavations by archaeologists found evidence of extensive middens, post holes for palisades, house sites, drains and underground fire pits (ahi komau).

### Conservation management

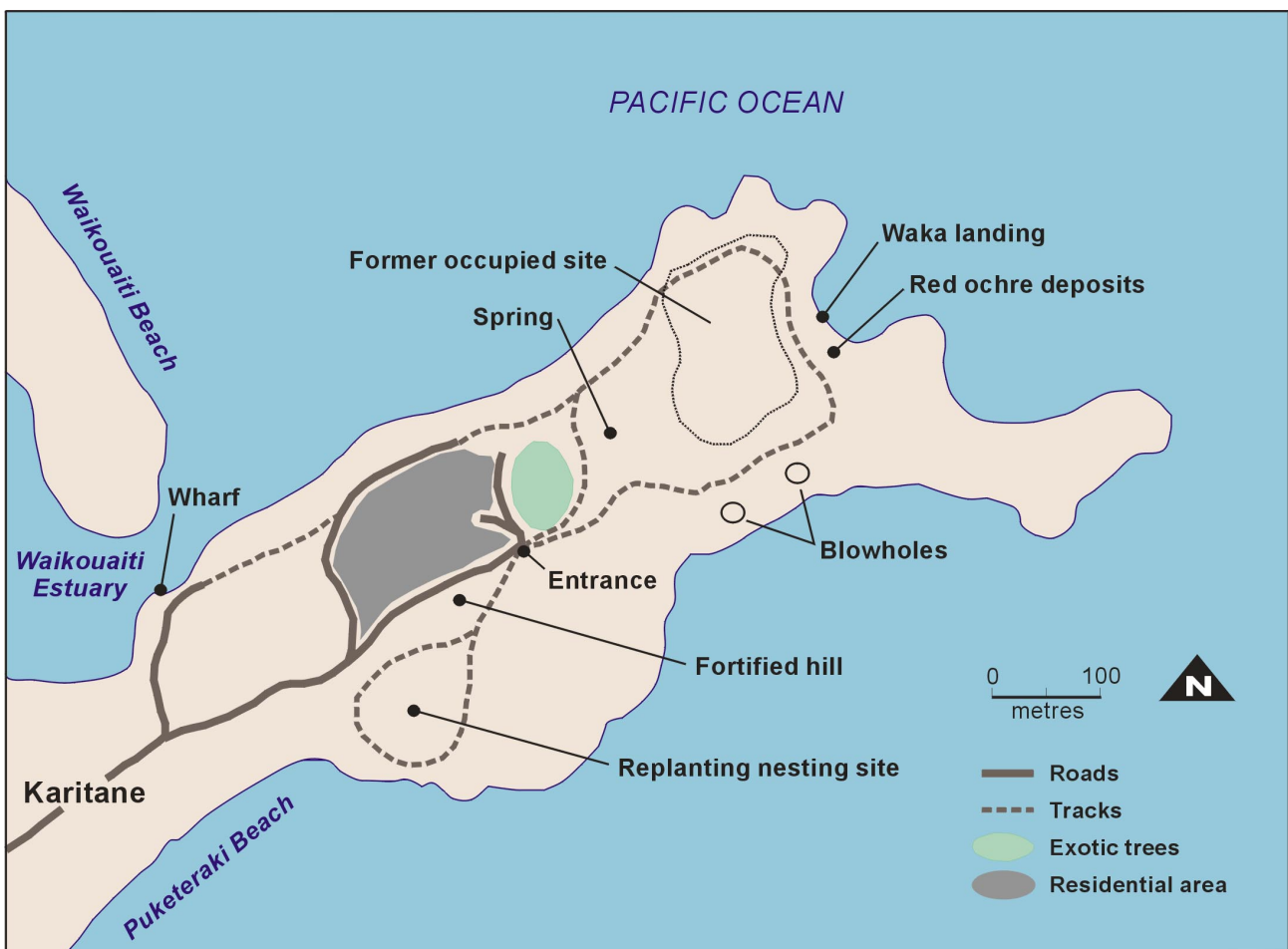
During the time of Te Wera, the peninsula was probably cleared of vegetation, to allow for better visibility of invaders. Today it is mostly covered with exotic grasses, but native shrubs and trees are regenerating naturally in places.

Gorse, boxthorn, thistles, horehound and cotoneaster are the major weed species.

Kaitiaki have started replanting native vegetation to help stabilise soils, improve drainage, stop erosion and to provide habitat for nesting birds. They have established a nursery and are growing plants from local sources. Several local schools are actively involved in this project.

Revegetation may encourage hoiho (yellow-eyed) and kororā (little blue penguins) to nest and breed here again, especially if they are provided with nesting boxes.

Huriawa Peninsula





# Site activities

## Pre-visit

- Locate your school and the Otago Coast on a map. Work out how long it will take to get there by bus. Find the nearest marae (there may have been ones closer to the Otago Coast in former times). Work out how long it would have taken for people to walk here. What other means of transport could be used over the past 200 years? Include coastal shipping. Debate the environmental impact of these different forms of transport.
- Mahika kai, food gathering, was an important activity of Māori. Read the story of *Te Waka Huruburumanu* (Huria, 1996) and/or *The People of the Place: Mahika Kai* (Dacker, 1990). Brainstorm why this Coast was a significant mahika kai area and list the foods that it contributed to the food basket of Ngāi Tahu. How has this changed over time? Consider the significance of this activity to the on-going involvement of Ngāi Tahu through the Claim Settlement Act of 1998. Consider in particular the significance of marine resources (kai moana).
- People have lived in this area for over 1000 years; Waitaha, Kāti Mamoe, Ngāi Tahu, whalers, farmers, etc. Develop a timeline of who they were, how they lived and how they valued the site. What does this tell you about their attitudes and values towards their physical and social environment? Invite people to talk about their involvement with the Otago Coast today.
- During your visit you may find an injured sea bird or a seal that has become entangled in old fishing net or a discarded object made of plastic. Find the names of people or organisations that deal with these problems. Make a list of their contact numbers to take these with you during your visit just in case you need them.
- Various sites on the Internet calculate your ecological footprint—the area of the Earth needed to support your lifestyle. Calculate and compare your ecological footprint with that of a Māori person of the same age living in this environment 200 years ago. What does this mean for sustainability?
- Place names often tell us about important features of the physical environment, about the natural resources and about the history of the area. Find Māori and Pākehā names in this area and the stories associated with these names. Think of ways your visit will help you understand the significance of these names.
- Visiting a DoC site requires us to take care of the environment and people who visit it. List possible hazards to people and the environment during your visit and suggest how these can be overcome or avoided. Write an outdoor safety code and have someone take responsibility for it during the visit. There are protocols involved in visiting a site of historical significance to Māori. How will you find out about these protocols and observe them during your visit?
- Find keywords associated with the management of a coastal environment. Include words from the DoC website and Māori literature on resource management, such as, conservation, rāhuitanga, quotas, taiapure, marine reserves. Compare and contrast these terms and identify issues that might be significant for the management of this site.

- Biodiversity is important for a sustainable environment but it is under threat from the introduction of exotic species and the destruction of habitat, among other things. Investigate these issues on a global scale and find out about New Zealand's Biodiversity Strategy by visiting DoC's website. Develop ways to investigate these issues during your visit to these coastal sites.
- Technology is purposeful activity for meeting the needs of people in the environment. Identify two pieces of technology used in this environment (before 1800 and after 1950). Compare the purpose for which they were designed and identify what this tells us about the people and the physical and biological environment. Were there any unintended consequences from using this technology? Suggest technologies that might be seen during the visit.
- Visit the environmental education website at Christchurch College of Education. Use some of these activities to explore the interdependence of people and environment. Adapt these games to a coastal environment. For example: play "Making the Links" (Law, 2002b); include such topics as recreational use, agricultural run-off, promoting tourism, endemic species, climate change, marine reserves, riparian revegetation, flooding, establishing aquaculture, etc.
- From the pre-visit activities you have studied, which aspect of the Otago Coast interests you the most? Brainstorm how you will find out more about this during your visit. What skills and equipment will you need to investigate the issue? Consider the environmental impact of any activity you will undertake.

### **Post-visit**

- Work in partnership with the local Rūnanga on a replanting project. Arrange for your school to take on this long-term commitment. Perhaps your school could establish a plant nursery to assist with the revegetation project. What annual events are planned to celebrate progress and learn about future plans?
- If you decide to grow native tree seedlings in a small nursery at school or at home, have you considered the effect these trees might have on bird life and the environment in general? Who else will be affected by what you do and how will you consult with them?
- Investigate the physical properties and use of *rimurapa* (bull kelp) to make pōhā. What are the similarities and differences between food preserved in a pōhā and food preserved in a tin? What was the significance of pōhā to Ngāi Tahu? Can you find five other uses for the pōhā?
- Share your knowledge and skills with others. There are many DoC super sites in Otago. Make contact with a school near another of these sites and share your information about the Otago Coast with them. How are these sites interdependent?
- Investigate traditional Māori concepts and technology of waste management in this environment. Compare this with today's concepts and technology. What are the options for the future?
- Use the types of movement you observed during your visit to tell a story. Refresh your memory by viewing the video you made as part of the "Charting Movements" activity. Perhaps use these movements to choreograph a dance that evokes memories and feelings of this place. Set this dance in any time period of your choice. What sounds will you use to accompany the dance? How will these sounds enhance the feeling of the piece?

- Build a food web of the marine environment beginning with the phytoplankton. Examine the environmental impact of changes to the food web. For example, what will happen to the top predators if there is an increase in pollution affecting the phytoplankton?
- Build an inventory of Māori technology required for mahika kai activities on this coast. Which natural resources were required to build these and which resources are available at this site? Where could the other resources have come from? What does this tell you about changes in the environment and the interdependence of sites in the Otago region? How will you share this information with others?
- Take a story in Māori, such as “*Kua hinga te Rāhui.*”(Kaa, 1992). Adapt the story to this environment, identifying the marine life affected by the rāhui and identifying the methods used to catch the range of seafood found in this region.
- Have students develop a set of statements about scenarios that might happen at these sites. Have others rate these statements on a 1 to 5 scale, giving reasons for their answers. Use this information to develop an action-oriented activity that takes account of the range of attitudes and values expressed.
- Different words evoke different feelings about the environment. Make a list of English and/or Māori words of the physical and cultural features of the coastal and adjacent environment, such as; rivers, cliffs, swamps, farmland, wetlands, rocky shore, beach, puke, moana, ... . Give this list to other people and ask them to rank them in order from “*most liked*” to “*least liked*” or “*don’t know*”. What does this tell you about how people value them? How would you run a campaign to enhance sustainability and biodiversity in this area? What words would you use in the campaign?
- Hold a “*Hot Seat - site scenario*” about the poaching of pāua along the coast. Identify all the stakeholders: divers, recreational fishers, commercial fishers, tangata whenua, Fisheries Officers, local resident, DoC, pāua, kelp beds, ... . Have each student take the position of one stakeholder, research the effects of the proposal on that stakeholder and be prepared to be put in the “*Hot Seat*” to justify and debate how the proposal will affect them.

## ACTIVITY 1: CHARTING MOVEMENTS

Take the opportunity to carefully observe how different things move in the environment.

### **Materials:**

- Clip board and pencils
- Video recorder

### **Method:**

- Identify the compass directions on your chart.
- Find a vantage point by yourself so you are not disturbed.
- Place an x at the centre of the chart to represent yourself.
- Record all the movements you can see in a period of 5 minutes: what is moving, how far away it is, ...
- Finally locate the different habitats in the environment.
- Use a video camera to record what you observed.

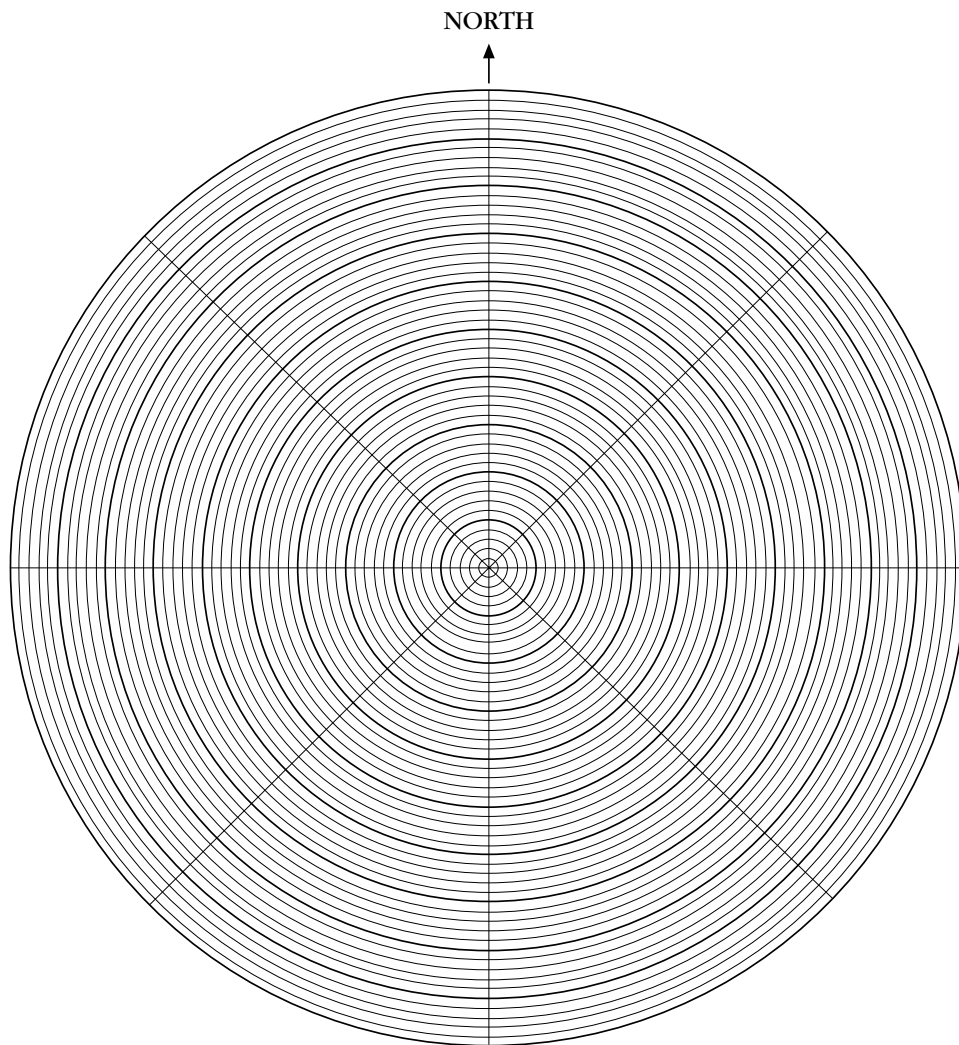
### **Movement Chart**

(see next page)

### **Processing Questions**

1. How do different birds move, in which directions?
2. Why are some birds in groups, and other by themselves?
3. How do waves move before they break? Do they all move in the same direction?
4. What movements could change over time and what impact could this have on the environment?

## Movement Chart



Location:	Date:
Recorder:	Time:

### Instructions:

1. Find a solitary space in the environment and sit in silence for 10 minutes.
2. Orient the movement chart towards north.
3. Record any movement you detect on the graph paper with respect to its direction, distance, source, identity etc.
4. Identify the habitats from which each movement came and continue over page.

## ACTIVITY 2: PRESERVING FOOD

The food supply in the natural environment changes throughout the year. To overcome this, Ngāi Tahu moved from their permanent settlements to temporary nohoanga (camps). This took pressure off the local environment and provided food that could be preserved and brought back to the permanent settlements. Rimurapa (bull kelp) was used to make pōhā for preserving tītī (muttonbirds) and other food. Food could be kept in pōhā for up to two years. Explore the physical properties of rimurapa.

### Materials:

- Paper and pencils
- A knife

### Method:

1. Observe the rimurapa moving in the surf.
2. Find some blades of rimurapa that have been washed in on the tide. Select one that is in good condition.
3. Observe the construction of the blade of bull kelp and sketch a cross-section.
4. Cut a piece about 30 cm long and hollow it out from one end, making sure to leave a 3 cm frill around the edges.
5. When you have finished return the rimurapa to where you found it. It is still part of the food chain for other animals.

### Process Questions:

6. Why does the rimurapa need to float on the surface? How does it protect itself from being damaged in rough seas?
7. How do the physical properties and construction of the blades help them to float?
8. Why are these properties important to the structure and function of the pōhā?
9. Research the construction and use of pōhā. Suggest reasons why it is such a successful piece of technology.
10. What other methods of food preservation did Māori use and how do these compare with the methods used today?
11. Compare the environmental impact of the pōhā with another piece of technology used for preserving food. Consider the use of natural resources and energy needed.

## ACTIVITY 3: ALL AT SEA

How do people find their way around their environment? Today we use maps, charts, satellite photographs and sign posts. It is one thing to find our way round on land, but another to find our way round at sea. Different methods were needed in coastal waters and the open sea.

In coastal waters, fishing grounds could be located by the intersection of two lines. Lining up two landmarks identified each line.

In open ocean there were no fixed bearings but wave patterns provided a relative fix on direction of travel. The sun and the stars were also used.

### **Materials:**

- Pencil
- Paper

### **Method:**

1. Go to a vantage point where they can see to the horizon.
  - Look carefully at the wave patterns on the sea.
  - Which direction are they coming? Are they long swells? How far between crests?
  - Are there other wave patterns from other directions?
  - Watch how the wave patterns change as they approach land or move round an object such as a rock.
  - Sketch a map of physical features of the coast and the wave patterns around these objects.
  - Now look around for evidence of other navigational aids that might help sailors find their way at sea.

### **Process Questions and Activities:**

1. How could an understanding of the way waves move help people navigate out of sight of land, or as they approached land?
2. Investigate other traditional methods of navigation used by Māori. Use *fish marks* technology to develop a navigation course around a local environment. (Best, p.6). Use a pair of photographs taken at each point to identify the spot and replicate fish marks technology.
3. Compare traditional technology with that used today. Which is more accurate? Compare the environmental impact of each type of technology.

## ACTIVITY 4: NATURE AWARENESS TREASURE HUNT

### Materials:

- Instruction card
- Pen or pencil
- Paper
- Hand lens (optional)

### Method:

1. Students work in pairs to find and record the items listed on the cards.
2. After a period of time, ask students to report what they have found.

### Nature Awareness Scavenger Hunt

Find evidence of the items below and explain the reason for their special feature (e.g., something that protects bird life - fences to separate people and birds.)

- Something that grows in water.
- Something that lives on this plant.
- Something with long, narrow leaves.
- Something people have used.
- Something people have done in the environment
- Something that tells people to be careful
- Something being done to improve the environment
- Something that protects bird life
- Something of special interest
- Something that is a sign of Tāwhirimātea (*God of Winds*)
- Something that feels smooth
- \* Something symmetrical

REMEMBER the Environmental Care Code.

- ✓ Stay on the tracks
- ✓ Treat plants and animals with respect
- ✓ Enjoy the environment

### Process Questions:

1. What do these things tell us about how people think and act in the environment?
2. Brainstorm descriptive words about these objects that relate to all the senses.  
How could you use these words in a brochure to encourage people to visit the Otago Coast?



## ACTIVITY 5: SIGNS AND SEALS

Early sealers referred to male fur seals as “wigs” and the females as “clapmatches” but Māori did not have different names for each gender. (Beattie, p.156). Kekeno (fur seals), RapokaWhakahao (New Zealand Sea lions), Rapoka (leopards seals), and Ihupuku (elephant seals) can all be found on the Otago Coast from time to time. Only the Kekeno is found on the rocky shore.

Fur seals come ashore to rest and to breed. Breeding colonies are called “rookeries”, resting sites are called “haul-outs”

### **Materials:**

- Picture cards of seals found on the Otago Coast
- Pencil and paper

### **Method:**

1. Remind students about safety around fur seals: feeding and touching seals can result in cross-infections that can become serious. 10m is usually a safe distance for observations.
2. Find a location where there are fur seals on the rocks
3. Carefully observe them and note down the following information: species; location; number of individuals; estimated sizes; what they were doing; the shape, colour and location on the body of any tag and the tag number.
4. Note any other signs, smells, that seals visit this site.

### **Process questions:**

5. From your observation data, about the average size and number of seals, is this site a breeding colony or a haul-out? What is your evidence for this?
6. If Māori traditionally hunted seals for food, and getting too close or touching seals could cause infection, how do you think they dealt with this problem?
7. In the early 1800s, life was not easy for Māori or the early sealers living and working around the southern coast. They had much to gain from each other. List the mutual benefits they derived from this early contact.
8. In fact, the sealers were the first Europeans to have long term relationships with Māori, prior to settlements in the North Island. What were the environmental impacts of this contact. What are the lessons for biodiversity and sustainability?

## ACTIVITY 6: GLOBAL THREATS, LOCAL ENVIRONMENTS

Factors that affect the global environment also impact on local environments. For example, species extinction is taking place at a global level due to factors such as:

- **Introduction of exotic species** – which pose a threat to native species.
- **Destruction of habitat** – turning wild places into monocultural environments and/or wasteland.
- **Over-harvesting** – Humans are switching predators, able to change their diet. People currently harvest 50% of the annual plant growth on Earth.
- **Islandisation** – impoverishment of habitat – the smaller the habitat, the more vulnerable the biodiversity.
- **Pollution** – especially CO<sub>2</sub> and greenhouse gases.

### Materials:

- Pens.
- Worksheets.
- Camera.

### Method:

1. Prior to the visit, make worksheets listing global factors that might impact on the Otago Coast environment.
2. During the visit, find as many examples as possible under each of the headings and identify what steps, if any, are being taken to limit or reverse the impact.
3. Identify any other headings that have been overlooked but are relevant to this site. List examples of their effects and the strategies, if any, being used to address them.
4. Use a camera to record examples of these global patterns in the local environment.

### Process Questions:

Prepare a report of findings then:

5. Compare how many of these global patterns are a direct result of human intervention rather than natural processes.
6. Compare the possible impact of a range of conservation strategies such as rāhuitanga and kaitiakitanga.
7. What would happen if human intervention stopped?
8. How do you feel about these issues?
9. What values and behaviours underpin these feelings?

## ACTIVITY 7: SELECTING A SITE

If plants and animals adapt to their environment by changing their physical characteristics and to a lesser extent their behaviour, how do people adapt?

Early Māori had campsites which were largely undefended at the entrance to estuaries, as at the mouth of the Shag River. Their technology lacked stone weapons. However, by the 1700s Māori had defensive pā sites on prominent headlands along the Otago Coast. Te Wera, one of the fighting chiefs, was not afraid of battle but it is said he was afraid of the sea lion.

Traditional settlements are often wāhi tapu—restricted areas. It is not appropriate to take food on to such sites. What other tikanga should be observed? How will this influence your planning to visit the Otago Coastal sites?

### Materials:

- Map of the Otago Coast
- Pencil and paper

### Method:

1. Stand on one of these headlands and think about all the reasons which led to this site being chosen as a pā site.
2. Stay quietly for 5 minutes to get a feeling for the site. Allow your senses to take in new information and become accustomed to the area.
3. Consider physical geography, what you can see, how easy it is to approach without being seen.
4. Consider access to food, water, and other resources.
5. In groups, write down key reasons why this was a suitable site.
6. Share your findings with others.

### Extension Activity:

7. Where were the other traditional settlements and pā sites around the Otago Coast?
8. Compare the early camp sites with the pā site. Consider the additional resources needed and comment on the environmental impact of each settlement.
9. People not only adapt to their environment, they also adapt to each other. What does this tell you about changes that were taking place at the time? Why would people want to defend areas of coastline?

## RESOURCES AND REFERENCES

In planning your site visit, the following resources and web sites may be of interest:

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Whakataka-Brightwell, M. (1994). *Waka*. Wellington, Ministry of Education.

## **Video**

Wild South documentary (approx. 20min), *Te Noboaka o Tukiauau (The Sinclair Wetlands)*.

## **Web sites**

[www.eednz.org.nz](http://www.eednz.org.nz)

A comprehensive directory of environmental education resources available on-line. Highly recommended

[www.doc.govt.nz](http://www.doc.govt.nz)

Gives a broad range of information on the Department of Conservation and offers excellent links to specific information on many species of birds, animals, plants, insects and pests. Also has on-line access to resource kits for schools.

<http://www.earthday.net/footprint.stm>

Earthday Network (2002). Ecological Footprint Quiz, Redefining Progress,

[www.nzbirds.com](http://www.nzbirds.com)

A great site for identifying New Zealand birds with easy index to use and great pictures.

[www.greenpages.org.nz](http://www.greenpages.org.nz)

A link with a directory of conservation organisations in New Zealand.

[www.forest-bird.org.nz](http://www.forest-bird.org.nz)

The Forest and Bird Protection Society is New Zealand's largest non-government conservation group.

[www.nzaee.org.nz](http://www.nzaee.org.nz)

The New Zealand Association for Environmental Education has a comprehensive directory of sources of information available on-line.

<http://www.niwa.cri.nz/rc/freshwater/fishatlas/key.htm>

Atlas of New Zealand freshwater fish compiled by the National Institute of Water and Atmospheric Research (Niwa) has a guide to identifying fish by their appearance or name.

<http://www.ew.govt.nz/ourenvironment/water/wetlands/plantsandanimals/fishaccess.htm>

This Environment Waikato site deals with native fish access between the sea and the wetlands where they spawn.