

Super Sites for Conservation Education - Te Tapuwae o Rongokako Marine Reserve

Resource Kit for Teachers

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1. Introduction

1.1 USING THIS RESOURCE

This Teacher Resource Kit is designed to give you a hand to plan exciting and educational conservation learning experiences outside the classroom. It focuses on a selection of parks and reserves administered by the Department of Conservation (DOC) in your region.

There are seven accessible sites within East Coast Hawke's Bay that are ideal for learning about marine reserves, mainland islands, forests, endangered species and historic reserves. By visiting these sites students can consolidate work already done and gain additional first-hand experiences and information to complete their studies.

1.2 CROSS-CURRICULAR OR SPECIALISED?

In planning your programme we suggest using the *Guidelines for Environmental Education in New Zealand Schools*. The guidelines provide advice on environmental topics and how to plan these into curriculum studies and programmes with a bicultural focus.

Sites can be used to meet goals from specific curriculum areas, or different curriculum areas simultaneously. This is an approach that mirrors the interconnectedness of the environment.

1.3 ACTIVITIES

Activities in these kits can be adapted to the age/level of your students, allowing you to choose the achievement objectives at the appropriate level. Activities are designed to support the key dimensions of environmental education - **in**, **about** and **for** the environment.

The activities offer students the opportunity of working across a range of related subject areas - in much the same way as the project teams work together to manage a mainland island or marine reserve, for the benefit of all. Teachers are encouraged to undertake further extension activities such as:

- Use of media such as the internet, books, videos, maps and tapes.
- Taking part in a Ministry of Education LEOTC (Learning Experiences Outside the Classroom) programme.
- Visits to zoos, aquaria, botanic gardens, museums, marine education centres and other facilities offering environmental education programmes and resources.
- Guided trips and recreational activities led by accredited outdoor education providers.

1.3.1 Pre and post visit activities

To get the best value from a field trip teachers should plan good lead-in and follow-up activities. If students have some formative ideas about what they might find, they will observe in a more focused way and therefore develop their concepts more fully. The suggested activities given below are designed to encompass learning ‘**about**’ and ‘**for**’ the environment. You will find specific site-based activities for the Te Tapuwae o Rongokako Marine Reserve (learning ‘**in**’ the environment) from page 13 onwards.

1.3.1.1 Pre-Visit Activities

- Brainstorm the ideas that students already have about Te Tapuwae o Rongokako Marine Reserve, for example what is a marine reserve? What is the intertidal zone? What would you expect to find living in the intertidal zone? Can you think of any rocky shores or beaches you have visited? **(about)**
- Design and carry out an opinion poll. What different attitudes do people have about marine reserves and their protection? Is there a range of views? What are the implications of your findings? **(for)**
- Have a class debate on why the marine system at Te Tapuwae o Rongokako Marine Reserve should be protected and saved. Explore concepts such as attitudes and values. **(for)**
- Examine the meanings of the words ‘endangered’, ‘exotic’, ‘endemic’, ‘indigenous’ and ‘native’. Think about what plant and animal species might be found at Te Tapuwae o Rongokako and where they fit into the above categories. **(about)**
- Consider the impact of the introduction of exotic marine species. What would be the effect on the native marine system. **(about and for)**
- Consider the impact of pollution and resource depletion. Why is their management necessary? Design a campaign to raise awareness about pollution and over-fishing and their impact on marine ecosystems. **(for)**
- Find out what the students know about DOC. Why does DOC exist? Is there a DOC office in your area? What sort of things does a DOC ranger do? Check out the DOC website: www.doc.govt.nz. **(about and for)**
- Look at what your class can do to help the environment – while visiting Te Tapuwae o Rongokako Marine Reserve and back at school. Why is this important? How can your school’s local community get involved in protecting natural areas? **(for)**
- Explore New Zealand’s responsibilities under global conventions such as the Convention on Biodiversity and the Kyoto Convention. Use the DOC website to find out about the New Zealand Biodiversity Strategy. Why is this strategy necessary? How do the goals and actions in the strategy relate to Te Tapuwae o Rongokako? **(about and for)**
- Find out who the local hapu are for Te Tapuwae o Rongokako. Where is their marae? Who are the kaumatua? What stories can they tell you about the Te Tapuwae o Rongokako Marine Reserve and the East Coast? How can traditional knowledge of Te Tapuwae o Rongokako and its use be more widely available to people who visit the area? Design ways of distributing information, such as interpretation panels, brochures, web pages and radio interviews. What will your message be? Why? **(for)**

- Visiting outdoor areas usually requires special gear and there are safety issues to take into account. Have students list the clothing and other gear they think they will need on the trip and create new designs. **(about)**
- Design an outdoor safety code. Appoint class members to help apply it on the day. Why is this important? **(about)**

1.3.1.2 Post-Visit Activities

- Make a marine display along a wall of your classroom with teams working on seaweeds, sponges, sea anemones, molluscs, crabs, shrimps and octopi. Add pictures or models of birds and sea mammals **(about)** Why is it important to protect and save these species? What can you do to protect an ecosystem? **(for)** Please remember not to collect your specimens from Te Tapuwae o Rongokako as the reserve has a No-Take policy which is strictly enforced.
- Draw plants and animals that make a food chain and /or cut them out. Arrange them into a food chain, or, for more advanced students, build up a food web. What happens when you introduce an animal pest (herbivore or predator) into the equation? **(about)**
- Choose a picture of a fish and identify its special features. Add labels for these adaptations (features) and say how each helps the fish survive. **(about and for)**
- Find out about the use of seaweeds as rongoa or traditional medicines. Ask your local kaumatua or check books in the library. **(about)**

Get your school involved:

- Adopt a local reserve.
- Join a community conservation group.
- Plant a native garden.
- Use plants that will encourage native birds to your school.
- Raise funds for a threatened species.
- Get involved with the Kiwi Conservation Corps (Forest & Bird) or Junior Naturalists.

For more information on how your school can get involved in conservation contact your local DOC office.

2. Organisation and Facilities

2.1 ORGANISATION OF OUTDOOR SAFETY

When planning a visit to Te Tapuwae o Rongokako Marine Reserve, follow school policy to make sure the correct procedures are being followed. For example you will need to do a risk analysis and management plan for your visit.

Points to Remember:

- Be sure to brief students on outdoor safety **before** the visit, and remind them again, on arrival, **to take care**. Students are to stay together at all times and under no circumstances are they to wander off by themselves.
- Have parents/helpers well briefed on their responsibilities – the main one is to know **exactly** where their charges are at all times.
- The study sites are along, or close to main tracks and the possibility of getting lost is minimal.

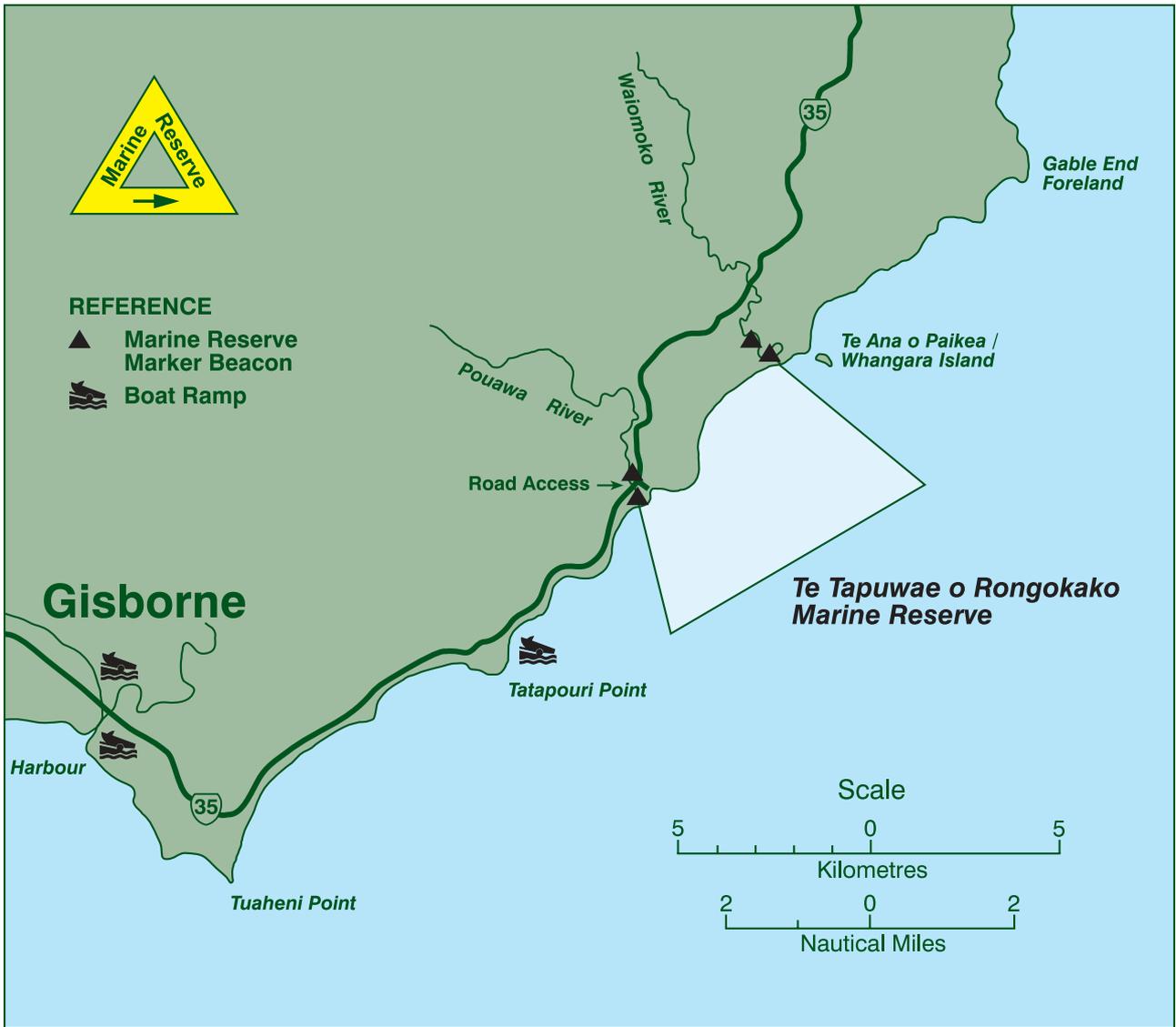
For further in-depth information on outdoor safety refer to:

- *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.

These publications are available in school or from your local EONZ branch.

2.2 FACILITIES AT TE TAPUWAE O RONGOKAKO MARINE RESERVE

- There are NO toilet facilities.
- A pre-trip visit to the site by the trip leader is recommended to enable the best organisation for the class/es on the day.
- **All plant and animal life, alive or dead, in the marine reserve is totally protected. No fishing, seaweed or shellfish gathering is allowed.** The reefs and sea floor are also protected so nothing can be removed from the reserve.
- When exploring the rock pools return any rocks you look under to their original position. This will help protect the plants and animals living on and under them.
- Take care when walking on the rocky platforms at low tide.
- Keep the ocean and shore clean.



3. Te Tapuwae o Rongokako Marine Reserve

Te Tapuwae o Rongokako Marine Reserve is located on the East Coast of the North Island, approximately 16 km north of Gisborne. It can be reached via SH 35, with public access at Pouawa.

The reserve protects an area of approximately 2450 hectares. It extends from near the Waikomoko River mouth in the north to near the Pouawa River mouth in the south. The landward or western, boundary follows the coastline along the level of Mean High Water Springs (MHWS) that is, approximately by the strand line of the seaweed. There is access to the beach above this mark, but please respect that this is privately owned land. There is no public access onto the farmland adjacent to the reserve without the permission of the landowners: Whitiwhiti Inc. Both northern and southern boundaries are marked by paired yellow, triangular beacons. The northern boundary is 5 km or 2.7 nautical miles in length and the southern boundary is 3.5km or 1.9 nautical miles long. The seaward boundary is 7.5km or 4 nautical miles long.

3.1 HISTORY

Te Tapuwae o Rongokako or the footprint of Rongokako, (an ancestor) is embedded in one of the rocky structures of the marine reserve, close to the shore. There are many traditions surrounding Rongokako, but there is general agreement that he was a man of immense athletic prowess and dexterity and a giant who could stride huge distances. Local tradition suggests that Rongokako was sent by Kiwa to investigate the late arrival of the Horouta waka to Turanganui-a-Kiwa. When he arrived there a disagreement arose between him and Paoa which resulted in Paoa chasing him down the East Coast shoreline. However Paoa was no match for fleet-footed Rongokako. Paoa set a large rat trap to snare Rongokako's pet, an enormous kiwi but Rongokako sprang the trap which flew inland to become Mount Arowhana. The site of the trap became Tawhiti between Te Puia and Tokomaru Bay. Rongokako left footprints in the flat rocks as he strode down the North Island. The first is at Wharekahika (Hick's Bay). The second is at Kaiora, south of Whangara mai tawhiti and is the one the marine reserve is named after. Then he left footprints at Turanga, Nukutaurua, Te Matau-a-Maui (Cape Kidnappers) and Raukawa (Cook Strait) before disappearing.

Kaiora the settlement that overlooks the marine reserve was a well populated papakainga (village). Porourangi, the famous East Coast chief, lived here and is buried close by. Another important chief who live here was Konohi. He had three sons: Marukauiti, Te Riwai and Wahakapi from whom the present hapu of Whangara mai tawhiti claim descent.

Te Tapuwae o Rongokako Marine Reserve was established in 1999.

3.2 ACTIVITIES AT TE TAPUWAE O RONGOKAKO MARINE RESERVE

- Swimming, snorkelling, diving and boating
- Beach recreation/picnicking
- Education
- Biodiversity monitoring and restoration
- Scientific research

3.3 CONSERVATION AND CURRENT ISSUES

Marine reserves are areas of the sea in which all natural features, including marine life, are protected in their natural state. Within marine reserves marine life often increases in abundance once fishing stops. Many types of fish also lose their fear of people. This allows us to explore, enjoy and learn from the marine environment in ways not possible elsewhere. Marine reserves are places where we can see how fishing affects the marine environment: they are benchmarks where the public and scientists can see how well we are managing the rest of the coast.

3.4 THREATS

Threats to the native marine flora and fauna include:

- The introduction of exotic seaweeds such as: *Undaria pinnatifida*, the large brown Asian seaweed, which could potentially displace native seaweeds and smother the coralline algal crusts that are the settlement surfaces of larval paua.
- Oil or toxic substance spills from damaged or wrecked ships/boats.
- Visitors: thoughtless actions such as treading on fragile eel grass and not returning rocks to their original position after they have been looked under.
- Deliberate misuse of the reserve by members of the public e.g. poaching for crayfish and setting nets, or releasing any plant or animal into the reserve that does not naturally occur there.

3.5 MANAGEMENT

Management Objectives of the Department of Conservation:

- To set up and manage areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study.
- To conserve areas that contain underwater scenery, natural features, or marine life of such distinctive quality, or so typical, or beautiful, or unique because their continued preservation is in the national interest.
- To encourage and facilitate recreational use and appreciation of the natural resources of the area.

Management of the marine reserve is the responsibility of the Department of Conservation. DoC is assisted in this by a committee representing the tangata whenua, local residents, and commercial and recreational users of the area.

- Compliance and law enforcement
- Monitoring of marine reserve health.
- Scientific research.
- Maintaining and upgrading recreational facilities
- Providing interpretation and publications.

3.6 MAORI MANAGEMENT OF THE SEA

Traditionally the Maori managed the sea with care. Iwi and hapu each had specific areas in which to fish.

Rahui is a term for the closure of certain areas for set periods of time. This may be because the fishery is depleted or when a death occurs at sea in the area. Kaumatua decide how long the rahui will last.

The Fisheries Act, 1996 established **taiapure** which provided for the participation of Maori and local communities in fisheries management. The Act provides an opportunity for local people to set up a taiapure and manage it under a committee nominated by the people. The committee's function is to define fisheries regulations for that area. The regulations set up for a taiapure over rule existing fisheries regulations.

SafetyWatch
0800 999 005
Report any safety hazards



Protect plants and animals

Remove rubbish

Bury toilet waste

Keep streams and lakes clean

Take care with fire

Camp carefully

Keep to the track

Consider others

Respect our cultural heritage

Enjoy your visit

*Toitu te whenua
(Leave the land
undisturbed)*

4. Background Information for Teachers

4.1 MARINE RESERVES

We live on a planet which is two-thirds water, yet we plunder, pillage and pollute this vitally important environment. As the world population increases the demand for food escalates placing pressure on areas already suffering from resource depletion. The introduction of marine reserves is a foundation stone in ensuring the protection of examples of New Zealand's natural landscape and ecosystems from development, the protection and preservation of indigenous biological diversity and protection of marine resources as well as to provide areas where people can experience nature.

A marine reserve gives us a unique opportunity to study or observe marine life in an undisturbed, unexploited natural state. Simple strict rules are adhered to - no fishing, no removals and no disturbance.

There are currently (2001) 17 marine reserves gazetted in New Zealand, with several others being applied for and a number at the proposal stage. The first reserve was formed in 1975 at Leigh, north of Auckland and the second was formed in 1981 at the Poor Knights Island.

More than a third of New Zealand's landmass is protected in reserves, but (excluding the Kermadec Islands) less than one per cent of the coast line is protected this way.

4.2 TE TAPUWAE O RONGOKAKO MARINE RESERVE

This reserve protects eight marine habitat types including inshore reef, rocky intertidal platforms and sediment flats which are representative of the marine area between East Cape and Mahia Peninsula. This area is strongly influenced by the warm, saline waters of the East Cape Current.

The beach and intertidal reefs are best explored at low tide. There is a sandy beach about 4 km long, as well as intertidal reef platforms around Pariokonohi Point near the southern boundary.

The best way to learn about the reserve is to get into the water with a mask and snorkel and explore the rocks close to the shore. The shallow moat near the southern end of the reserve provides an ideal place to observe some of the plants and animals of the subtidal area.

The subtidal area of the reserve contains several distinct habitats. Down to about 10 metres a variety of seaweeds such as flapjack and kelp can be found. Kina, marine snails and sponges are common. The species of fish you may see include spotties (paketi), banded wrasse (tangahangaha), red moki (nanua), hiwihiwi, butterfish or greenbone (marari) and marblefish.

The east coast between East Cape and Cook Strait also has very high rates of larval rock lobster settlement. As a result rock lobsters form a conspicuous and important part of the reef community. Depending on the time of year you may see hundreds of tiny crayfish in the crevices and overhangs of the reef.

Pre- and post-visit viewings of *Marine Things* (TVNZ/Wildtrack) and *Exploring the Sea* (Kingdom of the Sea, UK - 52 mins.) will enhance understanding of marine ecosystems.

4.3 PLANTS

Seaweeds

Green, brown and red seaweeds and diatoms are the most common marine plants. Collectively they are called algae. As with land plants, seaweeds contain chlorophyll and use sunlight as a fuel to convert water and carbon dioxide into sugars. However unlike land plants seaweeds need little woody tissue because the plant is supported by water. They do not have roots, instead they absorb minerals and water through all their surfaces and cling to rocks with a holdfast - a clinging pad or cluster of tendrils which acts as an anchor.

Seaweeds reproduce by spores, both sexually and asexually. Sexual reproduction occurs when the egg is fertilised by sperm. In asexual reproduction, the spores are produced from one parent plant.

4.4 BIRDS

Almost a third of New Zealand's bird species depend on the ocean for food, in the form of plankton, crustaceans, squid and fish. The availability of these food sources is largely controlled by the mixing of ocean currents and tide cycles.

During low tide at Te Tapuwae o Rongokako wading birds and gulls forage across the rock platforms for shellfish, chitons, crabs and fish. Black Shags and Little Black Shags perch on rock while Caspian and White Fronted Terns may be found resting on the beach down to low tide mark Blue penguins roost at night in clumps of vegetation along the Mean High Water Mark. Petrels, Shearwaters and Gannets may be seen further out to sea. The Eastern Bar-tailed Godwit and the Knot are two visitors from Siberia who arrive for the summer in September/October and leave in March for their breeding ground in Siberia.

4.5 MARINE MAMMALS

Whales and dolphins frequent the East Coast's coastal waters. Species include the Bottlenose dolphin, the Common dolphin, Dusky dolphin and the Orca. Further out to sea Sperm whales pass through on their migrations. The occasional Right whale can also be seen off the East Coast. These were the most sought after whales during the whaling days of the early 19th century and almost became extinct.

Solitary Leopard seals and Southern Elephant seals have been seen on the beaches of the reserve and New Zealand fur seals occasionally haul out onto the beaches.

Whales Dolphins and Porpoises Resource Kit

- This resource produced by Project Tohora may be obtained from:
T. Jenkins
PO Box 12056
CHRISTCHURCH

A visit to Te Tapuwae o Rongokako will be more interesting if you are able to recognise some of the seaweeds, birds, fish, shellfish and marine animals.



Elephant seal on beach

5. Statements about Curriculum Links and the Kits

Because this kit is site-based and most kit users will visit the site, the main curriculum objectives will be based around an **environmental theme**.

The strongest links will probably be with the **science, social studies and health and physical education** documents, although aspects of the **technology** and the **art** curriculums are important in getting the best value from a visit.

Of course the **English** document is always the basis of any study as the other documents continually feed in material that develops students' learning in oral, written and visual language. Similarly, good opportunities exist at all sites to explore many ideas in all of the mathematics strands.

The best summary of links for the seven curriculum areas can be found in: **Ministry of Education, 1999. *Guidelines for Environmental Education in New Zealand Schools*. Ministry of Education, Wellington, New Zealand.**

5.1 SOCIAL STUDIES

Social Studies Education aims to enable students to participate in a changing society as informed, confident and responsible students.

Te Tapuwae o Rongokako Marine Reserve visits and projects offer opportunities for students, at appropriate levels, to develop concepts in each of the five strands. Examples for each of the five strands are listed below:

5.1.1 Social Organisation

- How people organise themselves to visit the reserve
- What type of groups of people they are
- How groups organise themselves to respond to marine reserve management issues
- How DoC organises staff to manage the reserve

5.1.2 Culture and Heritage

- Aspects of Maori tradition associated with Te Tapuwae o Rongokako
- The use of the reserve by family, tramping, community and educational groups
- The marine reserve as a significant landmark and coastal feature for people of the East Coast.

5.1.3 Place and Environment

- Why the marine reserve is a significant environment for people
- How peoples' activities influence the marine reserve environment

- How and why peoples' perceptions of the marine reserve are reinforced or changed by information or experience
- How and why people seek to resolve differences over how places and environments should be used
- How people express a sense of belonging to the reserve
- The importance of the place and environment for recreation.

5.1.4 Time, Continuity and Change

- How past management decisions changed the nature of the reserve
- How beliefs and ideas in society change and how this has impact on the reserve
- How the process of change over time is used as a tool for reserve management
- How Maori use of the area has changed over the centuries.

5.1.5 Resources and Economic Activities

- How Maori used the area as a resource in the past
- The European use of the reserve in the past

5.2 SCIENCE

Learning in science is fundamental to understanding the world in which we live and work. It helps people clarify ideas, to ask questions, to test explanations through measurement and observation and to use their findings to establish the worth of an idea. (*Science in the New Zealand Curriculum*, p. 7.)

Of the four contextual strands: the living world, the physical world, the material world and planet earth and beyond, Te Tapuwae o Rongokako Marine Reserve studies will particularly enhance development of knowledge, understanding, skills and attitudes in the **living world** and **planet earth** strands.

5.2.1 Living World

Development of concepts in all of the four achievement aims (*Science Curriculum*, p. 52) could be attained during a Te Tapuwae o Rongokako project with the first three aims culminating in an enhanced understanding of the all important Aim Four. This can be achieved through appropriate activities at any level from one to eight.

- What are the living and non-living things that make up an intertidal rock pool?
- Design nutrient and water cycles.
- Identify shell fish, rock pool fish.
- Introduce rock pool ecosystems. Why are particular species found in specific localities or habitats?
- Identify coastal bird species.

5.2.2 Planet Earth

Achievements in Aims One and Two (*Science Curriculum*, p. 106) lead to achievement of Aim Four: investigate how people's decisions and activities change the physical environment and develop a responsibility for the guardianship of the planet and its resources. Any achievement in this aim through studies at Te Tapuwae o Rongokako is probably the most important of the entire New Zealand Curriculum Framework.

Research **Biodiversity** to develop children's understanding of why New Zealand's native plants and animals are unique.

Videos:

- *Paua Growing*
- *Marine Things* (TVNZ/Wildtrack)
- *Exploring the Sea* 52 mins. (Kingdom of the Sea, UK)
- *The Tale of the Crayfish* (TVNZ/Wildsouth)

Interpretation of the extensive views of the surrounding landscape, however elementary, from the vantage points can help to cement important '**our land, our place, our guardianship**' values and attitudes in students of all ages.

Investigations of the aims and objectives of the management plans for Te Tapuwae o Rongokako will give important insights into the environmental guardianship role given to the Department of Conservation by government policy.

5.3 TECHNOLOGY

Learning in technology implies becoming confident in using a variety of means to address needs and opportunities and solve practical problems within society. Technology education explores choice and the factors which influence choice, including culture and society, costs and benefits, aesthetics and fitness for purpose. It seeks to empower students to make informed choices in the use of technology and in their response to technological change. (*Technology in the New Zealand Curriculum*, p. 8.).

A wide range of opportunities exist through a visit to Te Tapuwae o Rongokako within the context of three strands:

- Technological Knowledge and Understanding
- Technological Capability
- Technology and Society

Examples could include the technologies involved in:

- Animal and plant monitoring at Te Tapuwae o Rongokako
- The development of facilities for visitors such as:
 - signage
 - toilets

- Aspects of the school trip to Te Tapuwae o Rongokako such as choices of:
 - clothing
 - food
 - drink
 - personal accessories
- Design an underwater viewing device.

5.4 HEALTH AND PHYSICAL EDUCATION

Te Tapuwae o Rongokako Marine Reserve visits and projects offer opportunities for students, at appropriate levels, to develop concepts in each of the four strands. For example:

5.4.1 Personal Health and Physical Development

- Identify and use safe practices and risk management in the reserve environment.
- Share ideas and beliefs about how the use of the reserve environment enhances a person's health.

5.4.2 Movement Concepts and Motor Skills

- All achievement objectives in this strand could be met through the development of concepts relating to safe and efficient water skills in a group situation.

5.4.3 Relationships with other People

- Development of skills relating to planning safe and enjoyable experiences at Te Tapuwae o Rongokako with class or family groups.
- Develop skills in relating to other group members while at Te Tapuwae o Rongokako - to maximise enjoyment and positive learning experience outcomes.

5.4.4 Healthy Communities and Environments

- Share ideas to identify factors that relate to reserve use and community mental and physical health.
- Identify concepts that are used in the management of the reserve environment that enhance the wellbeing of the plants and animals (ecosystem).

6. Suggested Activities for Teachers

6.1 DEBATING

During discussions about the place that the Department of Conservation has in preserving our natural and historic heritage students will realise that people hold different opinions on that role.

Encourage them to talk to their families, parents, friends etc. to find out what they consider should be done.

Use the media - for example TV, the newspaper (the free local edition, or the Education page in newspapers) magazines (if your school subscribes).

Use Web pages for information or write to organisations that are involved in environmental issues, such as Forest and Bird, Federated Farmers, Queen Elizabeth II Trust or the Historic Places Trust.

Find out about Resource Consents.

These findings can then be used to form debates on issues such as :

- Should more marine reserves be created?
- How should people be controlled?
- Should people pay to use the reserve?
- Who should make decisions about management of the reserve?
- If oil or minerals were found in Te Tapuwae o Rongokako - should it be extracted or mined?

Role playing could cover the same issues.

6.2 SURVEYS

The issues raised in the debating topics could be used to develop surveys to find out other peoples' views.

Surveys could be developed using criteria such as:

- Age
- Gender
- Culture

Collate information as graphs, percentages, etc.

Results could be presented :

- in the school newspaper
- at assembly

- on the local newspaper, or
- shared with other schools

6.3 MUSIC

This worksheet is designed to give you ideas you can develop with students of any age group. The suggestions may be developed individually or could become a major, integrated unit of work, linking many curriculum areas.

The sea and beach provide a wonderful symphony of sound. This could be taken back to the classroom, either by using a tape recorder, and/or having sound as one of the objectives students focus on during the visit. For example:

- Identify and note down the different sounds heard (in what form students record this is to be discussed before the visit.)
- Record these sounds.
- Take a tape recorder and record as many different sounds as possible.
- Elect groups to study specific areas, e.g.
- Natural - air, water, land.
- 'Man-made' - air, water, land.

Back at school

- *Discuss the different sounds heard and recorded.*
- *Record as many sounds as possible in written form to produce a score of music.*
- *Using voices and music produce a piece of music that represents the "Voices of Te Tapuwae o Rongokako".*

6.4 PLAYS

The beach also portrays the never-ending activities of the creatures in their habitat. These provide wonderful opportunities for students to develop their imagination. If you choose this concept, before your visit, you will need to prepare students to observe closely all the activities on site. These could then be the objectives on which to base your unit.

- Observe and record the areas creatures seen and how they move.
- Record the creatures responses to their environment. What would their response be if you could understand their language?
- Discuss the effect people have on their environment.

Back at school

- *Collate this information into a play for presentation e.g. at school assembly.*
- *Portray the characters using costumes, masks etc.*

6.5 ART

To develop an understanding of Te Tapuwae o Rongokako, students' attention needs to be directed towards the colour, texture and form of the environment.

- Feeling the different textures and recording (using crayon and newspaper)
 - rocks and sand
 - shells
 - feathers
 - seaweed
- Observe the colours – above, around and below – a camera will help record.
- Look at the form of plants, birds, fish, animals, water and the landscape.

Back at school

- *Develop the above points individually using a variety of media and discuss the need to look and record them individually.*
- *When developing form use pencil/charcoal sketching as a starting point.*
- *Combine the three elements of colour, form and texture to produce a picture. This can be developed with multimedia and as a group activity.*

6.6 EARTH SCIENCE

In conjunction with visits to Te Tapuwae o Rongokako, the children will be able to discover the natural processes and forces involved in forming the landscape. A variety of projects can be developed depending on the site visited, but much can be done pre and post-visit e.g.

- Discover the meanings of these geological terms, giving a brief description of each one:

| | | |
|------------|-------------|--------------|
| earthquake | fault line | sedimentary |
| igneous | metamorphic | thrust |
| fold | anticline | syncline |
| sandstone | mudstone | limestone |
| tephra | pumice | conglomerate |
| dip angle | | |
- Discuss and record the processes involved in forming the East Coast landscape.
- Estimate the geological age of East Coast.
- Predict the forces that are at work forming the coastline.
- Refer to the topographical maps Y17 and Y18. Find Whangara Island, Pouawa river and Tatapouri Point. Identify cliffs, gorges and fault lines in the area.

Field trip

Equipment needed: Whiteboards, 3-D viewers, rulers/tape measures, magnifying glass and camera.

Adaptations

Animals and plants found in the intertidal zone and in the sea have specific adaptations to live in this environment. Many of these organisms live in distinct zones. Encourage the children to look at and compare the animals and plants so they can discover the adaptations.

- Look at the rock platform.
- Select a rock pool
- Study the animals and plants within it
- List the adaptations of the inhabitants
- Do observational drawings of the inhabitants. (Remember to be careful and return everything to its original position).
- Map where the specific animals and plants are found. Measure the distances.
- Compare the adaptations of creatures in another part of the rock platform.
- How does the substrate influence where organisms are found?

Life Cycle and growth

- Observe and measure a particular species of animal e.g. shellfish
- Record the sizes
- Count how many there are within an area and compare with counts outside the reserve.

Remember that time spent on preparation at school will ensure better results in the field.

Back at school

- *Decide how the data can be presented and analysed*
- *Draw a graph*
- *Identify the area of the reserve you surveyed*
- *Show numbers and sizes of organisms*
- *Add drawings and written work to the class mural*
- *How do the animals react to:*
 - *light*
 - *predation*
 - *evaporation/heat*
 - *salinity*
 - *wave exposure*

6.7 MONITORING

This section covers the measurement of ecosystem recovery and the monitoring of species which indicate the success of management. Monitoring at Te Tapuwae o Rongokako includes fish and vegetation.

The intertidal ecosystem involves interactions between many different components. Different parts of the ecosystem and interactions between them, can be used as indicators of ecosystem health.

6.7.1 Procedures

Baseline studies refer to data that are collected to provide information on the present state of the area under study.

When marine scientists and managers check on marine health over a period of time they find out if the coast is improving, is stable or is declining in overall health. This is called **monitoring**.

Monitoring involves repeated sampling over time and at more than one location. Monitoring over a prolonged period is designed to detect variations in populations. It may include evaluations of impact, distribution and abundance.

Drawing comparisons between sites is an important aspect of marine studies and involves **sampling** organisms to gain information on distributions.

This information can be gathered by:

- Mapping the position of the organisms:
 - draw the rock pool and show where the animals and plants are found.
- Sampling the area repeatedly either using transect lines or quadrants.

This information can be compared with existing data from other habitats or locations.

Studies of **Variation** are ideally suited for along a shore or between micro-habitats. Variation across the shore is an exercise which can be developed because well-defined zones containing predictable sites of species are rarely, if ever found. An investigation can be carried out using transects and/or quadrats to determine the abundance of species.

6.7.2 Sampling Methods

Equipment:

- 25 metre tape measure or a measured length of rope marked at regular intervals e.g. every 5 m
- 0.25m² quadrats constructed from lengths of wood or metal
- Recording slate/board
- Identification charts

Transects:

Cross shore profiles can be obtained by using a transect line for studying habits, mapping widths and positions of **habitats** or **species assemblages** and for quantifying abundance patterns. Profiles can be used in association with quadrats.

Quadrats:

Quadrats may be deployed randomly over the whole shore, (**simple random sampling**), or placed in allocated areas. Within the test area quadrats can be placed in pre-selected strata, such as habitat.

A quadrat size of 0.25m² enables a wide variety of organisms and habitat types to be assessed.

Variables measured by quadrats include:

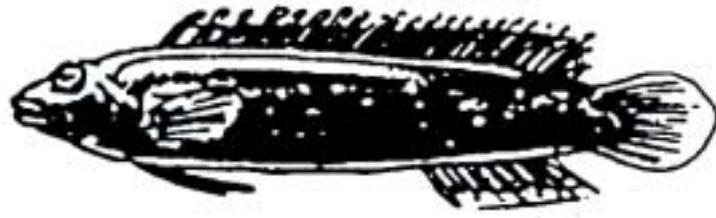
- Density of organisms
- Size of organisms
- Cover (proportion of area occupied)
- Frequency (percentage by which species occur in quadrats)

Sampling can cause a dilemma, but the alternatives are:

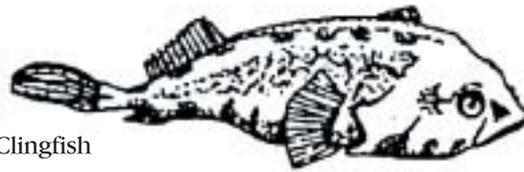
- Sample whatever falls within the randomly chosen quadrat.
- Arbitrarily move the chosen quadrat to avoid obstacles, if necessary.

6.8 STUDY SHEETS

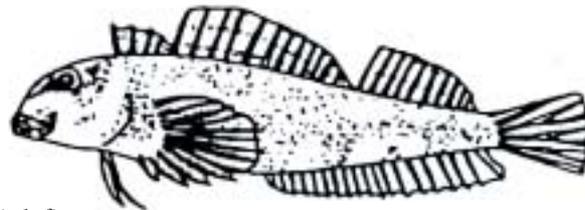
Identification study sheets for intertidal zone rockpool fish and shell fish can be found on pages 26 to 28.



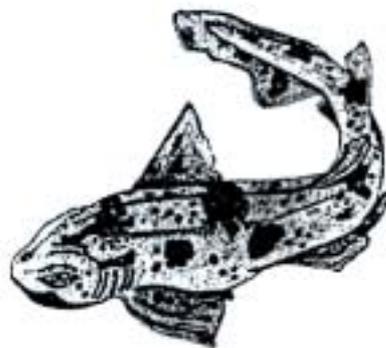
Rock Fish



Clingfish



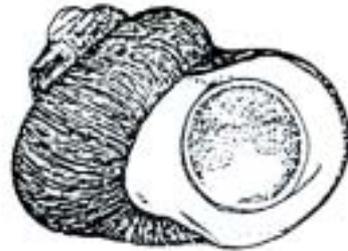
Triplefin



Dog Fish



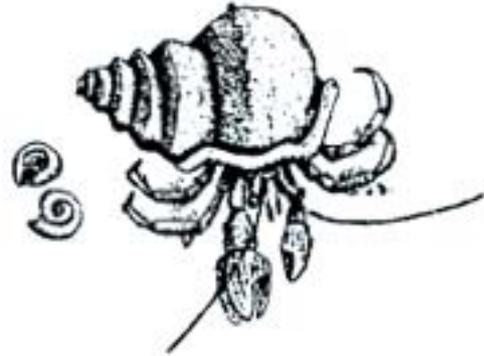
Sponge



Cat's Eye



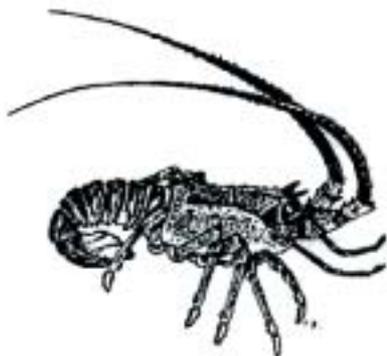
Turret shell



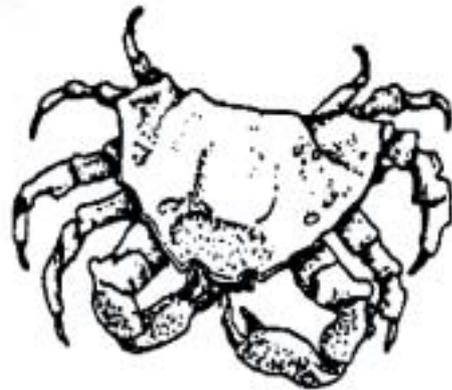
Hermit crab



Anemone



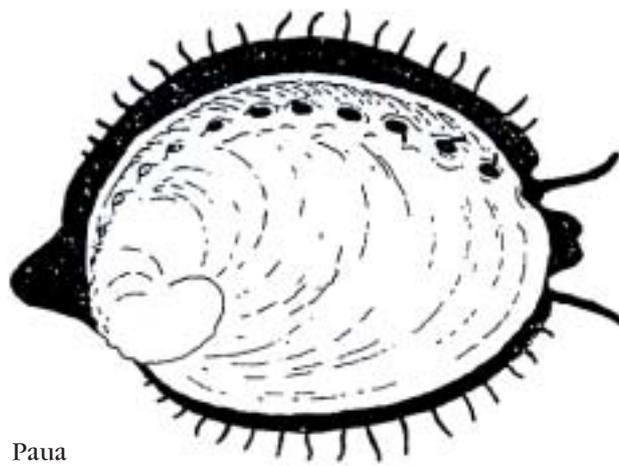
Crayfish



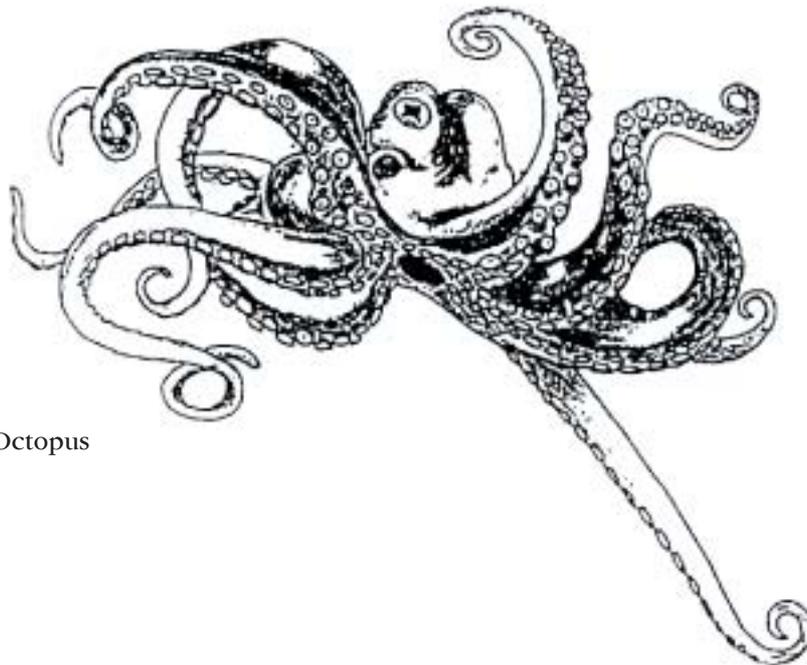
Crab



Kina



Paua



Octopus

7. Other References and Resources

7.1 CHECKLIST

- Field recording sheet
- Clip board
- Pencil
- Binoculars (optional)
- Ruler/tape measure
- Bucket
- 3-D viewer
- Worksheet 1 - birds
- Worksheet 2 - seaweeds
- Worksheet 3 - fish
- Worksheet 4 - molluscs
- Worksheet 5 - marine creatures
- Hat
- Sunblock

7.2 REFERENCES

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8. Te Tapuwae o Rongokako Marine Reserve

SUPER SITES FOR EDUCATION TEACHER RESOURCE KIT EVALUATION FORM

This “Super Sites” education resource is designed to help you plan exciting learning experiences using parks and reserves administered by DOC in your area. Is it useful? How can we improve it? Please let us know!

| | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|--------|
| How did you find out about this Super Sites resource? Comment: | | | | | | | | | | |
| | | | | | | | | | | |
| Was there enough information for you to get an overall understanding of the site? If NO, what else would you like included? | | | | | | | | | | YES/NO |
| | | | | | | | | | | |
| | | | | | | | | | | |
| What was the level of the class that used the resources? (Circle the answer) | | | | | | | | | | |
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Did the resources help you to meet your curriculum objectives? If NO, how could we improve them? | | | | | | | | | | YES/NO |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Were the activities enjoyable? | | | | | | | | | | YES/NO |
| Did they meet the learning needs and interests of your students? | | | | | | | | | | YES/NO |
| Do you have any suggestions for improving them? | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Were the suggested activities manageable at this site? | | | | | | | | | | YES/NO |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Were there any safety concerns arising from these activities, or the site? Comment: | | | | | | | | | | YES/NO |
| | | | | | | | | | | |

| | | | | | | | | | |
|--|------------|------------|-------|--------|---|---|---|---|----|
| Has using this resource helped raise your awareness of an environmental issue in your region? If so, what? | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Is your class or group taking on an environmental project as a result of the visit? | YES/NO | | | | | | | | |
| Comment: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Are you aware of any change in your students' attitudes or behaviour towards the environment/environmental issues since using this resource? | | | | | | | | | |
| Comment: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Was this your first visit with a class to a Department of Conservation Super Site? | YES/NO | | | | | | | | |
| Are you planning any more visits to this or other conservation sites this year? | YES/NO | | | | | | | | |
| Comment: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| How would you like future Super Sites resources and programmes to be developed? (Circle the answer): | | | | | | | | | |
| New themes | Web access | More sites | Other | | | | | | |
| Comments: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| On a scale of 1-10, how would you rate this resource? (1 = excellent, 10 = poor) | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Would you use a 'Super Sites' education resource again? | | | | YES/NO | | | | | |
| Have you any other comments about how we could improve this resource? | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Please post the completed form to: Community Relations Officer (Education), Department of Conservation, PO Box 668, GISBORNE.

Thank you!