



Hoea te Waka, piki te mātau

MARINE SURVEY

How can we keep track of the way things change over time? By carrying out a Marine Metre Squared (Mm²) survey or a shellfish (eg pipi) survey you can measure and record the way things are at the present time. You can then go back to this survey information to see if things have changed when you carry out another survey in the future.

This module includes:

- Marine Metre Squared (Mm²) survey
- Shellfish size survey

Marine Metre Squared (Mm²) - background reading

The rise and fall of tides is the most important thing for life in the intertidal zone. At high tide the shore is a great place to live; lots of sunlight, oxygen and food. But at low tide intertidal animals are exposed to the air. Living conditions on the sandy and muddy shore or the rocky shore vary according to the position in the intertidal zone.

Many animals have shells or exoskeletons to protect them. The shell allows them to retain moisture and provides a barrier to salinity changes.

Shelled animals such as pipi and snails close their shells during low tide.

A secure way of holding on is important where there is wave action. Barnacles cement their heads to rocks, limpets use suction and mussels secrete attachment fibres. Shellfish and worms burrow into the sand or mud for protection.

Some animals move under rocks and hide among seaweed to areas where it is damp and cool.

Many creatures have a built-in clock that tells them when the tide is low. These creatures slow down and put feeding and reproduction on hold.



MARINE SURVEY

Objectives of carrying out a shore survey

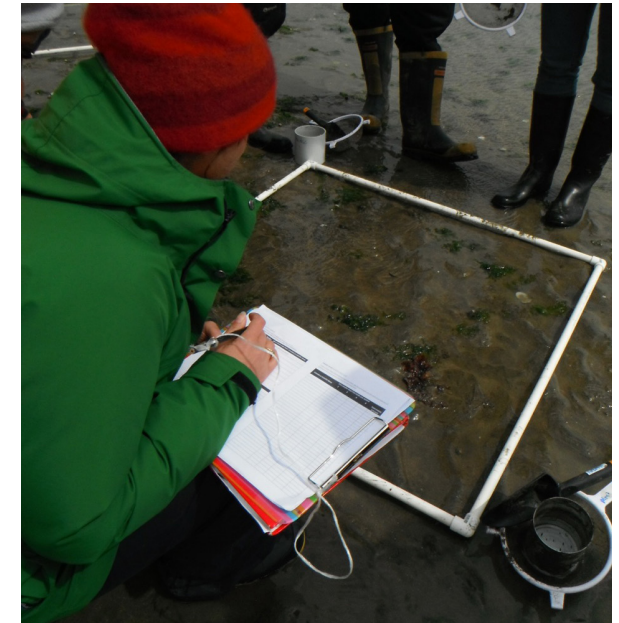
- To observe and record plants and animals found on the rocky seashore using a quadrat.
- To compare and contrast animals that live in different tidal zones.
- To identify stresses with living on the rocky shore and the adaptations that organisms have which allow them to survive.
- To record and share the data by entering it in the national database at www.mm2.net.nz so that the biodiversity of different regions can be compared and contrasted over time.

Marine Metre Squared

The Marine Metre Squared (Mm2) project was set up to facilitate surveying and monitoring biodiversity on the shores around New Zealand.

On the website: www.mm2.net.nz there are resources to help with your survey: identification guides (in English and te reo Māori), instructions, data sheets and links to films to show you how to carry out a survey.

It is important to enter your data into the database when you have completed a survey so that you can compare what you find with other regions and recall your own data for future use.



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Marine Metre Squared Survey - activity

Prior to your survey

- Choose a location
- Check the tides and conditions
- Wear appropriate clothing and footwear
- Check out information and resources on the mm2.net.nz website

What you need for the shore visit

- Quadrats or 4-metre pieces of string
- Rocky Shore or Sandy and Muddy Shore ID Guides (available from the mm2.net.nz website)
- Data sheets and pens or pencils
- An ice cream container lid with a 10cm x 10cm hole cut in it to help estimate percentage cover of seaweed (10cm x 10cm = 1%).
- Camera

In addition, if the shore is sandy or muddy, you will need

- Large can to act as a core to extract some mud from each corner of the quadrat
- Sieve
- Trowel
- Bucket

Method

- Divide class into small groups of 3-4 students.
- Give each group a quadrat to place somewhere along the shore. Ensure each of the different tidal zones is being surveyed.
- Using the data recording sheet, students record the number of plants and animals found and map what they see in their quadrat.
- On a sandy or muddy shore, take a core sample from each corner of the quadrat, tip each sample separately into a sieve, rinse off the mud or sand and count the animals (worms, bivalves, etc) left from each sample.
- Enter the data on the Marine Metre Squared website (www.mm2.net.nz) and compare with other regions.



MARINE METRE SQUARED (MM2) SURVEY

Name: _____ Date: _____
 Location: _____ GPS/grid ref: _____
 Shore level: _____ Transect length: _____
 Low tide time: _____ Exposure: _____
 Low tide depth: _____ m Sea conditions: _____
 Air temp: _____ °C Water clarity: _____ cm
 Sea temp: _____ °C Salinity: _____ g/L

DISTANCE ALONG TRANSECT: _____ m

SUBSTRATE		Percentage cover %	Totals
Reef	(stable rock cover)		
Boulder	(head size)		
Cobble	(fist size)		
Gravel	(marble size)		
Sand	(like the beach)		
Sediment	(fine grain size)		
Mud	(gloopy)		

SEAWEED SPECIES		Percentage cover %	Totals

ANIMALS	Species tally (count)	Totals

Shellfish Size Survey - background reading

Paphies australis or pipi, are a type of shellfish, only found in Aotearoa. At many beaches, pipi are collected seasonally in the summer, during low tide. Many families go to the beach in the evenings to collect this kaimoana to eat; often they are cooked into fritters. Usually only the larger sized pipi are collected. Pipi are found in flat sandy beaches, sandy and silty estuaries, and harbours. Some pipi are covered in a yellowish “periostracum” or skin. Pipi are also capable of releasing a thread of mucus to help them float and move to new locations. There are limits for how many pipi may be collected per person each day. Check the rules for your area before collecting any kaimoana.

How do we ensure there will be enough pipi for whānau to collect in the future?

Tikanga to think about and discuss with your group:

- What is one way we can check pipi numbers?
- How can we test the health of individual pipi?
- What pipi should we gather to ensure there will be more to collect next year?
- How could we find out about the health of the pipi population over many years?
- Talk to kaumatua about the shellfish and other kaimoana in the area.
- What was the kaimoana like here years ago?



Shellfish Size Survey - activity

A. In your group, collect 10 or more shellfish

1. Discuss where you think the best location will be to find shellfish. Eg Close to a river outlet? Where there are waves present?
2. Before collecting your shellfish, use the thermometer to measure the temperature of the water.
3. The best method to gather shellfish such as pipi is to stand in shin deep water and twist your feet from side to side into the sand. Pipi can be found approximately 5 cm under the sand; once you feel one with your feet, reach down and pick it up.
4. Place your shellfish in a bucket and bring them to shore.
5. Collect the same type of shellfish from two locations and two tide zones so you can compare the two samples.

B. Observations

1. Draw a sketch of one shellfish, and write down two possible things about it that might indicate how healthy it is.
2. Using the callipers, measure the length, and the thickness of each of them.
3. See if you can count the annual growth rings in order to find out the age of each one.
4. Use the sheet to record the information.
5. Compare the samples taken from the two sites.
6. Where are the biggest and oldest found?



Tuangi with growth lines marked on the shell



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C. As a group, design a survey to monitor the health of the local shellfish population.

Here are some questions to consider when putting together your survey:

1. What are some factors that could indicate that the shellfish population is healthy?
2. How often would you sample the population?
3. How many shellfish would you collect each time?
4. Would you collect shellfish from one area, or multiple areas along the beach?
5. What measurements would you record from both the collected shellfish and the environment?

Further Discussion Questions:

- Would finding only large shellfish in one area indicate a healthy or unhealthy population? Why?
- Does water temperature affect the likelihood of finding shellfish?
- What factors could be influencing finding shellfish?



Shellfish Size and Age Survey Recording Sheet

Name:	Date:	
Location 1:		
Description of habitat:		
Temp:	Salinity:	Weather:

Name:	Date:	
Location 2:		
Description of habitat:		
Temp:	Salinity:	Weather:

No	Size	No of growth lines
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Total:	Average Size:	Average Age:

No	Size	No of growth lines
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Total:	Average Size:	Average Age:

