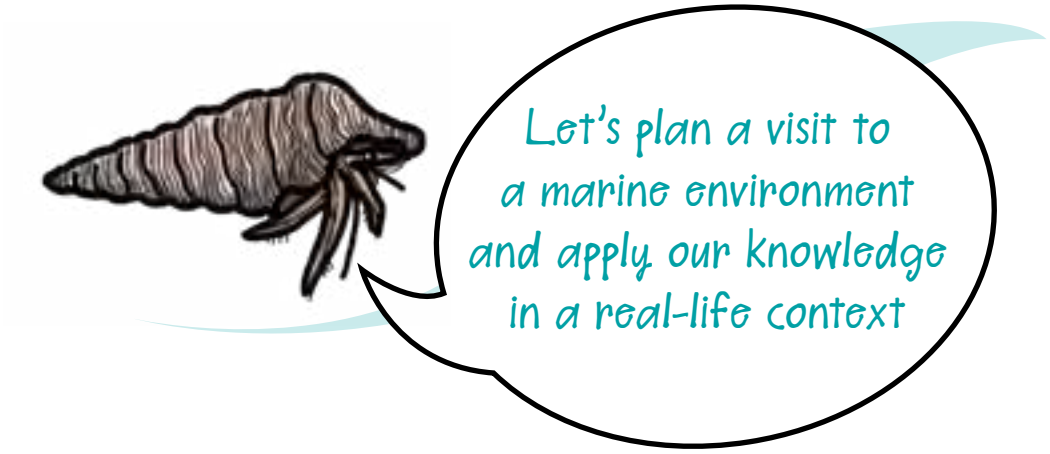
# Activity 8: Visiting marine environments and reserves




## CURRICULUM LINKS

| Learning areas | Learning intentions | Success criteria |
|---|---|---|
| **Science: Levels 1–4:**<br>▪ Living world: Life processes, Ecology, Evolution<br>▪ Nature of Science: Understanding about science, Investigating in science,<br>▪ Participating and contributing<br>**Science capabilities:** Gather and interpret data, Use evidence, Critique evidence, Engage with science<br>**Health and Physical Education:** Personal health and physical development: Safety management | **Students are learning to:**<br>▪ Plan for an effective trip to a marine environment or marine reserve, identifying and managing any risks.<br>▪ Gather data and find evidence to support or challenge their ideas about marine reserves or biodiversity. | **Students can:**<br>▪ Describe risks in the marine environment and contribute to writing a safety plan to manage these risks.<br>▪ Record observations, gather data and reach conclusions based on evidence about marine species. |

# CONTENTS

# BACKGROUND NOTES

## EXPERIENTIAL LEARNING

Experiential learning is a process that involves students having a direct experience in their environment and then reflecting on the experience to better understand their environment. Key elements of the process are experience and reflection.

A visit is an opportunity for place-based, authentic learning in your local marine environment. In marine reserves, students have the chance to see more biodiversity and life than in most coastal environments. Experiential visits can bridge the gap between students, their classrooms and the community. They also allow students to apply the knowledge and skills learned in the classroom in a real-life context.

## WHAT ARE THE BENEFITS FOR LEARNING IN A MARINE RESERVE?

There are many opportunities for learning and investigating the environment and biodiversity at a marine reserve. This will be a great platform for meaningful follow-up action for the environment and enables students to see, experience and understand marine biodiversity in real life. Students could visit the rocky shore or sandy shore and/or subtidal zone (in the water). Outdoor learning also provides physical, social and wider benefits for students.

West Coast Seaweek. *Photo: DOC*

If there is no marine reserve near your school, an alternative location for a visit could be an area that is protected in some way or is a potential marine reserve.

## WHAT DO STUDENTS AND SCHOOLS NEED TO CONSIDER BEFORE A FIELD TRIP?

Staff, students and the Board of Trustees (BOT) of a school will need to consider many factors before conducting a visit outside the school, including: safety, logistics, special needs, adequate supervision/ratios and equipment needed. Identifying and managing risks before the trip is essential. Therefore, a site visit before the class trip is highly recommended.

Information about safe practice in the outdoors can be found at the EOTC (education outside the classroom) TKI website: eotc.tki.org.nz/EOTC-home/EOTC-Guidelines. This site includes information on planning, staffing and supervision, emergency preparedness, legal responsibilities, and accepted best practice for EOTC.

## WHAT COULD WE INVESTIGATE IN A MARINE RESERVE?

The students' investigations are determined by their inquiry questions and research. Identify any gaps in knowledge or opportunities for data collection or observation that would relate to the questions you have been exploring.

Some options for self-guided student investigation during a visit are:

- Investigating biodiversity with a Marine Metre Squared survey (rocky or sandy shore) see: www.mm2.net.nz.
- Dune plant survey:
  - Survey the dune plants in your marine reserve and see if you can identify them. Be careful not to walk on dunes during your survey and respect any barriers. See page 9 of the DOC *Habitat Heroes: Explore your local marine environment resource* for instructions: www.doc.govt.nz/habitat-heroes-marine-resource.
- Litter survey to explore human impacts in your marine reserve:
  - See the DOC *Habitat Heroes: Explore your local marine environment resource* page 10 for instructions: www.doc.govt.nz/habitat-heroes-marine-resource.
  - Survey sheets and guidance for beach clean-ups and litter audits are available from Love Your Coast/Sustainable Coastlines at www.loveyourcoast.org.nz/learn.

## STUDENTS AS SCIENTISTS

A site visit enables students to feel like they are 'real-life scientists'. Scientists make predictions and then test their predictions by making observations, gathering and interpreting data, looking for patterns and trends, and critiquing their evidence. Students should be encouraged to engage in these science capabilities before, during and after the visit, as part of their inquiry. See: http://scienceonline.tki.org.nz/Science-capabilities-for-citizenship/Introducing-five-science-capabilities.

## WHAT IS CITIZEN SCIENCE?

Citizen science is a collaboration between volunteers (the public) and scientists for data collection, monitoring and research. Anyone, including students, can participate in citizen science and be a citizen scientist. Citizen science enables students to participate in the scientific community and contribute to increasing our knowledge about New Zealand's biodiversity. Using citizen science, students can increase knowledge of their marine biodiversity and record information in a digital format. This participation contributes to the big picture of our biodiversity knowledge and conservation in New Zealand.

For citizen science projects suitable for New Zealand primary students see: pond.co.nz/detail/2556231/citizen-science.

## DATA COLLECTION

Data collection and observations will also depend on the direction of student inquiry. For example, if students are interested in a local species of concern, you may wish to gather data about the abundance (number), distribution or threats for the species. Students may find it difficult to gather data in the field for some inquiry questions. For example sharks, dolphins and stingrays can be more difficult to spot or encounter easily and safely.

## Marine Metre Squared

The Marine Metre Squared (Mm2) project is an example of a marine citizen science project in New Zealand.

Collecting data about biodiversity in your marine environment is easy with the Marine Metre Squared project. Just go to www.mm2.net.nz. It is easy to use for primary, intermediate and secondary level students. See *Gathering data about biodiversity in your marine environment* on page 10 for more information. We suggest using the Mm2 method unless there is another more suitable, relevant method that suits your inquiry.

Possibilities for data collection and investigations using Mm2 include:

- Identifying whether you have a certain species on your rocky or sandy shore environment by noting presence or absence of certain species, e.g. do we have any sea stars in our marine reserve?
- Finding out about habitats of certain rocky shore animals by surveying different areas to see where some marine animals live, e.g. where do limpets prefer to live?
- Is there a variety of biodiversity in our marine environment, e.g. how many different species can we find in our marine reserve?
- Monitoring the abundance (number) of different animals over time, e.g. have the number of shellfish increased since the creation of our marine reserve?
- Comparing the numbers of certain fish or animals inside and outside a marine reserve. These must be in similar habitat types, e.g. rocky reefs. You may want to investigate a question such as: Are there more large shellfish inside the marine reserve than in an unprotected similar habitat or beach?

Matawai Seaweek. *Photo: Trudi Ngawhare (DOC)*

***Important note:*** *when conducting an Mm2 survey, it is important to keep disturbance of sand and animals to a minimum and put them back where you found them.*

## iNaturlistNZ

Record observations of biodiversity at iNaturlistNZ inaturalist.nz, a well-known citizen science website and information hub. Students can enter their observations onto the website to share information with science communities. You can also enter results for iNaturlistNZ on the iNaturalist app. Teachers will need to register at inaturalist.nz/signup before uploading observations.

# LEARNING EXPERIENCE 8:
# VISITING MARINE RESERVES/ENVIRONMENTS

## Resources for this activity

- Marine Metre Squared project: mm2.net.nz
- Map of marine reserves in New Zealand: www.doc.govt.nz/marine-reserves-map
- Education outside the classroom: eotc.tki.org.nz/EOTC-home
- 'Tiakina a Tangaroa – Protect our seas' by Jill MacGregor, *School Journal*, level 2, October 2011, http://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-2-October-2011/Tiakina-a-Tangaroa
- 'Visiting marine reserves: notes for schools and educators', in the *Appendices*

## Vocabulary

Experience, risk, safety, minimise, eliminate, data, observe, predictions, observations, support, challenge, ideas, evidence, visit, compare.

Focus question:
How can we gather data about biodiversity in marine reserves? How can we plan a safe visit to a marine reserve?

## Inquiry stage 3: Investigate

## BEFORE YOUR VISIT

- Reflect on your inquiry. Identify any gaps in students' knowledge. These gaps could help to determine a focus for your visit. Brainstorm ideas and questions that could be investigated.
- Select a question or idea to investigate during your visit.
- Students can make predictions about what they might find during your visit.
- Decide on a format for collecting data, recording information and making observations.

### Read about visiting marine reserves

- Read 'Tiakina a Tangaroa – Protect our seas', *School Journal*, October 2011, either as a class or in groups. This article describes an example of the experiential learning process. The article follows a group of students who visit unprotected marine areas as well as marine reserves. They learn about how they could protect their marine environments for the future.
  - After reading, discuss what the students were observing and the data they collected. (Students were comparing biodiversity in an unprotected area with biodiversity inside a marine reserve. Biodiversity gives an indication of how healthy a marine environment is.) What did the students do with this information?
  - Could you investigate similar ideas as part of your visit?

## Planning sequence for your field trip

1. Decide on the location of your field trip. For ideas and resources about DOC marine reserves suitable for school visits, see pages 15–19. If there is no marine reserve nearby, visit a valued marine environment where you can investigate your inquiry question.
2. Decide on the purpose of gathering data: what do students want to find out? See examples on page 4.
3. Students can make predictions about their area of interest, e.g. we think that the marine reserve will have a wide range of biodiversity because the area is protected.
4. Complete health and safety planning and necessary paperwork.
5. Inform parents about the visit and ask for volunteers to help with supervision.
6. How do we measure what we are investigating? Come up with a plan about how to gather data or observations about your chosen inquiry.


Marine reserves map: www.doc.govt.nz/marine-reserves-map

## Thinking about safety and risks

- What will students and teachers need to think about to make sure your group is safe in the location you are visiting?
- Ask students which risks or potential problems they could encounter in a marine reserve. Consider factors such as weather, tides, terrain, natural disasters, risks associated with people, becoming lost etc. Use the list of *General health and safety factors* to consider (see pages 8–9) to help generate ideas.
- Create a list of potential risks for the marine reserve you will be visiting, e.g. slipping hazards, sharp objects, large waves.
- It is recommended that the teacher visit the site before a trip to do a risk assessment. Use your list as a basis for this and report back to students about your findings.
- Decide on how you will **minimise** or **eliminate** any risks present and record your thinking on your SAP/ RAMS (Safety Action Plan or Risk Assessment Matrix) forms.
- With your students, work through the appropriate forms from your school or from the EOTC Toolkit: http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines/Tool-Kit.

## General health and safety factors to consider when visiting marine environments

*Note: These are general factors only – there may be unique risks present at your site. A site visit by a teacher who will be attending your visit is recommended before you write your health and safety plans, to determine site-specific risks for your group. Follow the protocols and policies of your school and BOT for your health and safety planning.*

### Tides

Tides can affect many aspects of a visit. Ensure the tides suit the purpose of your visit and your survey methods. For example, if you are visiting rock pools or doing a sandy shore survey, make sure the tide is low. If you visit the marine reserve at the right time, taking into account the tides, it will make your trip much more enjoyable and safer.

Find out about the tidal patterns at the place you want to visit. Look up your area on the MetService website: www.metservice.com/national/home under marine, surf and tides.

Low tide. *Photo: Andrew Malone*

### Weather

On the day before and the day of your visit, check both the marine and land forecasts. You may also need to check wave heights if you are working on an exposed rock shelf. High winds may increase waves and can make coastal visits more difficult and riskier.

If the weather is marginal, make sure there is adequate shelter available for the size of your group.

Depending on what you have planned, unless there is shelter available, plan your visit for a time of year when the weather will be relatively warm and settled for the comfort of students.

#### *Wet weather gear*

Ensure students bring adequate clothing and equipment to keep them dry if it rains. Check this before departure from school. It is recommended that students be prepared for a variety of weather conditions. Example of clothing requirements: raincoat, full shoes, hat/sunhat, jumper, and so on. Discuss this aspect well before the trip. Ask students if they own appropriate clothing. If some students don't own raincoats, try to make provision for them before the visit: could they borrow one or use school ones?

#### *Sun safety*

Ensure students are safe from the sun with hats, protective clothing, and/or sunblock. Taking extra sunblock with you is suggested, for additional applications and in case any students forget hats. Seek shelter and shade when possible on hot, summer days.

### Locations

Plan to spend time in safe, spacious locations where your entire group has room to learn and move around along with their adult helpers (taking tides into account). The teacher and at least one other helper should be familiar with the location so that in an emergency they can navigate to and from the location and/or provide details of the location to others.

## Appropriate adult help and supervision

Ensure that you have adequate adult helpers attending the trip. They should be well informed about their responsibilities on the day and that they also need to bring appropriate gear. Some students will require more supervision that others, according to their needs, so decide on ratios with these considerations in mind. For example, a student with specific special needs or mobility challenges may require 1:1 supervision, whereas another group of children may be able to have a 1:4 ratio.

Advise adult helpers and staff on your protocols for individual supervision of students, first aid and taking students to the bathroom. Adult helpers should also be familiar with the main points of your health and safety plans.

## Special equipment

Think about the following factors:

- weather
- visibility
- warmth
- protection from elements
- risks
- any specialised equipment needed.

For example, if students are snorkelling or entering the water, they will need wetsuits and other items for safety. Wetsuits are good for warmth and protection. Masks, snorkels, fins, and possibly life jackets, boogie boards or floatation devices will also be necessary.

It is preferable to use an experienced provider of LEOTC programmes if planning in the water activities. Providers will have the right equipment and experience for a safe and enjoyable event. Experiencing Marine Reserves (EMR) offer excellent guided snorkelling opportunities in many marine reserves across New Zealand, see page 12 and www.emr.org.nz.

## Planning for medical needs

Students who take daily medication should have all the necessary medication with them for the day. Also, students with allergies or EpiPens should take emergency equipment along for the trip. Designate a staff member or guardian to have all this carried with them. It is preferable that an adult familiar with the student and their signs and symptoms attends the trip.

## First-aid kit and logistics

Ensure you have a comprehensive first-aid kit at each location of your visit. Students and adults present should know where the first-aid kit is and who can help them if they need assistance.

There should be at least one trained first aider with a current certificate present, ideally at each location, if you are separating the groups. Plan for medical events before they happen and have agreed management strategies in place that all adult helpers are aware of. Share phone numbers of group leaders in case there is a problem or medical emergency. It is also a good idea to have a spare car as well as your bus, and more than enough adult helpers, in case a student requires medical attention and has to be taken off-site. There should be supervision guidelines for this scenario.

## Know your students

Knowing your students and giving them appropriate supervision can minimise risks in the outdoors.

## DURING YOUR VISIT

- Collect data and use an agreed format to record it.
- Make observations and record any relevant evidence or data.
- Follow your health and safety plans.
- Use a camera or digital device to take photos and record the day's experiences.
- Ensure adequate supervision and that everyone understands your safety plans.
- Have fun!

### Karakia

This Karakia may be said at the start of each session acknowledging our Whakapapa and connection with the environment including Tangaroa, the sea.

*Ko Rangi*
*Ko Papa*
*Ka Puta ko Rongo*
*Ko Tāne Mahuta*
*Ko Tāwhirimātea*
*Ko Tangaroa*
*Ko Haumia-tiketike*
*Ko Tūmatauenga*
*Ko te Rangi ki runga*
*Ko te Papa ki raro*
*Ka Puta te ira tangata*
*Ki te whaiao, ki te ao mārama*
*Tihei mauri ora*

### Gathering data about biodiversity in your marine environment

#### Marine Metre Squared survey

*Citizen science on rocky and sandy shore*

The Marine Metre Squared project is an easy survey method that is useful to examine biodiversity in your marine environment. The survey can be adapted for any age group, for example younger students may focus on one or two species in a small area, or experienced students could compare two-metre-squared surveys.

There are both rocky shore and sandy shore surveys for northern and southern New Zealand. See the New Zealand Marine Studies Centre for more information: www.otago.ac.nz/marine-studies/index.html.

For tools and resources for a marine metre squared survey, see: www.mm2.net.nz, where you can find guidance about how to do a biodiversity survey on your rocky or sandy shore. Recording sheets and associated resources can be found here: www.mm2.net.nz/resources.

## Rocky shore guides


There are fantastic rocky shore and sandy shore guides to assist you to identify the species you find.

These are handy guides to the common animals and plants living on the rocky seashores of New Zealand. The *Northern New Zealand* and *Southern New Zealand rocky shore guides* are available from the New Zealand Marine Studies Centre in card or waterproof versions.

All the following guides can also be downloaded in pdf format: www.otago.ac.nz/marine-studies/resources/download/otago057316.html.

- Northern New Zealand rocky shore guide
- Southern New Zealand rocky shore guide

## Sandy and muddy shore guides

Handy guides to the common animals and plants living on the sandy and muddy seashores and estuaries of New Zealand. The *Sandy and muddy shore guides* are available from the New Zealand Marine Studies Centre in card or waterproof versions (see URL above).

- Northern New Zealand sandy and muddy shore guide
- Southern New Zealand sandy and muddy shore guide.

## Te Reo Māori Shore Guides

Te Reo versions of all the shore guides may be downloaded in PDF format from the URL above.
Card versions are available from the New Zealand Marine Studies Centre.

- Aotearoa Ki Te Raki puka ārahi mō te ākau pōhatuhatu (*Northern New Zealand rocky shore guide*)
- Te Tai Tonga puka ārahi mō te ākau toka (*Southern New Zealand rocky shore guide*)
- Aotearoa Ki Te Raki puka ārahi mō te tapātai one (*Northern New Zealand sandy and muddy shore guide*)
- Te Tai Toka puka ārahi mō te tapātai one (*Southern New Zealand sandy and muddy shore guide*).

## More information about seashore animals

Details about individual species can also be found at:

- Marine Life Database: www.marinelife.ac.nz.
- *Collins field guide to the New Zealand seashore*, by Sally Carson and Rod Morris. Published by Harper Collins, 2017: www.harpercollins.com.au/9781775540106/collins-field-guide-to-the-new-zealand-seashore.
- Auckland Museum's marine life app: www.aucklandmuseum.com/collections-research/collections/remix-play-share/nz-marine-life-app.

## Experiencing Marine Reserves (EMR)

*Exploring subtidal areas through snorkelling experiences in the water.*

Experiencing Marine Reserves (EMR) is a national programme of experiential learning about marine conservation. EMR specialises in safe snorkelling excursions in marine reserves and other sites. There are EMR opportunities in Northland, Auckland, Coromandel, Gisborne, Taranaki, Wellington, Nelson and Otago. In these regions EMR deliver community guided snorkel day events and offer guided snorkel experiences for schools or groups. For more information, see: https://www.emr.org.nz or www.facebook.com/emr.mtsct.

Experiencing marine reserves. *Photo: Darryl Torckler:*

EMR can offer resources and assistance for identifying species during your snorkel, e.g. https://www.emr.org.nz/images/emr/pdf/educators/EMR_ID_Chart_2017.pdf. Contact email: info@emr.org.nz.

*When visiting marine reserves ensure that that you don't take anything away with you – even the sand and shells and seaweed are protected.*

### Inquiry stage 4: Extending thinking

## AFTER YOUR VISIT

- Review the data, observations, images and information you collected during your visit.
- Share several reflection questions to critique any evidence you have gathered so far, see the example over the page.

### Reflection questions from your visit

| | |
|---|---|
| What did you find out during your visit? | |
| Were there any patterns or themes in your observations/data? | |
| Were any of your inquiry questions answered from your observations or evidence from the visit? | |

| Reflection questions from your visit | |
|---|---|
| How sure are you of your results? Why is this? | |
| How can you explain your observations and findings? | |
| Were there any difficulties or limitations at your site? | |
| Did your results surprise you? Why/why not? | |

Google Docs version: goo.gl/f2YwXV.

- Share evidence and let others critique it to check reliability. This could be through the Marine Metre Squared project (see above) and/or at NatureWatchNZ: naturewatch.org.nz/projects/marine-metre-squared.
- Students could research other findings to support or challenge their own observations. Discuss your results with others, including any available experts.
- Think creatively to interpret your results. You may need to use problem-solving skills to create new ideas about marine reserves.
- During the visit, did you come across any issues or concerns about marine environments? What could you do about these? Record ideas to use for the next activity.

## Inquiry stage 5: Coming to conclusions

## REFLECTING ON LEARNING

- What were the overall student findings during their visit? How did their findings compare to their initial predictions?
- How does this new knowledge relate to what they already know? What conclusions or generalisations could students make from their results?
- To summarise their discoveries, students could write recounts or reports about the visit. For younger students, work together to collate their observations and evidence into a shared document.
- If your local area doesn't have a marine reserve, can you think about why? Is this a possibility? Where would be a possible location? Why would that location be the most suitable?

## EXTENDING LEARNING

### Citizen science – extending learning with the Marine Metre Squared project

- Compare different sites and regions using the Mm2 website: www.mm2.net.nz. Use the surveys map tab and species map tab to explore citizen science data from the project in your area. How do the species you found compare to other surveys in your region? Find another survey in a similar area and compare your results. Also see: naturewatch.org.nz/projects/marine-metre-squared.
- You could also return to the site in the following year/s to monitor changes in the area.
- Explore citizen science and the Marine Metre Squared project with this Radio New Zealand interview with Sally Carson: www.radionz.co.nz/national/programmes/the-weekend/audio/201784316/citizen-science-marine-metre-squared.
- Make an underwater viewer to enhance your rock pool experience with this Kiwi Conservation Club guide: kcc.org.nz/portfolio/make-an-underwater-viewer.

### Other citizen science projects

- NatureWatch NZ hosts citizen science projects for the following marine reserves:
  - Poor Knights Islands Marine Reserve: naturewatch.org.nz/projects/poor-knights-islands-marine-reserve.
  - Long Bay-Okura Marine Reserve: naturewatch.org.nz/projects/long-bay-okura-marine-reserve.
  - Motu Manawa-Pollen Island Marine Reserve: naturewatch.org.nz/projects/motu-manawa-pollen-island-marine-reserve.
  - Te Matuku Marine Reserve: naturewatch.org.nz/projects/te-matuku-marine-reserve.
- Visit these marine reserves and log the living things you find there through uploading an observation and photo after signing up at naturewatch.org.nz. If you don't know what the species is, upload the photo as 'unknown' and NatureWatch experts can help you identify it.
  - Orca monitoring (NatureWatchNZ): naturewatch.org.nz/projects/orca-monitoring.
  - Fur seal monitoring (NatureWatchNZ): naturewatch.org.nz/projects/nz-fur-seal-monitoring.
  - Auckland King Tides project: auckland.kingtides.org.nz. Snap your coast at a king tide to see the impact of climate change in the future.
  - Project hotspot: https://www.hotspot.org.nz (Taranaki-based project).

## MARINE RESERVES: POSSIBLE LOCATIONS FOR YOUR VISIT

A sample of New Zealand marine reserves suitable for school visits and investigations.

### North Island

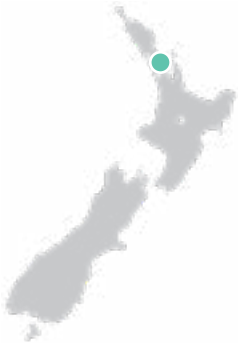
| Marine reserve | | Location |
|---|---|---|
| Whangarei Harbour Marine Reserve | This marine reserve is in a sheltered harbour, close to Whangarei. At Waikaraka you can see mangrove forest and mudflats and at Motukaroro there are shallow and deep reefs.<br>▪ DOC brochure: www.doc.govt.nz/whangarei-harbour.<br>▪ Experiencing Marine Reserves offers guided snorkelling trips to this marine reserve, see: www.emr.org.nz/index.php/about-emr/our-programme.<br>▪ See also 'Visiting Whangarei Harbour Marine Reserve: Notes for schools' in the *Appendix* for other ideas for your visit to this marine reserve. | **Northland**<br>  |
| Cape Rodney–Okakari Point Marine Reserve (Goat Island) | This marine reserve has a range of habitats present, including rocky shore, with an accessible intertidal zone, sandy shore beaches, kelp forest, sponge gardens and more.<br>▪ DOC brochure: www.doc.govt.nz/goatisland.<br>▪ Experiencing Marine Reserves offers guided trips to this marine reserve, see: www.emr.org.nz/index.php/about-emr/our-programme.<br>▪ Goat Island Marine Discovery Centre: www.goatislandmarine.co.nz/groups-tours.<br>▪ See also 'Visiting Cape Rodney-Okakari Point Marine Reserve (Goat Island): Notes for schools' in the *Appendix* for other ideas for your visit to this marine reserve. | **Auckland (North)**<br>  |
| Tāwharanui Marine Reserve | Tāwharanui is a surf beach; there is a short window during low tide for rocky and sandy shore surveys. Cape Rodney-Okakari Point Marine Reserve (Goat Island) (above) is half an hour from this marine reserve.<br>▪ DOC brochure: www.doc.govt.nz/tawharanui-marine-reserve.<br>▪ Tāwharanui Marine Reserve is part of the Tāwharanui Open Sanctuary where you can see a range of threatened and endangered species. See: www.tossi.org.nz for events and possible guided experiences. | **Auckland (North)**<br>  |

## Long Bay–Okura Marine Reserve

The Long Bay-Okura Marine Reserve, 20 km north of Auckland, includes sandy beaches, rocky reefs, estuarine mudflats and mangroves.

- DOC brochure: www.doc.govt.nz/long-bay-okura-marine-reserve.
- Auckland Council offers excellent facilitated education programmes for primary students (Years 1–8) in this marine reserve. For more information see: aucklandcouncil.govt.nz/EN/environmentwaste/educationvolunteering/Pages/learningthroughexperience.aspx.
- MERC (Sir Peter Blake MERC centre) also offers education programmes, see: https://merc.org.nz.
- See also 'Visiting Long Bay-Okura Marine Reserve: Notes for schools' in the *Appendix* for other ideas for your visit to this marine reserve.

**Auckland (North Shore)**

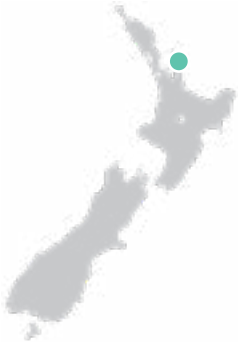


## Whanganui A Hei (Cathedral Cove) Marine Reserve

The majority of this marine reserve is sandy shore beach and loose rock/stony beach.

- DOC brochure: www.doc.govt.nz/te-whanganui-a-hei.
- Experiencing Marine Reserves offers guided trips to this marine reserve, see: www.emr.org.nz/index.php/about-emr/our-programme.
- See also 'Visiting Whanganui A Hei Marine Reserve: Notes for schools' in the *Appendix* for other ideas for your visit to this marine reserve.

**Coromandel**



## Te Tapuwae o Rongokako Marine Reserve

Te Tapuwae o Rongokako Marine Reserve is near Gisborne, on the east coast of the North Island.

- DOC brochure: www.doc.govt.nz/te-tapuwae-o-rongokako.
- See also 'Visiting Te Tapuwae o Rongokako Marine Reserve: Notes for schools' in the *Appendix* for other ideas about activities and experiences at this marine reserve.

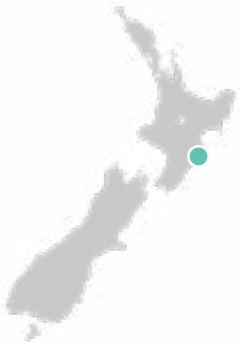
**East Coast (Gisborne)**

## Te Angiangi Marine Reserve

Te Angiangi Marine Reserve is in central Hawkes Bay, on the east coast of the North Island. It includes a range of habitats, including a boulder bank, sheltered bay and intertidal rock platforms.

- DOC brochure: www.doc.govt.nz/te-angiangi-marine-reserve.
- See also 'Visiting Te Angiangi Marine Reserve: Notes for schools' in the *Appendix* for other ideas about activities and experiences at this marine reserve.

**Hawke's Bay**



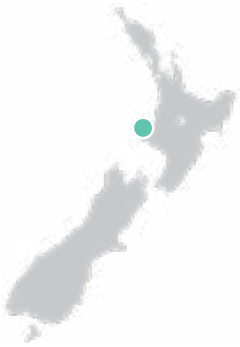
## Tapuae Marine Reserve

Tapuae Marine Reserve is near New Plymouth on the Taranaki coast. This rugged coast is an exposed, changeable environment, but is home to many diverse species.

- DOC brochure: www.doc.govt.nz/tapuae-marine-reserve.
- See also 'Visiting Tapuae Marine Reserve: Notes for schools' in the *Appendix* for other ideas about activities and experiences at this marine reserve.

**Safety – swimming is not recommended here.**
Contact DOC or council for more information

**Taranaki**



## Taputeranga Marine Reserve

This marine reserve is on the south coast of Wellington.

- DOC brochures: www.doc.govt.nz/taputeranga-marine-reserve and www.doc.govt.nz//taputeranga-marine-reserve-brochure.
- Taputeranga Snorkel trail photo map: www.doc.govt.nz/island-bay-snorkel-trail.
- Island Bay Marine Discovery and Education Centre: www.octopus.org.nz. This centre offers education packages for schools: www.octopus.org.nz/content/early-childhood-programmes.

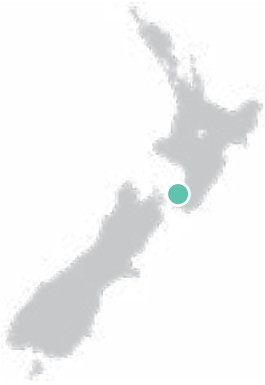
**Wellington**

## Kapiti Marine Reserve

Kapiti Marine Reserve is the fourth largest marine reserve in New Zealand. It is a relatively large reserve, on the west coast of the lower North Island on the Kapiti Coast. Waikanae Estuary Scientific Reserve (landward boundary of the reserve) is adjacent to this marine reserve.

- DOC brochure: www.doc.govt.nz/kapiti-marine-reserve.
- See also 'Visiting Kapiti Marine Reserve: Notes for schools' in the *Appendix* for other ideas for activities and experiences at this marine reserve.

**Wellington**



## South Island

| Marine reserve | | Location |
|---|---|---|
| Punakaiki Marine Reserve | Punakaiki Marine Reserve surrounds the Pancake Rocks and blowholes at Dolomite Point, on the west coast of the South Island. The closest towns are Greymouth and Westport.<br>▪ DOC brochure: www.doc.govt.nz/punakaiki-marine-reserve.<br>▪ Walks in the area: Pancake Rocks and Blowholes Walk (from Paparoa National Park Visitor Centre): www.doc.govt.nz/pancake-rocks-and-blowholes-walk.<br>▪ Truman Track, 3 km down from the Visitor Centre, goes through forest to the reserve: www.doc.govt.nz/truman-track.<br>▪ See also 'Visiting Punakaiki Marine Reserve: Notes for schools' in the *Appendix* for other ideas about activities and experiences at this marine reserve.<br>**Safety – swimming is not recommended here.** Contact DOC or council for more information | **West Coast**<br>  |
| Horoirangi Marine Reserve | Horoirangi Marine Reserve is north of Nelson, along the eastern side of Tasman Bay/Te Tai-o-Aorere.<br>▪ DOC brochures: www.doc.govt.nz/horoirangi-marine-reserve and www.doc.govt.nz/horoirangi-mr-brochure.<br>▪ Boulder Bank, which adjoins the marine reserve, is a significant cultural and historical site. For more information about the Boulder Bank, see: www.doc.govt.nz/boulder-bank. | **Nelson / Tasman**<br>  |

## Hikurangi Marine Reserve, Kaikoura

Hikurangi Marine Reserve is near the township of Kaikoura, at the point where the undersea Kaikoura canyon approaches close to the land.

- DOC brochure: www.doc.govt.nz/hikurangi-marine-reserve.
- This marine reserve is unique, as it is part of the Kaikoura Marine Management Area and the multi-partner agreement: Te Korowai o Te Tai ō Marokura. This agreement is a significant milestone and model for protecting marine ecosystems: www.doc.govt.nz/kaikoura-marine. It includes not only the marine reserve, but also a whale sanctuary, a fur seal sanctuary, two taiāpure and three mātaitai areas.
- Find out more about Te Korowai o Te Tai ō Marokura at: www.doc.govt.nz/te-korowai-brochure.

**Kaikoura**

## Piopiotahi/ Milford Sound Marine Reserve

Piopiotahi Marine Reserve is on the northern side of Milford Sound, stretching from the village of Milford Sound to the Tasman Sea. The closest town to this reserve is Te Anau.

- DOC website: http://www.doc.govt.nz/piopiotahi-marine-reserve.
- A highlight for education groups is the Milford Discovery Centre and Underwater Observatory: www.southerndiscoveries.co.nz/milford-sound/milford-discovery-centre-underwater-observatory.
- Walks in the area: Bowen Falls walk (30 min): Take a short boat trip across the basin and then walk up to the Lady Bowen Falls. See www.doc.govt.nz/milfordroad for other walks in the area.
- See also 'Visiting Piopiotahi/Milford Sound Marine Reserve: notes for schools' in the *Appendix* for other ideas about activities and experiences at this marine reserve.

**Fiordland**

### PROTECT OUR MARINE RESERVES

They are special places that protect the species and habitats within them.

- No fishing of any kind
- Don't take or kill marine life
- Don't remove or disturb any marine life or materials
- Don't feed fish – it disturbs their natural behaviour
- Take care when anchoring to avoid damaging the sea floor
- Call **0800 DOC HOT** (0800 362 468) to report any illegal activity.

## OTHER RESOURCES ABOUT EXPERIENTIAL LEARNING AND VISITING MARINE ENVIRONMENTS

- Education Outside the Classroom (EOTC), a comprehensive website to guide school health and safety planning: eotc.tki.org.nz/EOTC-home.
- For tailored, online health and safety policies to suit your school, see: www.schooldocs.co.nz.
- Habitat Heroes DOC competition and resource. This resource supports outdoor exploration of a local marine environment. Investigate the health of a local marine environment, and decide what conservation actions would improve the health of a local marine environment. See: www.doc.govt.nz/habitat-heroes-marine.
- Learn more about the experiential learning cycle: http://health.tki.org.nz/Key-collections/Curriculum-in-action/Making-Meaning/Teaching-and-learning-approaches/Experiential-learning-cycle.
- Learn more about water safety when snorkelling: Watch *Snorkel safety* from the LEARNZ Marine Reserves virtual field trip: vimeo.com/220902585.
- Explore how real scientists collect and use their data about Adélie penguins in the Ross Sea to make important decisions in 'An ecologist on ice' within 'Are you sure', *Connected*, Level 4, 2013: goo.gl/PsSxnT.
- *Collins field guide to the New Zealand seashore*, by Sally Carson and Rod Morris, published by Harper Collins, 2017. www.harpercollins.com.au/9781775540106/collins-field-guide-to-the-new-zealand-seashore.
- Seaweek website: seaweek.org.nz.