



Experiencing  
Marine Reserves

Tautōhito Āpure Moana



# EMR Educators Manual

Information ~ Pū Kōrero • Experience ~ Tautōhito • Action ~ Mahia



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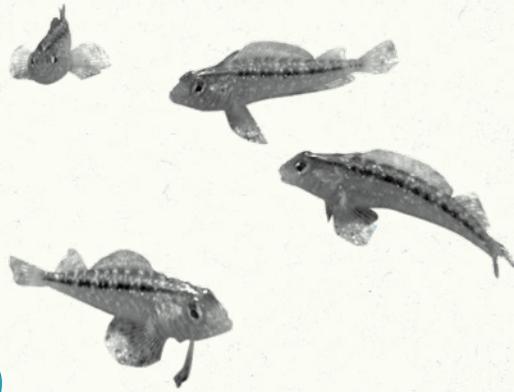


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# Haere mai - welcome



**New Zealand is surrounded by ocean - our oceans are a national treasure for many reasons, but we have begun to see a national decline in many of our fish species. It is only recently that we have begun to understand the bigger impact this has on the rest of our marine environment.**

**Only by working together as a nation towards understanding more about our marine environment can we minimise our impact upon it and conserve what we have for future generations. Marine education is vital in achieving this goal.**

The Experiencing Marine Reserves (EMR) programme empowers schools and communities by providing hands-on experience in the ocean. The aim of EMR is to raise awareness, understanding and involvement in marine conservation through provision of dynamic experiential environmental education opportunities. The full EMR programme involves investigating marine biodiversity within local marine environments before venturing to a fully protected marine reserve. After this experience (and/or research), students are able to compare unprotected and protected areas and are encouraged to put their knowledge into action within the community.

EMR is a professional marine education provider and a programme of the charity (CC #23406) - Mountains to Sea Conservation Trust. Since its establishment in Northland in 2002, programme uptake has expanded and continued to increase throughout the country. The Department of Conservation (DOC) is a foundation partner of the Mountains to Sea Conservation Trust, and has supported the development of the EMR programme since 2002. The Tindall Foundation and DOC Community Fund supports the programme's national expansion and community engagement focus.



Charity number: CC23406

# Marine and Freshwater Education and Conservation

[www.mtsct.marinenz.org.nz](http://www.mtsct.marinenz.org.nz)  
 For all enquiries: [info@emr.org.nz](mailto:info@emr.org.nz)

## Schools and community engagement programmes



[www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz)

- Community Riparian Planting Projects
- Whitebait Spawning Site and Habitat Restoration Projects



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

- Drains to Harbour (Whangarei)
- National Marine and Freshwater Wānanga
- Community Guided Snorkel/Kayak Days



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

- Reef Savers  
[www.reefsavers.nz](http://www.reefsavers.nz)
- 'How to' create a marine reserve proposal  
[www.howtokit.org.nz](http://www.howtokit.org.nz)

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# EMR is a national programme of experiential learning about marine conservation.

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## The essence of the programme:

- Introduction to marine biodiversity
- Investigation of local marine area
- Marine reserve experience or research
- Comparisons between unprotected and fully protected areas
- Action for the marine environment

## Our Main Focus

### Marine Education

Providing quality marine education opportunities to schools, communities and professionals.

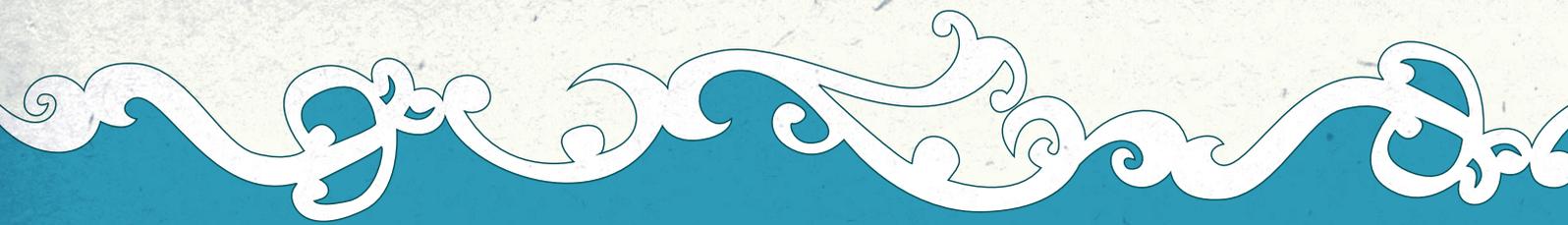
### Marine Conservation

Increasing awareness, encouraging action and support for marine conservation in New Zealand.

### Empowering Communities

Providing schools and their communities with the expertise and knowledge to experience their local marine environment first-hand, leading to local communities understanding marine conservation issues in their local area and fostering kaitiakitanga.





● Imagine snorkelling amongst a dense kelp forest, surrounded by dozens of fascinating new life forms. A frenzy is created on top of the water. Someone has spotted a crayfish, and everyone is taking turns to dive under to get a glimpse of a cray crouching under a ledge. Students come up gasping for breath, but feel reassured by their adult supervisor and bright yellow body board for time out.

● Large snapper cruise past to see what the fuss is about. Gurgling sounds come from a snorkel, while an eagle ray rests on the sand below.

● The kids are easy to spot in their bright yellow and black wetsuits. The parents come in buzzing, and the kids madly tell their mates about how big the snapper they swam with was and how many different fish they saw.



**Snorkelling enables an insight into the marine world. Even standing in waist-deep water looking about with a mask on is an experience!**

## EMR Snorkelling Objectives:

- 1 Experience marine life first-hand
- 2 Build water safety and confidence in the real environment
- 3 Encourage snorkelling as a recreational and fun activity
- 4 Instil caring attitudes and passion for the conservation of the ocean
- 5 Encourage emotional connection to marine environment

Refer to our standard operating procedures on [www.emr.org.nz/index.php/about-emr/health-safety](http://www.emr.org.nz/index.php/about-emr/health-safety)

## Our Offer

EMR coordinators offer guidance, direction and coordination of classroom exercises and field trips to the ocean. We also provide snorkel equipment, instruction, resources and snorkel risk management. For many students, it is their first time using snorkel gear. Our EMR snorkelling experiences aim for a 1:2 adult/student ratio for Year 8's and below (1:4 max), with the result being the active involvement of many whanau and community members.

## Main Curriculum Links

- Science – Living World, Ecology and Evolution
- Social Science
- Health and PE

## Success Criteria (Learning Outcomes)

Students will be able to:

- Give at least three examples of New Zealand marine biodiversity and explain what a marine reserve is
- Explain and use snorkel equipment
- Describe their local marine area and what lives in it
- Identify and classify some of the marine creatures they see and local threats
- Make comparisons between a marine reserve and unprotected marine area; base their opinions about the value of marine reserves on their personal experiences and learning throughout EMR
- Take action in their community - become kaitiaki!





## Key understandings for teachers

- Snorkelling is run in accordance with the EMR Standard Operating Procedures (SOP's for snorkelling), SMS and best practice standards.
- That it is important EMR action projects reach beyond the school environment
- That teaching and activities retain a New Zealand focus - meaning 'no clown fish'!

## The EMR programme big picture outcomes:

- Promotes education for sustainability and environmental enlightenment
- Information transfer and opportunities for community development
- Inspires action for the marine environment
- Builds safe snorkelling and water safety skills
- Increased awareness, knowledge and involvement in marine conservation
- Empowerment to make a difference in tomorrow's management of the marine environment
- Media opportunities
- Changes in attitude
- Promotes youth leadership
- Increased support for marine conservation
- Hands-on educational opportunities for 'learning by doing' learners
- Specialist snorkel programmes for different ages and abilities
- Participants learn about marine life
- Promotes ethic of Kaitiakitanga
- Embraces Māori culture





## Where and when does EMR operate?

The EMR programme has been operational in Northland since 2002 and available to other parts of New Zealand since 2004. Go to [www.emr.org.nz](http://www.emr.org.nz) to find national contact details. Due to the seasonal nature of the programme, it is offered in terms one and four when the weather is warmer and more suitable for snorkelling. Contact EMR at [info@emr.org.nz](mailto:info@emr.org.nz) to find out more.

## Our teaching and learning approach

Our programmes offer students, parents and community members a positive insight to environmental realms. Student participation and interaction maximise their depth of understanding and challenge minds in a way not possible by reading from a book or the internet. We focus on getting out into the environment and learning through experience.

Programme delivery methods cover four learning styles - auditory, visual, tactile and kinaesthetic - providing an appropriate mix designed to fully engage anyone in effective learning. The experiential learning aspects of the programme are especially suited to strongly kinaesthetic students who are often less catered for in 'normal' classroom situations. These students, will often come to life during our field trips.

**Refer to the EMR School Responsibility Agreement**

- the most important part -

# EMR Action

**After experiencing their local marine environment and the fully protected marine reserve, participants are encouraged to lead action projects and become kaitiaki of their marine environment.**

Over the years students have been involved in a range of action projects, from writing letters to their local authorities and Members of Parliament, presentations in front of assembly and public events, investigating where marine protected areas would go, supporting marine reserve proposal groups and addressing local issues in their community such as sand dune erosion.

The action component of the EMR programme is an essential factor in the students' learning process and one which helps us to assess the effectiveness of the programme at meeting the projected learning and conservation outcomes. By encouraging students to undertake action, which is based on their own experience, EMR aims to empower students and encourage support for marine conservation.

# EMR Action – case studies

## **Dargaville Intermediate's**

action projects included raising funds for the critically endangered Maui's dolphin (as few as 48 remain), with Dargaville's west coast being the Northern most habitat range. Some of their other projects included swimathons, selling baking at markets, or busking to fundraise for sea turtle, whio (blue duck), sperm whale and shark conservation projects. Some focused on marine pollution and beach clean ups, while others looked into local issues such as vehicles on dunes and signs to help protect birds such as the New Zealand Dotterel. Drain stencilling was also conducted within the school grounds. Overall the students raised almost \$2000 for the various conservation projects, which will result in donations to organisations involved in Maui dolphin conservation and to Dan Godoy's turtle conservation research as part of his PhD with Massey University.

## **The Whangarei Home Schoolers Group**

made a display at the Whangarei Public Library with an active focus on increasing awareness of the Whangarei Harbour Marine Reserve and its boundaries. Working with home schoolers is extremely effective in achieving outreach into the community, due to the high level of parental input.

## **Okaihau Primary School**

held a marine reserve information evening at the Okaihau College marae and invited the community to attend. They performed skits and waiata, and their presentation was followed by shared kai!

## **Waiheke and Great Barrier Island schools**

surveyed shellfish numbers and sizes on their local beaches. Gathering real, relevant data to assess the health of their marine environment has proven to be a practical and fun way for students to further develop their knowledge and understanding. Each site was surveyed and transect lines were mapped using aerial photos and GPS technology to ensure the same sites were sampled each year. Follow up classroom work was based around statistics, with teachers appreciating the ability to use real data that students have collected to create graphs and tables.

## **Kamo Intermediate School and Whau Valley School**

made language a follow-up focus and wrote letters to their district council campaigning for toilets and changing facilities at the car park above the newly established Whangarei Harbour Marine Reserve. As a result, the council have since established a toilet facility at the carpark.

## **Whangarei Intermediate**

got excited about a variety of topics and wrote letters to the editor of a local newspaper on issues such as marine pollution, bottom trawling, critically endangered Maui's dolphins and marine reserves. One student made a t-shirt to campaign against the damaging techniques of bottom trawling.

**Opua School** used music, drama and technology to perform their marine reserve skit and waiata to the Minister of Conservation and other dignitaries at the opening of the Whangarei Harbour Marine Reserve, as well as in front of their parents during a public community evening.



**Te Huruhi Primary** on Waiheke Island showed their marine reserve video on the ferry between Auckland and Waiheke. They also made a DVD to take action for Maui dolphins <http://www.youtube.com/watch?v=UTOqbQSuVRY>

**Whangarei Heads School** held a marine conservation information evening.

**Russell Primary** produced some amazing work including surveys of marine reserve opinions of their fellow school mates, 3D artwork and cool poems. Their work was on display at the local information centre, so it could be seen by a wider audience.

**Kamo Intermediate** students made individual submissions for a real local marine reserve application.

**Orakei School** set up a display about the value of marine reserves and presented their powerpoint at the local shopping mall.

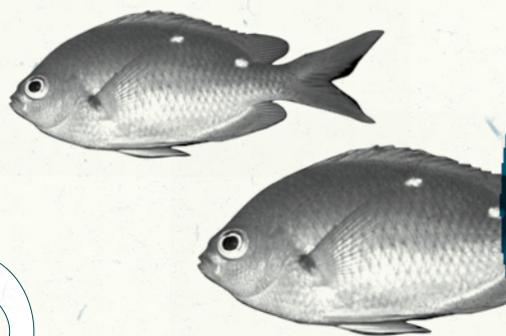
**Onerahi Primary** school made billboards to show their support for their local marine reserve, which they displayed outside their school and on the road to the marine reserve.

**Pompallier Catholic College** made an awesome marine reserve billboard to be displayed at the Whangarei Harbour Marine Reserve.

**Moerewa School** made a presentation to whanau on the marae outlining the 'kina barren' issue.

**Mahurangi College** have held community expo evenings to showcase individual action projects such as this project to propose a marine reserve - <https://www.youtube.com/watch?v=mbxRsN4bKjk>

**PLEASE NOTE**  
These are action examples from the time of EMR participation and may not necessarily be ongoing.



# Education for Sustainability

## NZ Curriculum – Unit Planner

**EMR Aim:**  
**To raise awareness, understanding and involvement in marine conservation through provision of dynamic experiential environmental education opportunities.**

### Key Learning Areas

Science, Social Science and Health and PE

### Vision

- Life Long Learners  
– informed decision makers
- Connected – connected to the land and environment
- Actively involved – contributes to the well being of New Zealand – social, cultural, economic and environmental

### Values

- Innovation, inquiry, curiosity
- Diversity
- Community and participation
- Ecological sustainability

### Principles

- Community engagement
- Future focus

### Key Competencies

- Thinking, participating and contributing, relating to others and managing self.

## Teaching and learning objectives

### Science

Living World - Ecology - Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human induced.

Evolution - Begin to group plants, animals and other living things into science-based classifications.

### Social Science

Students will gain knowledge, skills and experience to:

Understand how:

- Groups make and implement rules and laws
- Cultural practises vary but reflect similar purposes
- People view and use places differently
- People participate individually and collectively in response to community challenges

### Health and PE

Personal Health and Physical Development - Safety management – Identify risks and their causes and describe safe practises to manage these. Access and use information to make and action safe choices in a range of contexts.



School: \_\_\_\_\_  
Date: \_\_\_\_\_

## Education in the environment:

- Investigating the local area, snorkelling in a marine reserve, onshore activities at local marine area and marine reserve

### Investigate and learn about:

- the variety of marine life, researching how people use the local marine area, research the benefits of marine reserves, research the process for development of a marine reserve proposal and find out the different points of view of people who use or do not use the marine reserve area.

### Education for the marine environment:

Actions like:

- Report to the local community; create a pamphlet for distribution; produce and perform a role-play; make a Youtube clip or photo-story to provide information to the public; address a local marine issue; or start a marine conservation campaign.

## Concepts

### Show knowledge and understanding of:

- The interdependence of living things in the marine environment.
- The impact people have had, and can have, on the marine environment.
- The significance of marine reserves for protecting and enhancing marine biodiversity.
- The importance of working together as local communities, including the ethic of Kaitiakitanga (stewardship).

## Reflection

- EMR journal continuum (before and after programme)
- Timeline of events, students contribute feelings on a board in the class
- Direct observations
- Koosh ball activity

## Evidence

(may be collected through a variety of media)

- Student voice
- Work and actions produced for the marine environment
- Student and teacher evaluations



# EMR Learning Experiences

Also refer to the EMR/School Responsibility Agreement Provided by EMR coordinator (full programme only)

## PROVIDED BY EMR

### Initial visit to school

- Planning and preparation with teachers involved

### Introduction lesson in the classroom

- Explanation of EMR programme
- Multi-media presentation about marine biodiversity
- Discussion around the 'EMR marine taonga/treasure chest'
- Explanations of marine inter-relationships (the 'kina barren' story – how a living thing has responded to environmental changes, both natural and human induced)
- Deep sea marine biodiversity adaptations
- Threats to our marine environment
- Make comparisons between land and sea conservation
- Introduce the concept of marine reserves

### Snorkel Skills

(subject to pool availability)

- Preparation required for students/ participants to participate safely in the snorkel activity, including but not limited to snorkel safety briefings
- Snorkel skills in pool environment

### Local Area Investigation

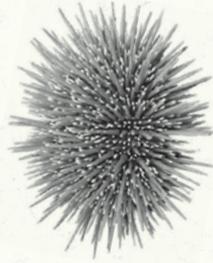
- Snorkel safety briefings (as above)
- Snorkel skills in shallow water (if area suitable)
- Responsibility for all in water leadership and decisions with regards to safety around snorkelling activity
- Snorkel and marine life debrief

### Marine Reserve or protected area investigation

- Introductory briefing includes snorkel safety management systems for the day and expected marine life to be encountered
- Debrief includes overview of findings

### Follow up visit (at school)

- Review student reporting (ACTIONS)



## PROVIDED BY TEACHERS

### After introduction lesson

- Visit the Curriculum section [www.emr.org.nz](http://www.emr.org.nz)
- Set up a nature enquiry table
- Adaptations Activity 1 and ABC Activity 6
- Investigate responses in EMR learning journal
- Investigate the fishing regulations, Activity 8
- Get students to design their own RAMs

### During snorkel skills and local area investigation

- The school remains responsible for activities on the shore - shore activities, and behaviour management remain under the control and responsibility of the teacher/parent in charge
- The school provides appropriate parental/community/teacher supervision for land activities
- Possible rotational ideas: mmm2, human impacts and uses (learning journal) and treasure hunt (learning journal)

### After the local area investigation

Through research and investigation, the students will:

- Complete Activity 10 for story writing
- Learn about existing and proposed marine reserves in New Zealand
- Establish a collection of newspaper articles, internet and other information about marine reserves see [www.marinenz.org.nz](http://www.marinenz.org.nz)

- Find out about who manages marine reserves and what happens if the rules are broken (Activity 20)
- Learn about indigenous New Zealand and the coast, Activity 9
- Study human impacts - Who dirtied the harbour? Activity 15

### During marine reserve investigation

- The school remains responsible for activities on the shore - shore activities, and behaviour management remain under the control and responsibility of the teacher/parent in charge
- Possible rotational activities: Rock pool treasure hunt (learning journal), marine reserve interpretation quiz (learning journal – Goat Island only) and glass bottom boat ride (Goat Island)

### After the marine reserve investigation

- Complete EMR learning journal
- Brainstorm action ideas. What is an acoustic poem? (see page 17)
- Use the EMR action planner for students to decide on, organise and participate in an individual and group marine action. Individual ideas include: radio interviews, letters to newspapers and/or members of parliament. Group activities could include: assembly or evening community presentations, monitoring shellfish and/ reef fish and presenting results.

### English – Reading

Read and interpret 'The hungry kina' - Activity 6  
Read and interpret a feature article for positive and negative discussions about marine reserves - Activity 22

### English – Writing

Report writing - Letters to local MPs  
Story writing - Activity 10  
Comparisons inside and outside of the marine reserve – EMR learning journal  
Public speaking

### English – Oral and Visual

Speeches  
Marine reserve role play - Activity 23  
Writing marine waiata  
Marketing marine conservation - Activity 14  
Presentations and storyboards

### Maths

Interpreting graphs Activity 20  
Make a graph using information collected from own fish survey 'Yes, marine reserves actually work' - Activity 22.



## Linking learning areas – suggested activities

### Science

Grouping (classify) Living things - Activity 12  
Word wall - Activity 5  
What do the scientists say? - Activity 11  
Kermadec marine biodiversity focus - Activity 4

### Social Science

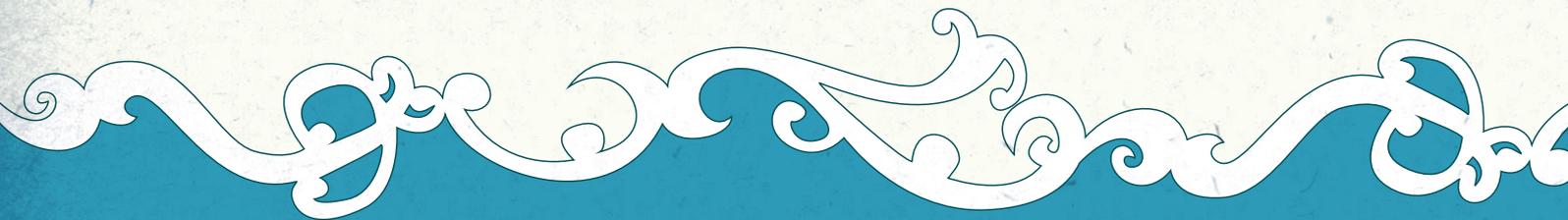
Human impact investigation  
– EMR learning journal  
Where, who, when, why, what & how? Use the Maui dolphin for example - Activity 3  
Marine reserve and land reserves - Activity 18  
Research the current number of marine reserves around New Zealand [www.doc.govt.nz](http://www.doc.govt.nz)

### Art

Diorama – comparisons inside and out  
ABC in the sea - Activity 6  
**Technology**  
PowerPoint presentations – make a PowerPoint about your EMR experience and action for the marine environment.  
Photo stories

### PE/Health

Physical safety procedures, students write their own RAMs, based on EMR snorkel guidelines  
Snorkelling skills – complete quiz in learning journal  
Contribute to a healthy community and environment group



## EMR activity guide

These activities have been selected to guide you through the progression of the EMR programme. The activities can be adopted to different parts of New Zealand and relate to EMR's success criteria (page 9). Focus first on the biodiversity found in New Zealand's rich and complex marine environment, from subtropical to the subantarctic, with over 15,000 known species.

We encourage you to explore your local marine environment and local threats (human impacts). Let your action projects be inspired and sculptured by your students experiential learning in the marine environment. If you get stuck for action ideas, see activity 24 to 28. Students become kaitiaki of the sea and together they make a difference!



### Success Criteria One

Give at least three examples of New Zealand marine biodiversity and explain what a marine reserve is.

- Activity 1:** Adaptations – Creature feature (all year levels) **Pg 20**
- Activity 2:** Food webs (all year levels) **Pg 20**
- Activity 3:** Maui dolphin - Where, who, when, what, why and how? (year 4 and up) **Pg 21**
- Activity 4:** Kermadec marine biodiversity focus (year 5 and up) **Pg 21**
- Activity 5:** Marine word wall (year 5 and up) **Pg 22**

### Success Criteria Two

Explain and use snorkel equipment

### Success Criteria Three

Describe their local marine area and what lives in it and identify local threats

- Activity 6:** ABC in the sea (year 1 and up) **Pg 26**
- Activity 7:** Triplefin focus (year 1 and up) **Pg 26**
- Activity 8:** New Zealand fishing rules (all year levels) **Pg 26**
- Activity 9:** Indigenous New Zealanders and the coast (year 4 and up) **Pg 27**
- Activity 10:** Story writing (all year levels) **Pg 27**
- Activity 11:** What the scientists say (all year levels) **Pg 27**

### Success Criteria Four

Identify and classify some of the marine creatures seen and local threats

- Activity 12:** Marine classification (recommended for year 6 and up) **Pg 28**
- Activity 13:** Marine threats (year 3 and up) **Pg 28**
- Activity 14:** Marketing marine conservation (all year levels) **Pg 28**
- Activity 15:** Who dirtied the harbour? (year 2 and up) **Pg 29**

### Success Criteria Five

Make comparisons between the marine reserve and their local marine area

- Activity 16:** A very hungry kina (year 1 and up) **Pg 30**
- Activity 17:** Acrostic poem (year 4 and up) **Pg 30**
- Activity 18:** Marine reserve versus land reserve (year 4 and up) **Pg 18**
- Activity 19:** Marine protection match up (year 3 and up) **Pg 32**
- Activity 20:** Interpreting graphs (year 3 and up) **Pg 33**

### Success Criteria Six

Base their opinions about the value of marine reserves on their personal experiences and learning throughout EMR

- Activity 21:** Marine reserve management (year 5 and up) **Pg 34**
- Activity 22:** The different marine reserve points of view (year 6 and up) **Pg 35**
- Activity 23:** Yes, marine reserves actually do work (year 5 and up) **Pg 37**
- Activity 24:** Marine reserve role play (all year levels) **Pg 40**

### Success Criteria Seven

Take action in their community - become kaitiaki!

- Activity 25:** Conduct a marine metre squared survey (all year levels) **Pg 41**
- Activity 26:** Design your own marine reserve (all year levels) **Pg 41**
- Activity 27:** Support sea turtle research (all year levels) **Pg 42**
- Activity 28:** Support the extension of the Kermadec Marine Reserve (year 3 and up) **Pg 43**
- Activity 29:** Reef savers (year 8 and up) **Pg 43**

**Note: Suggested year levels are a guide only.**

# Success Criteria One

Give a least three examples of New Zealand marine biodiversity and explain what a marine reserve is.

New Zealand Marine biodiversity information  
<http://www.biodiversity.govt.nz/picture/biodiversity/what/coastal.html>

Note: If participating in the full EMR programme, this information will be covered in your EMR classroom introduction presentation.

## ACTIVITY 1: Adaptations – Creature Feature

### Teacher instructions:

Students to research adaptations in the New Zealand deep sea habitat. <http://www.teara.govt.nz/EarthSeaAndSky/SeaLife/DeepSeaCreatures/3/en>

Students research their deep sea or other marine animal/plant, including finding the scientific and Māori name (if applicable), size and where it lives (make sure the creature has a New Zealand context). Students should identify the different features and what they are used for and list three interesting facts. Students should identify and compare a range of different features/adaptations of marine animals e.g. fins, eyes, gills, tails, eggs and body shape.

### Student activity:

Show in a class presentation or report how different features are useful in assisting with survival in different environments or conditions e.g. a hard shell and strong foothold would be useful on the rocky shore but not in the open ocean.

### Extra for experts:

Bryozoan creature feature  
<http://sciencelearn.org.nz/Contexts/Life-in-the-Sea/Looking-Closer/Bryozoans>  
<http://sciencelearn.org.nz/Contexts/Life-in-the-Sea/Sci-Media/Video/Bryozoans-role-in-the-ecosystem>

## ACTIVITY 2: Food Webs

### Teacher instructions:

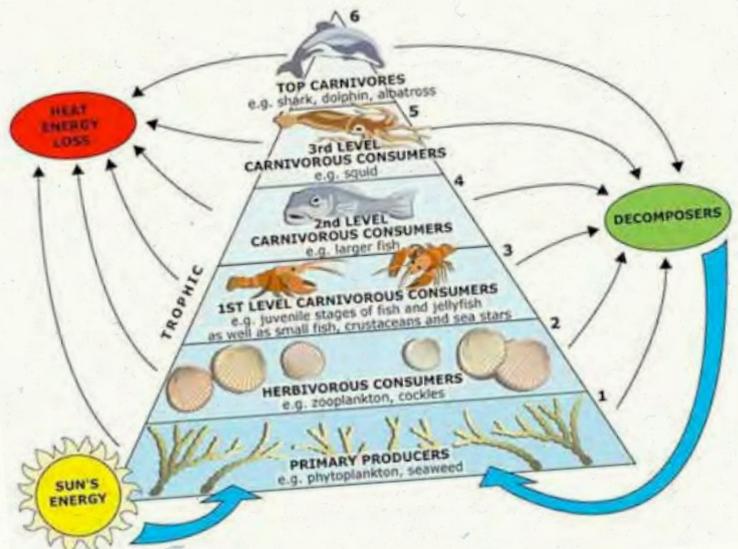
Make a food web pyramid like the one in this page (copyright University of Waikato) for your marine area. <http://sciencelearn.org.nz/Contexts/Life-in-the-Sea/Science-Ideas-and-Concepts/Marine-food-webs>

Also refer to EMR's virtual marine reserve experience: <http://www.emr.org.nz/index.php/education/virtual-marine-reserve-experience>

Try the [living blue foodweb game](#)

### Student activity:

What are kina barrens? How are they created? <http://www.fishforever.org.nz/why-no-take/35-ever-seen-a-kina-barren.html>. Make a diagram to explain this. Read the 'Very hungry kina' and make a role play or illustrate and write your own book. [http://emr.org.nz/images/emr/pdf/educators/The\\_very\\_hungry\\_kina\\_A\\_Arnold.pdf](http://emr.org.nz/images/emr/pdf/educators/The_very_hungry_kina_A_Arnold.pdf)



### ACTIVITY 3:

## Maui Dolphin - Where, Who, When, What, Why and How?

### Teacher instructions:

Students to research Maui dolphin at [http://www.panda.org/what\\_we\\_do/endangered\\_species/cetaceans/about/hectors\\_dolphin/mauis\\_dolphin/](http://www.panda.org/what_we_do/endangered_species/cetaceans/about/hectors_dolphin/mauis_dolphin/)

### Student activity:

Find out where Maui dolphin live, how many are there, who is involved in their protection, what are people doing to help, when is the action taking place, why is this happening, and how can you help?

### Student action:

Display your information at a public place, write to the Government, sign online petitions, make dolphin cookies as a fundraiser and donate proceeds to the Maui dolphin NZ campaign. (also relates to success criteria 7)

### ACTIVITY 4:

## Kermadec Marine Biodiversity Focus

### Teacher background:

Situated between mainland New Zealand and Tonga, the remoteness and subtropical location of the Kermadecs have combined to forge unique flora and fauna.

The reef communities are transitional between tropical coral reefs and temperate rocky reefs. Algae forests, common along mainland New Zealand are absent and instead rock faces are covered in turf-forming algae. Individual hard corals are common. Intertidal and shallow subtidal rock faces down to three metres are dominated by giant Kermadec limpets. The planktivorous demoiselle and Kermadec demoiselle are the most common reef fish. There is only one triplefin known to the Kermadecs and it is endemic. Two large predators play a major role on the Kermadec reefs, the Galapagos shark and the spotted black grouper, for which the Kermadec Islands support the only remaining large population in the world. For more info on the Kermadecs refer to [http://www.forestandbird.org.nz/files/file/KermadecsSanctuarybooklet\\_2014.pdf](http://www.forestandbird.org.nz/files/file/KermadecsSanctuarybooklet_2014.pdf)

Wade Doak and the EMR programme refer to marine reserves as 'wet libraries' – the Kermadecs are like a 'wet museum' due to the number of endemic creatures!

### Teacher instructions:

Watch the EMR Kermadec clip: <https://www.youtube.com/watch?v=8kIYhIJWsCk>

### Student activity:

Make a list of the plants and animals that you might see. How would you group them? Use some of the examples below to help.

a. 'plant' or 'animal' b. 'vertebrates' or 'invertebrates'

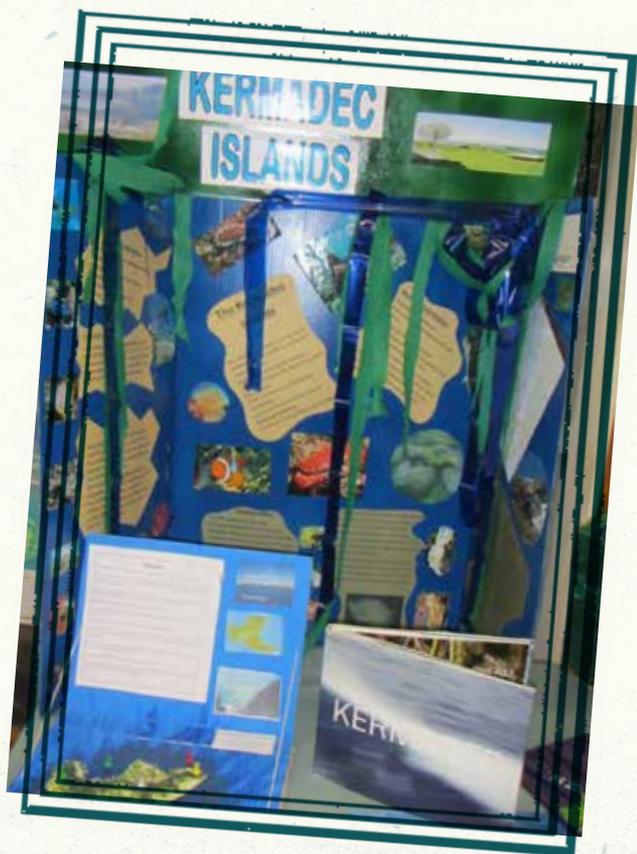
What does endemic mean? Can you give an example of an endemic Kermadec creature?

Biology focus – Spotted black grouper – find out five interesting facts (Kermadec resources are also found on the curriculum section on [www.emr.org.nz](http://www.emr.org.nz))

### Extra for experts:

Have you ever found pumice on the beach and wondered where it came from? <https://griffithreview.com/articles/hitching-a-ride/>

Read the NIWA blog <http://www.niwa.co.nz/blogs/critteroftheweek/166>. A fun art activity could be to make a pumice pyramid or wall hanging.



**ACTIVITY 5:****Marine Word Wall****Teacher instructions:** Cut up the words and the meanings.**Student activity:** Students to match the words with the meanings.

|                          |   |
|--------------------------|---|
| <b>Abundance</b>         | Plenty, more than enough.   |
| <b>Abyssal</b>           | The bottom zone of the ocean, lying between 4,000 and 6,000 m.  |
| <b>Algae</b>             | Primitive plants ranging from unicellular organisms to large seaweeds, forming the base of the complex oceanic food webs. They are becoming more economically important as a human food source, particularly in Asia. |
| <b>Anadromous fish</b>   | A fish that spends most of its life feeding in the open ocean but that migrates to spawn in fresh water.  |
| <b>Aquaculture</b>       | The culture of aquatic organisms.   |
| <b>Baleen</b>            | Horny material growing in comb-like, fringed units from the upper jaws of whales of the order Mysticeti.  |
| <b>Benthic</b>           | The area of the sea bottom; organisms that occur on the sea bottom.   |
| <b>Biodiversity</b>      | Variety of all life on earth including the genes they contain and the ecosystems they form.   |
| <b>Biogeographically</b> | Life in a specific geographical area.   |
| <b>Bioluminescence</b>   | Light emission, often as flashes, by many marine organisms.   |
| <b>Blubber</b>           | The layer of lipid that serves as an insulating layer under the skin of whales and other marine mammals.  |
| <b>Bryozoans</b>         | Filter feeding, coral like creatures.   |
| <b>Bycatch</b>           | Catching species during fishing that were not intended to be caught.  |
| <b>Carnivorous</b>       | An animal that consumes other animals as food.  |
| <b>Catadromous fish</b>  | Fish that spawns in seawater but feed and spends most of its life in estuarine or fresh water.  |
| <b>Cetacea</b>           | The order of mammals that contains the whales and porpoises.  |
| <b>Competition</b>       | An interaction between or among two or more individuals or species in which exploitation of resources by one affects any others negatively.   |
| <b>Continental shelf</b> | The shallow underwater extension of a continent; usually limited in depth to 200m.  |
| <b>Coral Reef</b>        | Massive limestone structure built up through the constructional cementing and depositional activities of secreting organisms. Note: There are no coral reefs in New Zealand.  |

|                                      |  |
|--------------------------------------|--|
| <b>Deforestation</b>                 | Stripping the land of its forest.  |
| <b>Dredging</b>                      | The removal of sediment from estuaries to form harbours, or from natural harbours and rivers to deepen them for navigation of boats and ships.   |
| <b>Ecosystem</b>                     | A biological community and its physical environment.   |
| <b>Erosion</b>                       | Wearing away of earth's surface by wind or water.  |
| <b>Estuary</b>                       | A semi-closed body of water that has a free connection with the open sea and within which seawater is diluted measurably with fresh water derived from land drainage   |
| <b>Exclusive Economic Zone (EEZ)</b> | 200 mile limit out to sea belonging to New Zealand.  |
| <b>Exoskeleton</b>                   | An external supporting skeleton, commonly found in arthropods.   |
| <b>Food Chain</b>                    | The pathway that transfers energy from a given source plant or plants through a series of consumers.   |
| <b>Food web</b>                      | The combination of all food chains in a given community or ecosystem.  |
| <b>Global warming</b>                | Increase in average global temperature due to build-up of gases such as CO <sub>2</sub> , NO <sub>2</sub> , and chlorofluorocarbons in the atmosphere.   |
| <b>Grazer</b>                        | An animal that feeds on plants or other sessile animals.   |
| <b>Herbivore</b>                     | An animal adapted to feed only on plants.  |
| <b>Holdfast</b>                      | A structure that attaches seaweed to the sea bottom or other substrates.   |
| <b>Habitat</b>                       | The place where an organism can be found.  |
| <b>Intertidal</b>                    | Benthic area lying between extremes of low and high tide.  |
| <b>Invertebrate</b>                  | All kinds of animals lacking a backbone, from protozoans to insects and starfish.  |
| <b>Keystone species</b>              | Have very important functional roles; fluctuations in their populations can have very significant impact on the entire community in which they live.   |
| <b>Larvae</b>                        | Immature insect (animal) after leaving egg.  |
| <b>Mangrove forest</b>               | A shoreline ecosystem dominated by mangrove trees, with associated mudflats.   |
| <b>Marine Reserve</b>                | Fully protected marine areas where there is no fishing and no extractive use. Non-consumptive uses such as swimming, diving and recreational boating are permitted up to levels which do not harm the environment. |
| <b>Mtaitai</b>                       | Discrete area of traditional importance to Maori, where Tangata Whenua are authorised to manage the area.  |
| <b>Migration</b>                     | Move from one place to another, for example from the sea to fresh water streams.   |
| <b>Niche</b>                         | The role of an organism in a community.  |

|                                |  |
|--------------------------------|--|
| <b>Omnivore</b>                | An organism that consumes both plant and animal material.  |
| <b>Organism</b>                | Living animal or plant; anything capable of growth and reproduction.   |
| <b>Pectorals</b>               | The fins on the side of a fish's body.   |
| <b>Pelagic</b>                 | Living in the water column; the open ocean water of the shelf-slope break.   |
| <b>Photosynthesis</b>          | Process occurring in green plants, by which they use the energy of sunlight to synthesise energy-rich organic compounds from carbon dioxide and water.   |
| <b>Plankton</b>                | Tiny bacteria, plant or animal life found floating in the ocean. Plankton is the base of the ocean food chain.   |
| <b>Predator</b>                | An animal that feeds on another animal.  |
| <b>Quota Management System</b> | QMS - a rights-based regime for commercial fishing that was established by the Fisheries Act (1983).   |
| <b>Rāhui</b>                   | Total ban on harvesting seafood, due to tapu by loss of life at sea, pollution, or to guard against over-exploitation.   |
| <b>Scavenger</b>               | An animal that feeds on the dead remains of other animals and plants.  |
| <b>Seamount</b>                | An undersea volcano.   |
| <b>Sessile</b>                 | An organism that is fixed in place, attached to the substrate.   |
| <b>Spawning</b>                | The release of eggs.   |
| <b>Tangaroa</b>                | God of the sea.  |
| <b>Terrestrial</b>             | Of or living on land.  |
| <b>Territory</b>               | An area occupied and protected by a species against others of its own species, usually for breeding or feeding purposes.   |
| <b>Tide</b>                    | Periodic rise and fall in the surface water of the oceans due to gravitational attraction of the sun and moon and the rotation of the earth.   |
| <b>Trophic</b>                 | Level in the food chain.   |
| <b>Trophic structure</b>       | Position of an organism in the food chain, determined by the number of transfers of energy that occur between the non-living energy source and that position. Trophic levels include producers (seaweed etc) and several levels of consumers (animals eating plants, animals eating animals etc). All trophic levels must be maintained to secure the trophic structure. |
| <b>Zonation</b>                | Prominent horizontal bands of organisms that succeed each other vertically.  |

## Success Criteria One – Extra links

Marine protected areas information  
<http://www.doc.govt.nz/conservation/marine-and-coastal/marine-protected-areas/>

Marine reserve information  
<http://www.marine-reserves.org.nz/>

No-take Marine Reserves, Part 1 by  
Dr Roger Grace [http://www.youtube.com/  
watch?v=AReMLupmm4g&feature=plcp](http://www.youtube.com/watch?v=AReMLupmm4g&feature=plcp)

No-take Marine Reserves, Part 2 by  
Dr Roger Grace [http://www.youtube.com/  
watch?v=d5tXq-W-9Fo&feature=plcp](http://www.youtube.com/watch?v=d5tXq-W-9Fo&feature=plcp)

Generalisation of marine habitat changes  
at Goat Island - an animation  
[http://www.youtube.com/  
watch?v=BjaMbASpKCU&feature=plcp](http://www.youtube.com/watch?v=BjaMbASpKCU&feature=plcp)

Marine reserve animation [http://www.youtube.  
com/watch?v=uAQQAcbt15w&feature=plcp](http://www.youtube.com/watch?v=uAQQAcbt15w&feature=plcp)



## Activity Ideas:

Design a poster showing what you have learnt  
about marine reserves.

Perform a waiata or rap including all the facts  
your class knows about marine reserves.

What are the marine reserve rules?

## Success Criteria Two

**Explain and use snorkel  
equipment.**

EMR practical pool session and  
ocean snorkel experiences. Refer to  
the [EMR Snorkel Guidelines](#) and the  
[EMR Learning Journal](#) for Activities

### Student activity:

After participating in EMR make your own book  
or video for safe snorkelling.



# Success Criteria Three

Describe their local marine area and what lives in it and identify local threats.

## ACTIVITY 6: ABC in the Sea

### Teacher instructions:

Brainstorm as a group to come up with the name of a sea creature to match every letter of the alphabet e.g. A = Anemone, B = Blue cod, C = Crab. Choose sea creatures and images from New Zealand waters.

### Student activity:

Each of the students to pick one of the sea creatures (or they can be assigned) to illustrate on a piece of card with the sea creature's name written in both Māori and English under the appropriate letter. Students could also add some key facts about their creature.

The cards can then be displayed around the classroom in alphabetical order.

## ACTIVITY 7: Triplefin Focus

### Teacher instructions:

Use your Young Ocean Explorers DVD (delivered free to every school in August 2015) to learn about triplefins.

### Student action:

Make a poster or community display to encourage people to look out for triplefins while snorkelling.

## ACTIVITY 8: New Zealand Fishing Rules

### Teacher instructions:

Students to research New Zealand fishing rules and regulations that apply in their area, including shellfish and fish species, the daily limits and sizes (info from the Ministry for Primary Industries website: [www.mpi.govt.nz](http://www.mpi.govt.nz)). Students could also research the different gathering methods and regulations.

### For discussion:

Discuss some of the marine life that does not have a limit (e.g. seahorses - how do we protect them?)

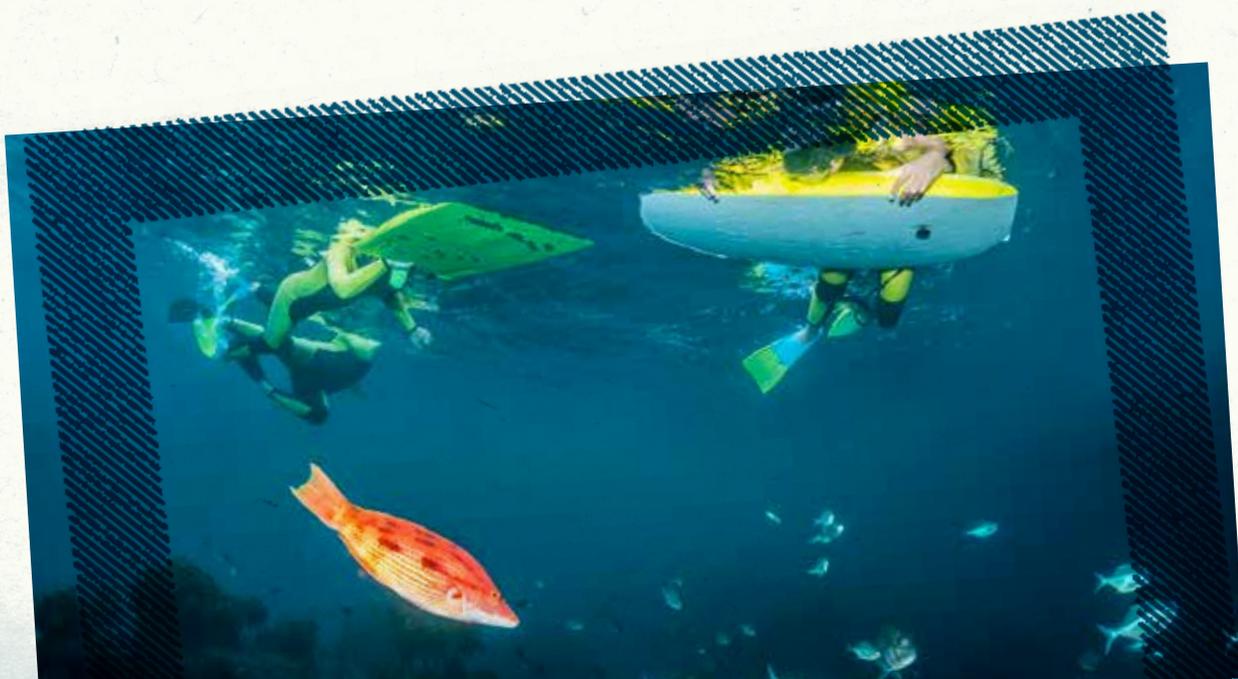
### Student action:

Present findings to rest of the class. Encourage their parents to download the free fishing regulations app. <http://www.mpi.govt.nz/travel-and-recreation/fishing/fishing-rules/>

- Send a free text to 9889 with the name of a species – for example “blue cod” or “pāua”. You’ll be sent legal bag and size limits for that species by return text.
- Get a brochure from MPI offices.

### Extra for experts:

How does the Treaty of Waitangi relate to our fishing regulations? What was the Sealord deal in 1992 and how did this effect Māori interests?



## ACTIVITY 9: Indigenous New Zealanders and the Coast

### Teacher instructions:

Students to research how early Māori used the coast. How important was it to them? What are some Māori terms used to describe and implement marine conservation concepts and strategies? What are some Māori myths, legends or sites that relate to the marine environment and what significance do they have today?

### Student activity:

Ask your grandparents or local kaumatua what the fishing used to be like? Have things changed? Present findings to the rest of the class.

## ACTIVITY 10: Story Writing

### Teacher instructions:

Students to write a short story about the seashore where the main characters are marine animals. Will it be a tale about how a crayfish finds a marine reserve? Will it be a detective drama investigating the causes of a diminishing population? Will it be a science fiction story looking at life in 2050?

### Student activity:

The stories can then be read aloud to the class by students or presented collectively in a book (e.g. Snapfish).

### For discussion:

The relationships that are formed in the marine environment as well as the potential effects that human beings have on these relationships.



## ACTIVITY 11: What the Scientists Say

### Teacher background:

Use your schools copy of 'Young Ocean Explorers' (provided free to every school in New Zealand in August 2015) to identify ways which scientists work together and provide evidence to support their ideas.

### Student action:

Are there local marine biologists working in your area? What issues are they addressing?

## Success Criteria Three – Extra links

Whangarei Harbour Marine Reserve:

<http://www.doc.govt.nz/parks-and-recreation/places-to-visit/northland/whangarei-area/whangarei-harbour-marine-reserve/>

Marine reserves A-Z: <http://www.doc.govt.nz/conservation/marine-and-coastal/marine-protected-areas/marine-reserves-a-z/>

Interactive marine ecosystem animation: <http://www.sciencelearn.org.nz/Contexts/Life-in-the-Sea/Sci-Media/Animations-and-Interactives/Marine-ecosystem>



# Success Criteria Four

**Identify and classify some of the marine creatures, issues, and local threats.**

Marine NZ Fish ID [www.marinenz.org.nz](http://www.marinenz.org.nz)  
Reserve (Cape Rodney to Okakari Point) Fish  
by Wade Doak [http://www.youtube.com/  
watch?v=3cm3KdeQhJM](http://www.youtube.com/watch?v=3cm3KdeQhJM) Goat Island Marine

## ACTIVITY 12:

### Marine Classification (recommended for year 7 and up)

Download the instructions and colourful pictures here  
[http://emr.org.nz/images/emr/pdf/educators/EMR\\_  
classification\\_activity.pdf](http://emr.org.nz/images/emr/pdf/educators/EMR_classification_activity.pdf)

## ACTIVITY 13:

### Marine Threats

#### Teacher instructions:

Research the effects of marine pollution, such as marine debris on our marine life. How long does it take for common debris to break down? Refer to [http://www.otago.ac.nz/marine-studies/resources/download/  
otago062848.pdf](http://www.otago.ac.nz/marine-studies/resources/download/otago062848.pdf)

#### Student activity:

Make a personal plea for reducing plastics in our oceans. Organise your own beach clean-up, and display your collection on a timeline for how long your debris will take to break down.

Scientists have identified four major threats to our oceans:

- Overfishing
- Habitat destruction
- Pollution
- Climate change

An example of an emerging threat is marine biosecurity (pests). [http://emr.org.nz/images/emr/pdf/educators/  
emr\\_marine\\_pest\\_lesson\\_plan\\_v2.pdf](http://emr.org.nz/images/emr/pdf/educators/emr_marine_pest_lesson_plan_v2.pdf)

Example of local issues could include:

- Dune erosion
- Storm water run off
- Fisheries offenses
- Marine reserve offenses
- Seaweed forest decline
- Biodiversity loss

#### Student activity:

Brainstorm how humans have affected or changed your local marine area – refer to EMR learning journal. Marine threats information: [http://www.mfe.govt.nz/marine/  
marine-pages-kids/effects-human-impacts](http://www.mfe.govt.nz/marine/marine-pages-kids/effects-human-impacts)

An EMR student made this clip about ocean acidification: <https://www.youtube.com/watch?v=jlCs5D9jSzw>

## ACTIVITY 14:

### Marketing Marine Conservation

#### Teacher instructions:

Inform the class that they have their own advertising agency and have just landed the exclusive account from the New Zealand Government to sell the idea that humans need to look after the sea.

Divide the students into advertising account teams and challenge them to write a jingle, magazine, TV or radio advertisement to get people concerned about the sea, as well as giving them ideas about what they can do to help.

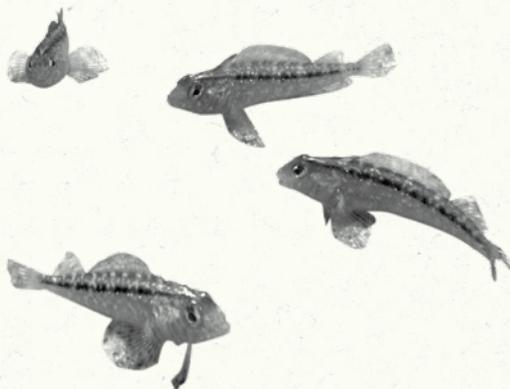
#### Student activity:

Teams perform or present the advertising to the whole class. Where to next?

Check out an example by Oromahoe School: [http://www.youtube.com/watch?v=ou\\_d0rjL4zo&feature=plcp](http://www.youtube.com/watch?v=ou_d0rjL4zo&feature=plcp)

Animation example of threats to marine area:

<http://www.youtube.com/watch?v=R4HqaTgkw2o>



## ACTIVITY 15: Who Dirtied the Harbour?

### Teacher instructions:

This is an interactive story that asks students to take on the roles of different historical and modern characters who have had a role in the pollution of their local waterways and ocean. Ask if your local EMR coordinator can deliver this activity or [http://emr.org.nz/images/emr/pdf/educators/who\\_dirtied\\_the\\_harbour.pdf](http://emr.org.nz/images/emr/pdf/educators/who_dirtied_the_harbour.pdf).

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# Success Criteria Five

## Make comparisons between the marine reserve and their local marine area.

### ACTIVITY 16: A Very Hungry Kina

#### Teacher instructions:

Read to your students or get your students to read the story [‘The Story of a Very Hungry Kina’](#)

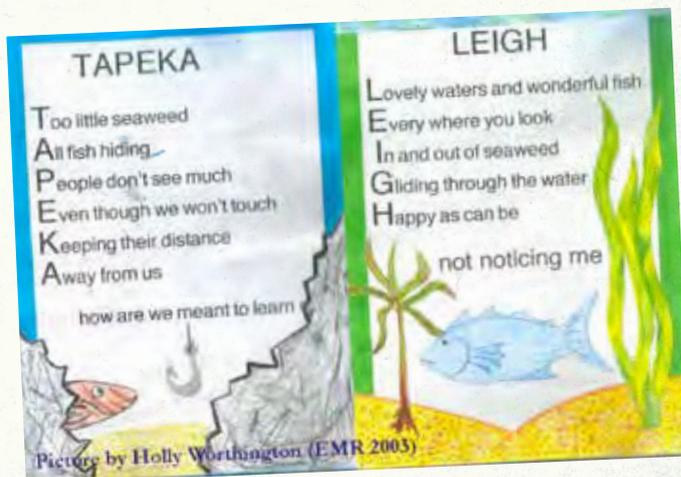
#### Student activity:

Make a poster to explain what happened in this story.

### ACTIVITY 17: Acrostic Poem

#### Teacher instructions:

Use the students snorkel experience to inspire their writing. See a great example below:



## ACTIVITY 18:

# Marine Reserve Versus Land Reserve

### Teacher instructions:

Students to read and complete the following activities.

### Student activity:

What is the current number of marine reserves in New Zealand? (For the most recent marine reserve figures – [www.doc.govt.nz](http://www.doc.govt.nz))

Compare the current percentage of land protected by reserves to the current marine reserves percentage along the mainland coast (excluding large offshore areas such as the Kermadec and Auckland Islands)

Although New Zealand is surrounded by sea, we have spent most of our time worrying about the land. With government support, we began setting up National Parks 100 years ago. This has not been the same for the sea and Marine Reserves. In fact, the low priority given to marine resources by some groups of people in the past, has delayed the introduction of New Zealand's Marine Reserves (*Te Atawha Moana O Aotearoa*). It began like this . . .

- Leigh selected as the site for the University of Auckland's marine laboratory.
- 1965: Leigh Marine Laboratory committee wrote to the Government's Marine Department with a formal request to set up a marine reserve. The response was negative. Some members of the University and supporters from other groups decided to gain public support to help put pressure on the Government. They gave public lectures, undertook research projects, looked into legal requirements, held open days at the marine laboratory and coordinated national support. Finally, due to this pressure, the Government produced draft laws for the setting up of a marine reserve.

- 1971: this draft legislation was passed and the Marine Reserves Act was passed.

• 1972: Marine Department abolished. Marine Reserves became part of the Ministry of Agriculture and Fisheries. This Department was not prepared to do the work necessary to put the law into practice to create the marine reserve. They said non-government agencies must do the paper work



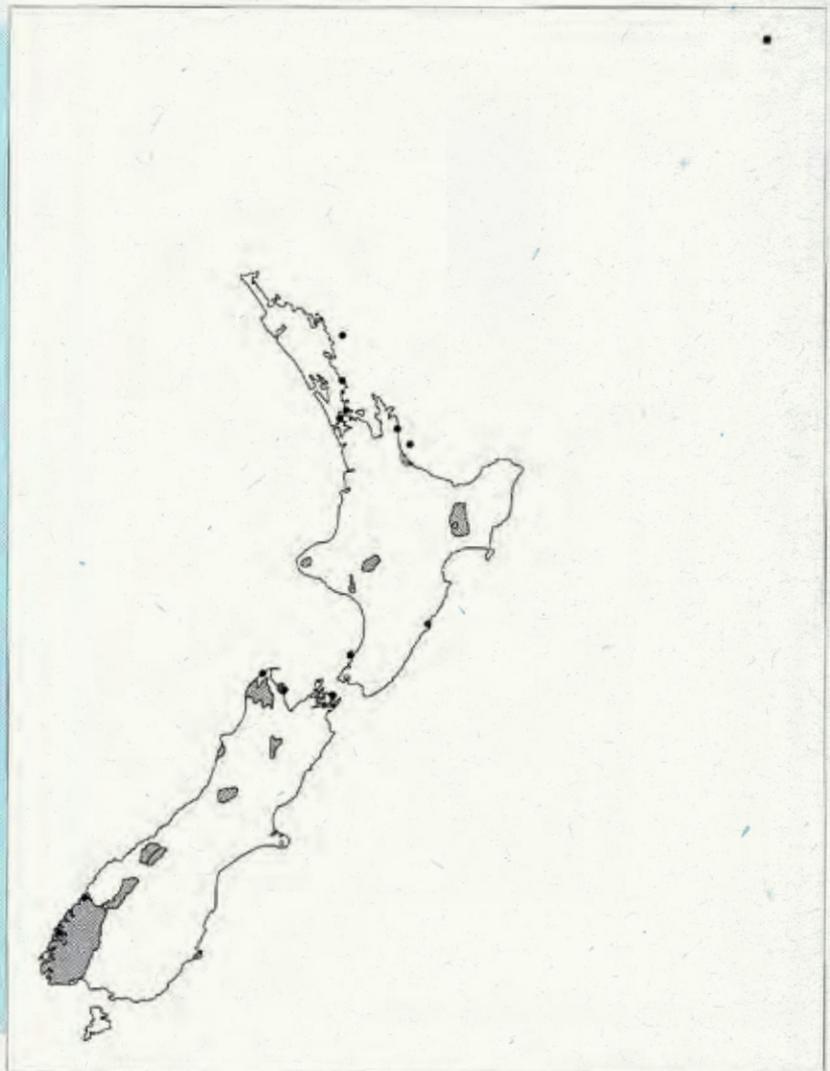
of notification, advertising, and gathering objections.

Non-government groups did the work and submitted it to the Ministry of Agriculture and Fisheries.

- Ministry took two years to make a decision.
- 1975: notice given legally establishing the Cape Rodney–Okakari Point Reserve. The Reserve was established in theory, but not in practice. A management committee needed to be formed.
- 1976: a notice was put up in the car park publicly acknowledging the establishment of the marine reserve covering 5 km by 800 m.



- 1 How many years was it from the time the idea of Marine Reserves was put to the Government to the time a Marine Reserve was established?
- 2 What does this length of time suggest about:
  - a the time it takes to make laws
  - b the importance of Marine Reserves to the Government at this time?
- 3 What does the process tell you about the way the public (people in the community) can bring about changes to our laws?
- 4 Trace the map on the right. Then, using an atlas and the tables below:
  - a print the correct place name in blue next to each Marine Reserve
  - b print the correct place name in another colour next to each National Park
  - c give your map an appropriate title and key.



**Marine Reserves in New Zealand**

| Area                                     | Year established | Area in hectares |
|--|------------------|------------------|
| Cape Rodney–Okakari Point                | 1977             | 518              |
| Poor Knights Island                      | 1981             | 2 410            |
| Kapiti Island                            | 1991             | 2 167            |
| Kermadec Islands                         | 1991             | 748 000          |
| Te Whanganui A Hei (Hahei)               | 1993             | 840              |
| Tuhua (Mayor Island)                     | 1993             | 1 060            |
| Long Island–Kokomohua                    | 1993             | 619              |
| Tonga Island (Abel Tasman National Park) | 1993             | 1 835            |
| Piopiotaahi (Milford Sound)              | 1993             | 690              |
| Te Awaatu Channel (Dusky Sound)          | 1993             | 93               |
| Te Tai Tapu (Westhaven)                  | 1994             | 536              |
| Motu Manawa–Pollen Island                | 1995             | 500              |
| Long Bay–Okura                           | 1995             | 980              |
| Te Angiangi                              | 1997             | 446              |
| Pohatu                                   | 1999             | 218              |
| Te Tapuwae O Rongokako                   | 1999             | 2450             |

**National Parks in New Zealand**

| Area          | Year established | Area in hectares |
|---------------|------------------|------------------|
| Tongariro     | 1887             | 78 651           |
| Egmont        | 1900             | 33 543           |
| Arthur's Pass | 1929             | 99 270           |
| Abel Tasman   | 1942             | 22 541           |
| Fiordland     | 1952             | 1 251 924        |
| Mt Cook       | 1953             | 69 923           |
| Urewera       | 1954             | 212 675          |
| Nelson Lakes  | 1956             | 101 753          |
| Whanganui     | 1986             | 74 231           |
| Paparoa       | 1987             | 27 818           |
| Westland      | 1960             | 117 547          |
| Mt Aspiring   | 1964             | 289 657          |
| Kahurangi     | 1996             | 500 000          |

**ACTIVITY 19:**

## Marine Protection Match Up

**Teacher instructions:** Learn about the different marine protection measures in New Zealand

**Student activity:** Draw lines to match up the correct definition for the different kinds of marine protection we have in New Zealand.

**Taiapure**

A marine area of traditional importance to Māori for customary food gathering. Usually recreational and customary fishing are allowed within the reserve, but not commercial fishing.

**Marine Mammal Sanctuary**

An area where an endangered marine mammal is protected.

**Marine Reserve**

An area which is temporarily closed to fishing or a ban has been placed on certain fishing methods, so that fish numbers can improve and/or because it has traditional importance to Maori.

**Mataitai**

An under water mountain, which has been closed to bottom trawling.

**Rahui**

A Marine protected area that may have limited fishing regulations, for example no commercial fishing but recreational fishing may be allowed. It is managed by the Ministry of Primary Industries.

**Marine Park**

Fishing areas with special importance to local Māori, managed by the community with involvement from local iwi and hapū. Commercial fishing is usually allowed.

**Closed Sea Mounts**

A protected marine area, which is managed by the Department of Conservation. No fishing of any kind is allowed. No fish feeding and no taking or disturbing of any marine life.

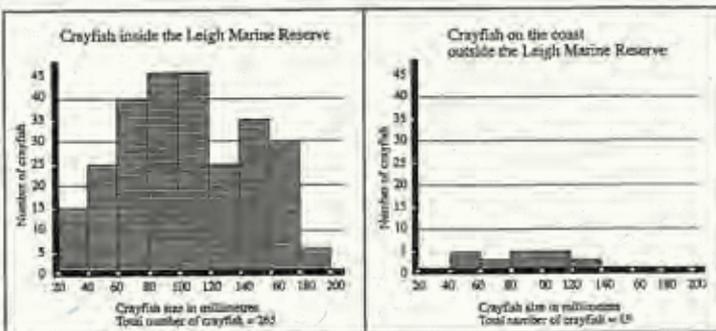
## ACTIVITY 20: Interpreting Graphs

**Teacher instructions:** Students to complete the following interpretation of information and graphs.

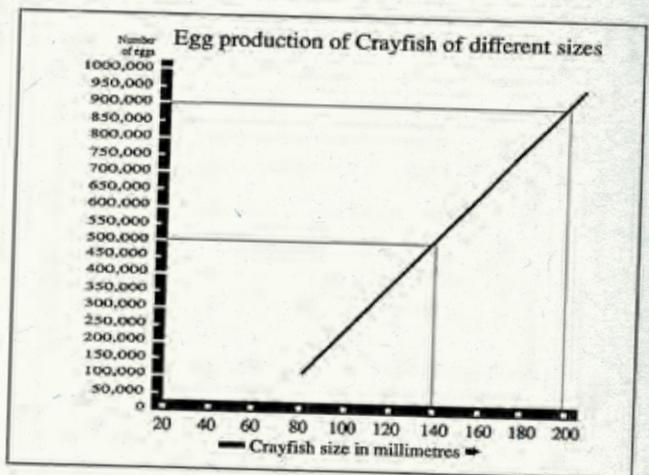
Jeffs, A. (Editor) 1990 *The Underwater world - Te Marae Nui O Hine-Moana - A kit for teachers of form 1 and 2*  
Department of Conservation, Wellington.

Ten years after the reserve was first set up, some scientists decided to find out if the reserve had affected crayfish.

- Imagine you are one of those scientists who is going to the Leigh Marine Reserve to investigate crayfish. Your task is to find out if there are more crayfish living in the marine reserve at Leigh than in areas outside the reserve.  
How would you go about finding out?
- One of the scientists decided to count and measure the size of all the crayfish living in two areas of exactly the same size, one in the Leigh Marine Reserve and the other on the coast near to the reserve. She dived in both of these areas to count and measure all the crayfish hiding in the rocky crevices. She drew these two graphs to show what she had found. Study the graphs and answer these questions,
  - What does the graph tell you about the numbers of crayfish living inside and outside the reserve?
  - What does the graph tell you about the size of crayfish living in the reserve compared to those living outside the reserve?



What happened to crayfish in the marine reserve.



- One of the scientists in your group decided to investigate the relationship between the size of female crayfish and the number of eggs they produce. After spending weeks counting millions of the tiny eggs she drew this graph.
  - How big are crayfish when they start to lay eggs?
  - Do larger crayfish carry more eggs than smaller crayfish?
  - The largest crayfish living outside the reserve are about 140 millimetres in length.  
About how many eggs does a crayfish of this size produce?
  - The largest crayfish living inside the reserve are about 200 millimetres in length. About how many eggs does a crayfish of this size produce?
  - What do these studies tell you about the egg production of crayfish living within the marine reserve compared to areas outside the reserve?

## Success Criteria Five – Extra links

Virtual EMR marine reserve experience:

<http://www.emr.org.nz/index.php/education/virtual-marine-reserve-experience>

Experiencing Marine Reserves DVD 2008: <http://vimeo.com/2261076>

Experiencing Marine Reserves 10 year celebration clip 2011:

[http://www.youtube.com/watch?v=WMWsm95bR\\_Y&feature=player\\_embedded](http://www.youtube.com/watch?v=WMWsm95bR_Y&feature=player_embedded)

Tiakina a Tangaroa – School Journal, Level 2, October 2011, Year 4 reading resource:

[http://www.emr.org.nz/uploads/file/Education%20Corner%202012/L2%20October%202011%20-%20Tiakina%20a%20Tangaroa\\_Online.pdf](http://www.emr.org.nz/uploads/file/Education%20Corner%202012/L2%20October%202011%20-%20Tiakina%20a%20Tangaroa_Online.pdf)

# Success Criteria Six

Base their opinions about the value of marine reserves on their personal experiences and learning throughout EMR.

## ACTIVITY 21:

### Marine Reserve Management

#### Teacher instructions:

Students to read 'Anglers in court for fishing in marine reserves', Courtesy of the Whangarei Leader, July 8, 2008.

#### For discussion:

Who manages marine reserves? What happens if you break the rules?

#### Student action:

Promote your local marine reserve and boundaries and the number to call if you see people fishing in marine reserves.

Get the message out to the community about your local existing marine reserve through posters, pamphlet drops, facebook and via your school website, presentations in the community or marae.

## Anglers in court for fishing in marine reserves

By Deanna Harris

Recreational fishermen are ending up in front of a judge after being caught fishing in marine reserves in Whangarei Harbour. Alan Fleming, a marine protection ranger with the Department of Conservation in Whangarei, says staff members have had enough of people breaking the law by fishing in the reserves.

In the past six months 39 anglers have been caught fishing in the harbour and Poor Knights Islands marine reserves. During June and July, 11 people will have appeared before the courts after being caught and a further three will also appear who were caught fishing in the Poor Knights reserve.

An additional 10 will appear before the courts in the near future, he says.

Penalties for fishing in a marine reserve include a fine of up to \$10,000 and/or up to three months' prison. Commercial fishers caught within a reserve can be fined up to \$250,000 and/or up to three months' prison.

"Fishers need to be familiar with marine reserve boundaries as strict liability applies and ignorance is no defence," says Mr Fleming.

As well as these alleged offences, Mr Fleming says 120 anglers have been lucky not to be apprehended because they were seen arriving at a reserve by a conservation department ranger who warned them before they started fishing. Some fishers have had personal fishing gear seized instead of facing court action.

Mr Fleming says most people have been caught at the Motukanaro site of the harbour reserve where the department is maintaining a strong presence.

The reserve is made up of two sites - Motukanaro near Rootahi and at Waikaraka, covering 253.7 hectares or 2.34 percent of the harbour.

The reserves were first proposed by Kamo High School students and finally established in October 2008.

Mr Fleming says there should be no reason people don't know it is a reserve.

The department installed nine signs in the Waikaraka area, 11 signs and three buoys at Rootahi and nine signs at all the community-used boat ramps throughout the harbour when the reserve was established.

"Many apprehensions were the result of reports made by the public and a network of boaters who are keen on protecting marine reserves," says Mr Fleming. "The department is thankful for the public support it has received."

"Marine reserves provide a place where people can experience and observe a relatively undisturbed marine environment. People in Northland are passionate in ensuring these places are protected," he says.

If you suspect someone is fishing, or taking marine life within a marine reserve, please call 0800 DOCHOT and for more information about the reserves call 430 2133 or go to [www.doc.govt.nz](http://www.doc.govt.nz).



## ACTIVITY 22:

# The Different Marine Reserve Points of View

### Teacher instructions:

Read to students or get students to read and identify the different points of view. The Great Barrier Island Marine Reserve was approved by the Minister of Conservation, but not the Minister of Fisheries (now the Ministry of Primary Industries), so the Great Barrier Island Marine Reserves did not go through. Read the for and against arguments. [http://emr.org.nz/images/emr/pdf/educators/for\\_and\\_against\\_small.pdf](http://emr.org.nz/images/emr/pdf/educators/for_and_against_small.pdf) Also, see the example below from the Waikeke community for different points of view (Keep our Beaches and Friends of the Hauraki Gulf)

### Student activity:

Write down the different viewpoints found in the articles below.



Friends of the Hauraki Gulf

21 October 2013

## Marine Reserves - The Facts

**Have boundaries for a Waikeke northern side marine reserve been set?**  
No. The Friends Group has often stated that there is no fixed focus on one possible location for the marine reserve. There are nine zones being looked at along the northern side of the island. We were mistaken in suggesting various possible boundaries too early. Because of feedback from our community, we have removed 'lines from the map'. A decision on the boundaries will only be made after we have comprehensive scientific data, and thorough consultation with the Waikeke community.

In a formal statement to the Waikeke Local Board on 15 August, FOHG said: "Right now there is no proposal for any specific boundaries... All we ask is that we be given the time to conduct those scientific studies without prejudice."

**Will visitor numbers on Waikeke increase if there is another marine reserve?**  
No one can be certain yet. Reserve opponents are quoting existing visitor numbers for some marine reserves without any explanation of context, or baseline figures. These current visitor numbers don't provide any information on how many visitors have come specifically for the marine reserve.

For example, Cathedral Cove was a popular tourist destination well before the Hahei Marine Reserve was established. Long Bay has over a million visitors per year, but a very high percentage of those visitors don't even know that Long Bay has a marine reserve next to it. They go there for other reasons.

It takes 10-15 years for underwater ecosystems to recover in a marine reserve. This gives a community time to plan properly for visitors.

**Marine ecosystems in the Hauraki Gulf are degrading, and we have the opportunity to do something positive about this. Please consider the facts.**

**Can dogs be allowed on beaches next to marine reserves?**  
Yes, if the adjacent land is not already a conservation area. Of the 8 marine reserves in NZ that could possibly allow dog walking along the beaches, 7 do - as at Long Bay (left).

**Will DOC "take control of the beaches"?** No. Sarah Bagnall national planning manager for DOC says: "Marine reserves are not required to include the foreshore (any land covered and uncovered by the flow and ebb of the tide at mean spring tides). The ownership of areas adjacent to marine reserves is not affected by the marine reserve - the Department does not control lands it does not manage." In Waikeke's case, beaches and reserves will continue to be managed by Auckland Council.

**Are there marine reserves in front of residential beaches?** Yes. There are 6 marine reserves in New Zealand in front of residential beaches, and many in Australia and overseas.

**Will DOC allow permits for commercial concessions on the beaches?** No. DOC says: "Under current Marine Reserves legislation the Department is not able to issue concessions over marine reserves. The Department cannot issue concessions over land it does not administer."

**Can you anchor or moor boats in a marine reserve?** Yes. It is OK to anchor boats or have permanent moorings within a marine reserve - as in Island Bay, in Taputeranga Marine reserve, Wellington (above).



Authorised by Alex Stone, Linda Simpson, Tania Lovell, Friends of the Hauraki Gulf <http://www.rutunspace.org.nz/groups/friends-of-the-hauraki-gulf>

## THANK YOU WAIHEKE!

### You have said a resounding 'NO' to a Marine Reserve on Waiheke's Northern Residential Beaches

The Marine Reserve being proposed for the northern side of Waiheke will potentially include any of our residential beaches from Oneroa to Onetangi, including Enclosure Bay, Sandy Bay and Palm Beach. **Over 2000 of you have already signed the petition to voice your opposition** to these residential beaches being included in any marine reserve proposal.

Some of our reasons for this opposition include

- **Busy crowded beaches** – a marine reserve is likely to attract **100 000+ extra visitors** a year.
- **Commercial operator, boats, tour buses and cars** cluttering the narrow streets, beaches and water.
- **Pressure on already overloaded facilities** - toilets, showers, water supply, rubbish, parking etc
- **No fishing or shellfish collecting** anywhere in the reserve or off the rocks.
- **No dogs on beaches** - 84% of NZ marine reserves prohibit dogs, others impose severe restrictions
- **Loss of Boat launching on Sandy Bay** as visitor numbers escalate.
- **Loss of Little Palm Beach** as a clothing optional beach as privacy is inevitably lost

**Like you, we want to preserve the special character of Waiheke, and the lifestyle we all enjoy and treasure, for future generations. We support a network of Marine Reserves in the Hauraki Gulf, however, we do not believe our Waiheke northern residential beaches are the right location for a marine reserve.**

We are conveying the concerns of the Waiheke community about the proposal to the new Local Board, relevant Members of Parliament, as well as key members of the Hauraki Gulf Forum, and the Department of Conservation.

We are preparing a formal submission to the Minister of Conservation Nick Smith, to ensure that the Waiheke community's opposition to any proposal for a northern marine reserve that includes our residential beaches is clearly understood. We are also actively participating in the Hauraki Gulf Marine Spatial Plan process, which will provide an integrated plan for the protection of the entire Hauraki Gulf, rather than the development of ad hoc 'solutions' such as this. And we will continue our opposition to the current proposal and keep you informed on progress.

**SO THANK YOU WAIHEKE** - to those who have signed the petition, and to the many hundreds who have called, emailed or talked to us in person over the past months. If you haven't yet signed our petition, you can sign online at [www.ipetitions.com/petition/petition-opposing](http://www.ipetitions.com/petition/petition-opposing) or talk to us at the Ostend market this Saturday.

The team at Keep Our Beaches

Email us at [Keepourbeaches@gmail.com](mailto:Keepourbeaches@gmail.com) or call us on ph 022 129 0560 [www.ipetitions.com/petition/petition-opposing](http://www.ipetitions.com/petition/petition-opposing)

### ACTIVITY 23:

## Yes, Marine Reserves Actually Do Work

### Teacher instructions:

Read to your students or get your students to read the marine reserve article by Dr. Roger Grace below, or collect data on your snorkel at the Reotahi site of the Whangarei Harbour Marine Reserve while snorkelling with Experiencing Marine Reserves. Also refer to [www.reefsavers.org.nz](http://www.reefsavers.org.nz)

### Student activity:

Make a graph to show fish numbers inside and outside the reserve.

## Yes! Marine Reserves Actually Work!

I had occasion recently to talk to a reporter about marine matters. Part way through the conversation I was rather shocked when she said "Oh, you think marine reserves actually work then?". She had obviously been influenced by some of the ridiculous claims emanating from certain recreational fishing sources that marine reserves don't work. And here she was living within 25 kilometres of two of the oldest and most successful no-take marine protected areas in the country.

It is amazing that, with the several examples of long-established successful marine reserves around our coasts, it is possible still to hold the view that marine reserves don't work. Of course they work! You just have to go and have a look and it is obvious! You don't have to be a scientist to understand that if you stop taking fish and crayfish out of a section of coastline, their numbers will build up and the size of individual fish will increase. Because they are not being taken away they have a chance to grow older and larger and more numerous.

There has been a lot of scientific study on this very topic - irrefutable evidence that when an area is given full protection from fishing, the marine life flourishes, fish numbers and sizes increase, and marine habitats change to a state closer to "natural".

But a lot of people don't read scientific papers. They rely on popular interpretations, magazines, pamphlets and books, talking to people who have swum in marine reserves, or actually jumping in the sea and taking a look for themselves.

With this in mind I recently carried out a simple test which anyone with mask and snorkel can do. Even a ten-year-old could do this test, and come up with their own independent conclusion that, yes, there are more fishes in the marine reserve!

Most of you will know Matheson Bay, and Goat Island Bay, both near Leigh, and on comparable pieces of coastline. Goat Island Bay is the site of the first marine reserve in New Zealand. It has been protected from fishing for 30 years. Matheson Bay has always been open to spearfishing, fishing with rod and lines off the rocks, nets, and fishing from boats.

There are many similarities between the two beaches and surroundings. Both sites have similar access, and both are popular for diving and snorkelling. Large numbers of families picnic on both the beaches. But take a look underwater and there are considerable differences in the fish life.

The simple test I carried out involved snorkelling out off the beach at high tide and counting fishes seen as I swam out from the beach and back again. At Matheson Bay 7 October 2005) I got in at the beach and swam toward the rocks to the left, crossed the channel and reached the rock platform surrounding the island, identifying and counting fishes on the way whilst snorkelling and observing only from the surface. I then did a similar count while swimming back to the beach by a different route but through similar underwater country. In scientific terminology this was a "replicate" count. On the return route I crossed the channel then swam north along the outside of the rock platform to a narrow opening in the platform, through this gully and back along the beach to the original point of entry. The route is shown in the sketch map. Each leg of the swim took about 15 minutes.

A few days later (12 October 2005) I repeated the exercise at Goat Island Bay. Here I entered the water off the right side of the rock platform and swam across the channel to the edge of the island. On the return journey I moved west toward Shag Rock, then turned south to the middle of the beach. Again each leg of the swim took around 15 minutes. The sketch map shows where I swam. The bottom types and depths were similar on both legs, and similar to the swims at Matheson Bay.

At both areas my swim was done close to high tide and the waves were less than half a metre. Visibility was 10 metres at Matheson Bay, but only about 5 to 6 metres at Goat Island. So my viewing conditions were a little better at Matheson Bay than at Goat Island, which might have influenced my counts a little in favour of Matheson Bay.

So, what do you think I saw? The table shows the fish seen and their numbers for both Matheson Bay and Goat Island Bay.

| Location              | Matheson Bay |           | Goat Island Bay |           |           |
|-----------------------|--------------|-----------|-----------------|-----------|-----------|
|                       | Fish species | Swim out  | Swim back       | Swim out  | Swim back |
| Parore                | 1            | 1         | 20              | 16        |           |
| Red moki              | 1            | 1         | 5               | 2         |           |
| Goatfish              | 3            | -         | -               | -         |           |
| Drummer               | -            | -         | 1               | 1         |           |
| Snapper               | -            | -         | 3               | 4         |           |
| Spotty                | 5            | 6         | 2               | -         |           |
| Blue maomao           | -            | -         | 1               | 9         |           |
| Trevally              | -            | -         | 1               | -         |           |
| <b>Column total</b>   | 10           | 8         | 33              | 32        |           |
| <b>Location total</b> |              | <b>18</b> |                 | <b>65</b> |           |
| <b>No. of species</b> |              | <b>4</b>  |                 | <b>7</b>  |           |

The number of individual fishes seen at Goat Island Bay was more than three times those seen at Matheson Bay. I saw seven species at Goat Island and only four at Matheson Bay.

Also what the table does not show is a difference in fish sizes, especially for red moki. The two red moki seen at Matheson Bay were about 30 centimetres long. Those at Goat Island Bay were much bigger, older fish, around 60 centimetres.

The parore seen were about the same size at both locations, but were much more numerous at Goat Island Bay.

Two silver drummer seen at Goat Island were enormous - huge fat fish around 70 centimetres long.

Snapper, seen only at Goat Island, were mostly around 40 centimetres - a good legally takeable size if outside the reserve - but also included one giant about a metre long and probably in excess of 20 pounds (over 9 kilos).

Do you think those snapper, especially the 20-pounder, would be just out off the beach at Goat Island if people were allowed to fish off the rocks? Do you think those huge drummer and so many parore would be there if set-netting was allowed? And would those large red moki be there if spearfishing was allowed? Of course they would not.

A ten-year-old could understand this. Why is it so hard for some adults to get the same message?

There were fewer goatfish and spotty seen at Goat Island Bay than at Matheson Bay. This might have related to the poorer visibility at Goat than at Matheson on the day I did the counts. By counting only from the surface, goatfish would have been hard to distinguish against their sandy bottom habitat. And spotty would have been harder to see against the kelp background.

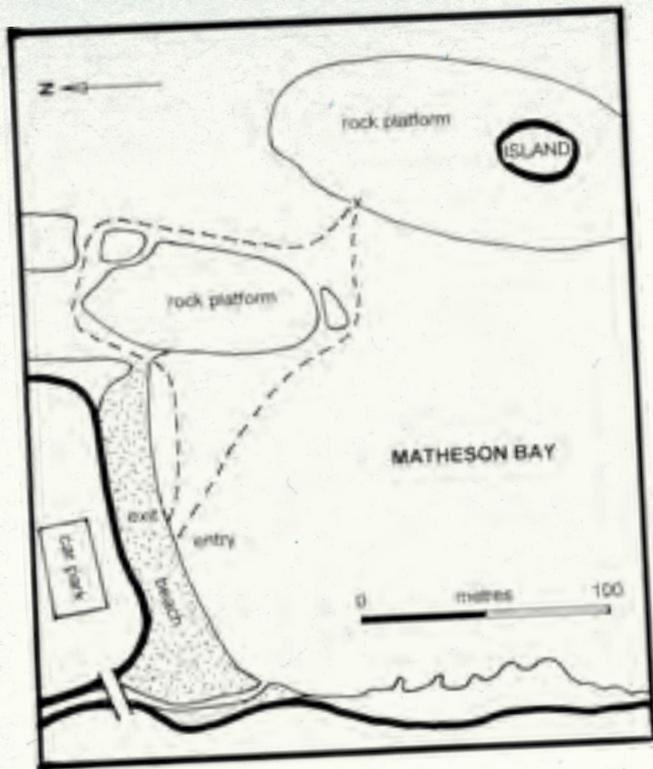
If you were to repeat the counts in summer, there would likely be more species and higher numbers at both locations. Fish such as blue maomao, sweep, and spotty vary seasonally in abundance. But I am confident there would still be a big difference between Goat Island Bay and Matheson Bay.

The "Experiencing Marine Reserves" programme, supported by the Nga Maunga ki te Moana Conservation Trust, and the Department of Conservation, has been running in Northland for about four years, and last year extended into Auckland. Samara Sutherland takes groups of kids snorkelling on a piece of coast not too far from their school, where there is no protection for the marine life. Then she takes them to a marine reserve, usually Goat Island, which may be a 4-hour bus ride away from their hometown. They experience for themselves the abundance of fish in a no-take marine reserve and make the comparison with a fished piece of coast nearer home.

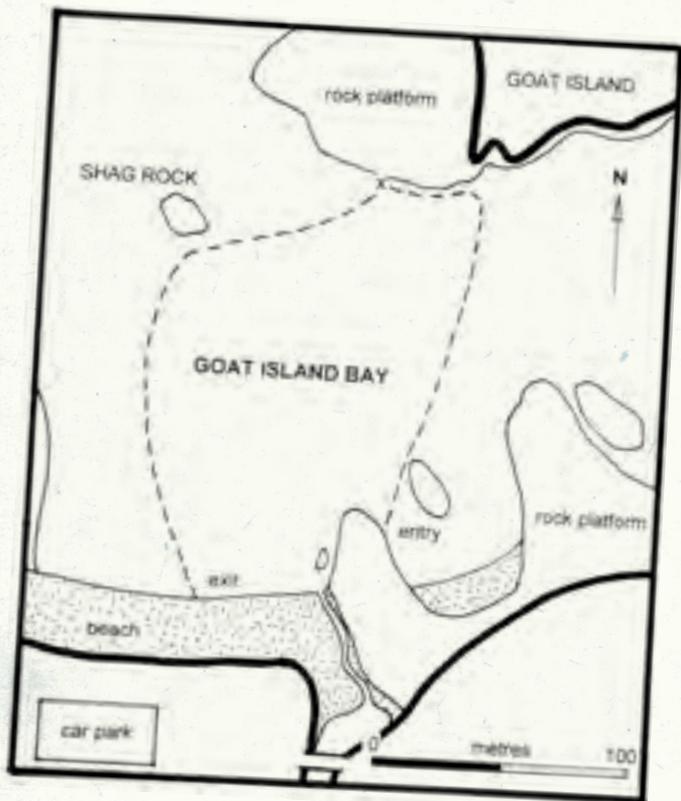
Most kids come away enthusiastic to have a marine reserve much closer to home! Why should they have to travel four hours each way to see fish and other marine life in its natural state? Just as there is a bush reserve not far from nearly all schools, there should be a marine reserve within an easy drive of all schools. We owe that to the kids of the present and future.

### **Roger Grace**

For Dive New Zealand magazine, December 05/January 06, # 91.



**(Map 1) Sketch map of Matheson Bay, showing the snorkelling route out to the island, then return via a gulley through the rock platform.**



**(Map 2) Sketch map of Goat Island Bay, showing the snorkelling route out to the island, then return to the beach via Shag Rock.**

## ACTIVITY 24:

# Marine Reserve Role Play and Tribute to Dr Bill Ballantine

### Teacher instructions:

Students to read information on marine reserves.

The late Dr Bill Ballantine was a marine conservation legend, and was influential in the establishment of New Zealand's first marine reserve at Goat Island, Leigh. Bill wrote educational material that clearly outlines the principals of marine reserves. Use Bill's book to help with the marine reserve role play, especially red herrings.

<http://emr.org.nz/images/emr/pdf/educators/marinereservesbook.pdf>

### Student activity:

Marine reserve role play, using the theme: 'Act out the different points of view with regards to marine reserves'. Roles could be chosen from: a local fisher, a local teacher, a local tourism operator etc.

### Student action:

Write to the editor of the local newspaper, hold a marine reserve or rahui meeting, or write a submission in support of a local marine protection measure.

### Extra for experts

Read Dr Bill Ballantine's summary of 'Fifty years on - lessons from New Zealand marine reserves'.

<http://emr.org.nz/images/emr/pdf/educators/marinereservesbook.pdf>

## Success Criteria Six – Extra links

Kaikoura Rahui: <http://www.youtube.com/watch?v=WX6lVKXv7VY>

Goat Island: <http://www.youtube.com/watch?v=s74C7Ha28qg&feature=related>

Whangarei Harbour Marine Reserve: <http://www.youtube.com/watch?v=1fi3sZkORMc>

Poor Knights - Marae Investigates: <http://www.youtube.com/watch?v=mgGGdMnMDgU>

Kermadec Islands Marine Reserve: <http://www.youtube.com/watch?v=mrjvPjPRAwo>

Background to the world oceans and international threats: <http://www.youtube.com/watch?v=Vdo-YUFZd6c>

Whananaki School at the Poor Knights: <http://www.youtube.com/watch?v=mrjvPjPRAwo>

# Success Criteria Seven

## Take action in their community

### ACTIVITY 25:

## Conduct a Marine Metre Squared Survey

### Teacher instructions:

Marine Metre Squared is an easy way for anyone to survey the plants and animals living on their local seashore.

The NZ Marine Studies Centre, University of Otago, is encouraging everyone to participate in long term monitoring of their marine environment – the Marine Metre Squared. Anyone can take part – individuals, families, schools and community groups.

<https://mm2.net.nz/>



### ACTIVITY 26:

## Design Your Own Marine Reserve

### Teacher instructions:

Students to research what a Marine Protected Area (MPA) is. What makes a marine reserve different from a marine park? Where are the different marine reserves located around New Zealand and how much of our mainland territorial (sea out to 12 nautical miles around our three main Islands) sea do they cover?

Identify what the benefits of marine reserves are and how they are chosen, e.g. marine reserves are chosen at sites that represent our different marine habitats such as rocky shores and mangroves.

### Student activity:

Design your own marine reserve area in your local harbour or bay by illustrating it on a map of your area. This activity can be done individually or in groups. Students should provide information about why they chose that particular area e.g. species diversity, accessibility, habitat and what the area could be used for e.g. scientific research, education, monitoring.

Finally, students should learn about the process involved in making a formal application to the New Zealand government for a marine reserve. The Kamo High School formal proposal was approved in 2006 - see [www.emr.org.nz](http://www.emr.org.nz) for more info. To find out 'how to' make a marine reserve go to [www.howtokit.org.nz](http://www.howtokit.org.nz).

Here are some examples of EMR projects for creating marine reserves:

<https://www.youtube.com/watch?v=Lylxp6JFw6k>

<https://www.youtube.com/watch?v=mbxRsN4bKjk>



## ACTIVITY 27:

# Support Sea Turtle Research

### Teacher instructions:

Direct your students to the link below and sea turtle information on our curriculum section of our website:

<http://www.doc.govt.nz/nature/native-animals/marine-fish-and-reptiles/sea-turtles/>

Of the seven sea turtles in the world, how many are known to frequent New Zealand waters?

What are the identifying features of the two most common sea turtles in New Zealand waters?

What do you do if you see a sea turtle?

What is a common reason for sea turtle strandings?

What do you do if you find a stranded sea turtle?

### Student activity:

Create a poster or brochure that answers the above questions. Investigate the research of marine scientist Dan Godoy.

### Student action:

Contribute to Dan's research, start a fundraising project like Danielle! Ideas include a swimathon, school mufti day, marine creatures dress up or baking sale. Contact your EMR coordinator for details on how to direct your donation.

Dargaville & Districts News, June 12, 2013

# Turtle champion speaks

By PETRICE TARRANT

THE efforts of young conservationist Danielle Steed are bringing sea turtle expert and researcher Dan Godoy to Dargaville.

The aim is to increase wider understanding about marine turtles, as there have been strandings along the West Coast of Northland.

Mr Godoy will give a presentation to the students at 2pm tomorrow, and 6pm at Dargaville Intermediate School Hall.

"My talk will focus on marine turtle threats, and in particular plastic marine debris. I will also cover a little about the rehab work Kelly Tritons does and the satellite tracking work I've done over the years. I will also include a map showing the strandings along Dargaville's coast to put the area in context," Mr Godoy says.

The visit is a result of Dargaville Intermediate school's participation in the Experiencing Marine Reserves programme last year. Danielle managed to raise funds for sea turtle conservation by approaching local businesses to sponsor her for a swimathon.

The Dargaville Intermedi-



**Strong swimmers:** The fundraising efforts of Danielle Steed brings Dan Godoy to Dargaville.

ate school pupil decided to get behind sea turtles after researching the ocean creature for a school project about marine animals. The 12-year-old swam 100 lengths of the Dargaville High School pool and raised \$845 which was donated to Dan Godoy for research.

Mr Godoy's visit is also a celebration of World Environment Day on June 5.

Mr Godoy says the turtles do not breed in our waters, and funding restrictions as well as a lack of large resident turtle populations, means that scientists have to rely on stranding data to



**Saving lives:** Marine turtle expert Dan Godoy will give residents a presentation on turtle conservation.

help them understand more about these critically endangered species.

"That's why the

community's help is crucial in our ability to find out more about turtles in New Zealand," Mr Godoy says.

■ Contact the DOC Kauri Coast Area office on 09 439 3450 if you see a marine turtle, alive or dead.

## ACTIVITY 28:

# Extend the Kermadec Marine Reserve

### Teacher instructions:

Refer to Activity 4 focused on the marine biodiversity of the Kermadec Islands. The National Geographic Society has called the Kermadecs 'one of the last pristine sites in our oceans'. The Kermadec Marine Reserve is currently the largest in New Zealand waters. Pew and its partners, is working with local communities, governments and scientists around the world to protect and conserve some of our most important and unspoiled ocean environments. The Pew and its partners are calling to extend the marine reserve to become a Kermadec Ocean Sanctuary covering 620,000 square kilometres of coastline, which would make it the largest marine reserve in the world. The government of New Zealand has announced its commitment to create a 620,000-square-kilometre (239,383-square-mile) fully protected marine sanctuary in the Kermadec region. Download the Kermadec factsheet: <http://www.pewtrusts.org/~media/Post-Launch-Images/2014/Kermadecs/Assets/Kermadec-fact-sheet.pdf> and <http://www.forestandbird.org.nz/kermadec-ocean-sanctuary>

### Student action:

Contribute to a global ocean legacy. Write a letter thanking your local MPs and the Prime Minister for supporting the Kermadec marine sanctuary. Emphasise what you have learned about the importance of marine reserves (large and small) and your support for the extension of the Kermadec marine reserve across the whole of our EEZ. <http://www.forestandbird.org.nz/saving-our-environment/marine-and-coastal/kermadec-islands-marine-sanctuary>.

Design a campaign poster to advertise the extension of the Kermadec Marine Reserve.

## ACTIVITY 29

# Reef Savers

### Teacher instructions:

'Reef Savers' is focused around the issue of kina barrens and the importance of shallow reef algal forests. It's a citizen science project based around a website resource that provides a portal for communities to share stories and data about their reefs. There are different levels of methodology and layers of enquires, from simple observations and photographed to detailed transect lines and more complex monitoring. There will also be an actions section to support ideas and case studies for saving the reefs. Find out more at [www.reefsavers.nz](http://www.reefsavers.nz).

## Success Criteria Seven – Extra links

Marine reserve human chain:

<http://www.youtube.com/watch?v=9GAWmkpLwO8&feature=plcp>

Mahurangi college EMR action:

<http://www.youtube.com/watch?v=Sp3dtbYCVIc&feature=plcp>

Make a submission for a marine reserve or other marine conservation measure:

[http://www.youtube.com/watch?v=\\_IUMgSZqDJ8&feature=plcp](http://www.youtube.com/watch?v=_IUMgSZqDJ8&feature=plcp)

Te Huruhi take action for Maui dolphin: <http://www.youtube.com/watch?v=UTOqbQSuVRY>

The students of Kamo High School made a marine reserve! <http://www.youtube.com/watch?v=1fi3sZkORMc>

Monitor your local estuary <http://www.doc.govt.nz/estuaries>



# Additional Resources

## EMR Learning Journal

### Teacher instructions:

Use the EMR learning journal to document experiences throughout the various stages of EMR.

### Student activity:

Complete all sections for evidence of learning

## Koosh Ball Catch

### Teacher instructions:

At an appropriate time for review, perception check or brain check, the teacher takes out the koosh ball. Throw the koosh to a student, the student with the koosh outlines one thing that they have learnt so far in the programme. The student throws to another student and so on.

## Highly recommended resources used by EMR

Our Big Blue Backyard DVD and complement book

The Last Ocean DVD and education resource

<http://www.lastocean.org/>

Hard Hat Harry and the Pearls of Wisdom – great DVD for primary school age children – available from EMR on request or ask your coordinator to screen it for you

Water Whisperers – Tangaroa – available from EMR on request or ask your coordinator to screen it for you

**For extra web links – check out the ‘links’ page on [emr.org.nz](http://emr.org.nz)**

# EMR - Annual Poor Knights Competition

**The action component of EMR and is an essential factor in the students learning process and one which helps us to assess the effectiveness of the programme at meeting the projected learning and conservation outcomes.**

Students need to be able to decide on, plan and take effective action on marine environment sustainability issues that concern and motivate them. The action needs to be aimed at addressing the cause of the marine issue. Teachers need to connect the students EMR experience and growing understanding of the issue to achievable things they can do that will make a difference for the future and put their idea into action.

The action could have a direct impact on the marine environment to mitigate, remediate, resolve or prevent harm to marine ecosystems. Action may also be about seeking to influence others to make decisions and choices that will result in improvements to marine ecosystems.

To be eligible for the EMR action prize, Annual Poor Knights Competition, students must have participated in the full EMR programme and be involved in a group action and/or an individual action project for the marine environment (keep an eye on the EMR website for the most recent terms and conditions).



# EMR Action Project Prize

## Criteria

Action projects that demonstrate guardianship of their marine environment

## Judging criteria

- New Zealand relevant
- Action reaches beyond the classroom
- Action relates to marine conservation, marine monitoring, addressing marine issues and/or building public awareness

You must participate in a class/group or individual action project as well as submitting something individually to be chosen. Tell us about or submit information about your action (use EMR action plan template):

- The course of action you were involved in to make a difference, for the conservation of your local marine area
- Results of the action undertaken to date and any plans for the future.

Your individual submission (class work) to support your action could be judged on the following:

- Your (written or oral) explanation of your first-hand experience with marine reserves or the marine environment

- Your explanation of the difference between your local area and marine reserve (either habitat differences if the two are comparable e.g. same type of habitats or social differences in the way the community threat the marine environment (full protection vs. no protection). This comparison could also be in the form of research (without visiting a marine reserve).
- Your passion and demonstration of understanding of marine conservation, marine reserves, marine protected areas and or/marine issues in New Zealand
- Your communication and demonstration of creativity, presentation, leadership and kaitiakitanga
- Use of New Zealand marine biodiversity and conservation context (New Zealand references and pictures) e.g. no pictures of exotic clown fish etc.
- Your teacher's opinions and recommendations



This competition trip is sponsored by the Bobby Stafford-Bush Foundation and Dive Tutukaka, with support from the Tindall Foundation and is offered to students (number depends on number of students involved/spaces on boat and quality of action projects) from each school participating in the EMR programme from Northland and Auckland (up to 20 schools every year) and 1 representative from each other region participating in EMR (Taranaki, Coromandel, Gisborne, Wellington, Nelson and Otago). Based on the criteria above, representatives from each of the participating EMR schools/regions will be chosen by your EMR regional coordinator (evidence may be collected at time of completing projects and winning representative/s will be informed by April).



## Introducing the new **Bobby Stafford-Bush – EMR Ocean Art Prize**

**In addition to the opportunity to represent your school or region for the EMR Action Project prize, we will be picking one piece of artwork per EMR region (one student and one parent will be funded from each region to join the annual EMR trip to the Poor Knights in May).**

A living inheritance - Bobby Stafford-Bush was young but he was passionate about the sea, marine life, art, technology, inventing and making things. He also liked to help people. He was a very capable young man who had his life ahead of him when he was so tragically killed in a car accident at 16 years of age in 2001. Some time has passed since Bobby died and his family has decided that the formation of a charitable trust would be a living document to Bobby and in essence be an extension of his life if he had lived. Accordingly, the family decided to create a 'living inheritance'.

The Bobby Stafford-Bush Foundation supports this special prize for young kiwis that have experienced the marine environment with EMR and display that passion and experience through art. EMR regional coordinators will annually choose three pieces of art from each EMR region. EMR management and sponsors will then decide on one piece of art per region (Northland, Auckland, Taranaki, Coromandel, Gisborne, Wellington, Nelson and Otago).

One student and one parent/guardian from each region will then attend the annual EMR competition trip to the Poor Knights, including flights and accommodation if applicable. An overall ocean art winner will be chosen by the sponsors, receiving a cash prize and the artwork will be used for promotional purposes for both EMR and the Bobby Stafford-Bush Foundation.

### **Bobby Stafford-Bush – EMR Ocean Art Criteria**

Must convey a marine conservation message, such as:

- Protecting or education people about marine biodiversity/marine issues
- Human impacts on your local marine environment
- Marine conservation (different marine conservation measures)
- Marine reserves (rules, boundaries, local marine reserves)
- Differences and similarities between your local area and marine reserve
- Kaitiakitanga

### **Judging criteria**

- Must mention Experiencing Marine Reserves or EMR in some way
- You will also be judged for creativity and presentation
- Keep an eye on [emr.org.nz](http://emr.org.nz) for most recent terms and conditions

# EMR Action Plan

**The action component of the Experiencing Marine Reserves (EMR) programme is an essential factor in the students' learning process and one which helps us to assess the effectiveness of the programme at meeting the projected learning and conservation outcomes.**

By encouraging students to undertake action that is based on their own experience, EMR aims to empower students and encourage support for marine conservation.

Students need to be able to decide on, plan and take effective action on marine environment sustainability issues that concern and motivate them. The action needs to be aimed at addressing the cause of the marine issue. Teachers need to connect the students' EMR experience and growing understanding of the issue to achievable things they can do that will make a difference for the future.

The action could have a direct impact on the marine environment to mitigate, remediate, resolve or prevent harm to marine ecosystems. Action may also be about seeking to influence others to make decisions and choices that will result in improvements to marine ecosystems.

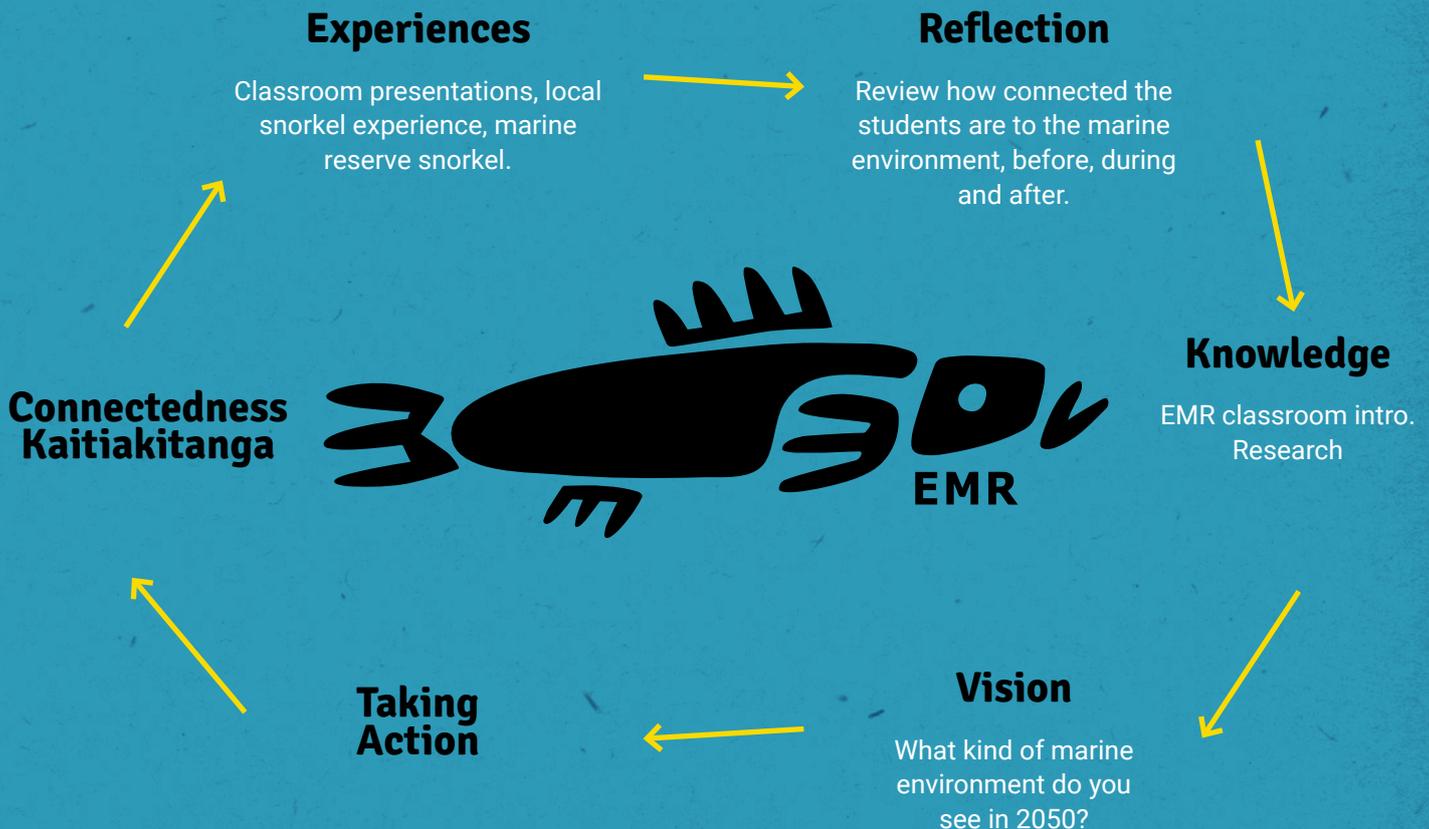
Action competence refers to a student's abilities to act with reference to environment concerns, as active participants in education for sustainability.



## EMR action criteria:

- In response to a marine issue
- Relevant to New Zealand
- Taking action beyond the classroom

## EMR development of Action competence – experiential learning leads to taking action!



**Please note that the ideas presented below are a range of ideas for a range of answers – blank templates are found under ‘Curriculum’ on [emr.org.nz](http://emr.org.nz)**

### **What is the issue?**

- Marine biosecurity threats
- Lack of marine protection or marine reserves
- Storm water pollution
- Lack of information in the community
- Lack of awareness about a current marine reserve or marine protection measure
- Illegal harvesting
- Overfishing
- Sand dune erosion
- Vehicles on beaches

### **What is our goal or vision?**

- See a marine reserve at our local beach
- To see a rahui at our local beach
- To have clean storm water entering our marine environment
- To help community make an informed decision to create a marine reserve
- Increase awareness of an existing marine reserve
- Increase awareness of local marine reserve boundaries
- Engage members of the public in marine conservation
- To make information about marine reserves available to all cultures and languages
- Construct a continuum to identify people’s opinions about a marine reserve proposal

### **Who could influence our decision?**

- Students and teachers
- Parents and whanau
- School community
- Hapu and iwi
- Local community groups
- Conservation groups
- Government

### **What curriculum learning opportunities are there?**

Literacy – letters to politicians or media  
Public speaking – oral communication  
Technology

### **What skills will we need to enhance knowledge?**

Public opinion by developing a survey

### **What action will we need to take to develop our goal**

- Letters to politicians and local papers
- Marine monitoring projects
- Community engagement events
- Public presentations at marae
- Public marine awareness signs
- Coastal and riparian planting events
- Storm water awareness projects
- Fundraising projects for marine conservation
- Supporting local marine conservation community or iwi/hapu groups
- Initiating marine reserve or other marine protection projects
- Addressing local marine issues
- Making submissions to conservation projects
- Public marine conservation displays
- Promotion of marine reserve biodiversity

### **What information will we need to know?**

Read proposals for establishing marine reserves

### **Who will be able to help us reach our goal?**

Your EMR coordinator, DOC, local council, marine conservation groups, Kaumatua and Kuia, experts

### **Benefits of the action:**

Less compliance in marine reserves required from DOC  
Marine environment protected

### **What obstacles could we face?**

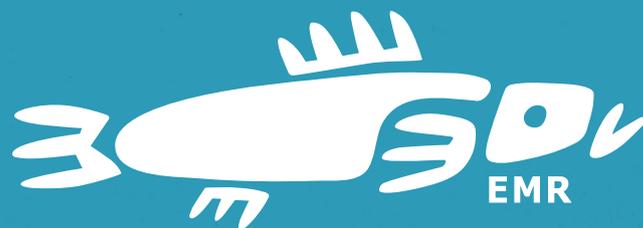
Concerns from the community

### **How will we keep people informed and record progress?**

Signs, newsletters, newspaper reports

### **What evidence will show us that the goal was achieved?**

- Response from politician/s
- Publication of press release by local media
- Pictures showing your storm water stencils
- Pictures showing the community response to your community information evening



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