



Portobello Marine Laboratory



RV Polaris

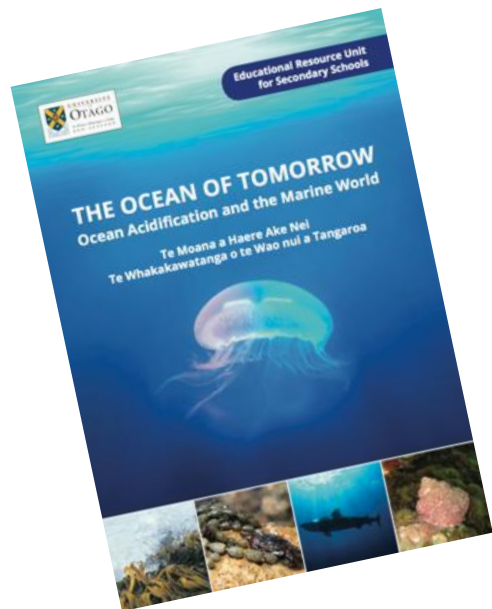




# Hands-On Science



Enriching Local Curriculum



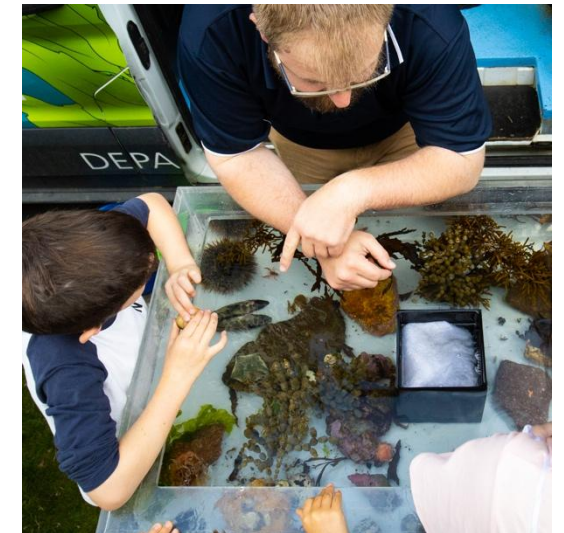
Field and laboratory



Authentic science



Place-based



[www.marine.ac.nz](http://www.marine.ac.nz)





# NZ's Ocean is Big!

- NZ has > 15,000 km of coastline
- NZ's EEZ is one of largest in the world
- Subtropical to subantarctic
- Sheltered harbours to deep canyons
- <1% protected

**Celebrate our coastal environment  
and actively care for it!**



# 17,000 Marine Species

- 10% global marine biodiversity
- Half only found in NZ waters
- Over 4000 still undescribed

**Build environmental awareness  
(e.g. record local species)**





# Our Ocean is changing....

- Sea level is rising
- Sea is becoming more acidic
- Ave temperature is rising, Heatwaves more extreme
- Storm events increasing (waves, sediment input etc.)



Dead and dying paua on a Kaka Point beach. PHOTO: EVELYN THORN

August 2022, after high rainfall event

Stuff

environment

## Mass bleaching of native sea sponges in Fiordland shocks scientists

Hamish Cardwell of RNZ • 19:15, May 16 2022



Ray's Bream – May 2022

**Environmental monitoring  
(e.g. record change)**



A photograph showing two people standing on the deck of a boat, looking out at a vast, choppy sea under a sky filled with white and grey clouds. The boat's structure, including railings and equipment, is visible in the foreground.

# World beneath the waves..

*Provide opportunities for  
'hands-on' experiences*

*(e.g. Clubs have coastal facilities, boats, wharves, shorelines)*

*Engage in 'citizen science' projects*

*(e.g. Clubs have knowledge of the local area)*

*Embrace local experts*

*(e.g. collaborate with community initiatives and research projects)*





Marine  
Metre<sup>2</sup>

[www.marine.ac.nz](http://www.marine.ac.nz)





# iNaturalist

<https://www.inaturalist.org>

- Identification of local species by experts
- Create a species list for your local area
- Record seasonal events (e.g. whale migration, jellyfish stranding)
- Connects with scientists and local community

The screenshot shows the iNaturalist project page for 'NZLBlueBelt Worser Bay'. At the top is a banner image of a coastal scene with a boat and a house on a hill. To the right of the banner is an 'About' section with text: 'The Worser Bay Yacht Club is the prototype location for New Zealand's first 'BlueBelt' site under the Moanamana project. Our iNaturalist page helps advance some citizen science effort towards understanding the ecological diversity of this beautiful marine area.' Below the banner are statistics: 202 OBSERVATIONS, 92 SPECIES, 82 IDENTIFIERS, and 58 OBSERVERS. There are buttons for 'Map', 'Grid', 'List', 'Identify', 'Search', and 'Export Observations'. The main content area displays a grid of species observations, each with a photo, a green 'RG' (Research Grade) label, the species name, and the number of observations and time since the last observation. The species shown are: Hooded Shrimp (Order Cumacea), Brown Periwinkle (*Austrolittorina cincta*), Pipi (*Paphies australis*), Morning Star Shell (*Tawera spissa*), Purple Sunset Clam (*Gari stangeri*), Smooth Dosinia (*Dosinia subrosea*), New Zealand Bull Kelp (*Durvillaea antarctica*), and Genus *Marginariella*.

About Leave 8

The Worser Bay Yacht Club is the prototype location for New Zealand's first 'BlueBelt' site under the Moanamana project. Our iNaturalist page helps advance some citizen science effort towards understanding the ecological diversity of this beautiful marine area.

[Read More >](#) [Your Membership](#)

[Project Journal](#)

Overview **202** OBSERVATIONS **92** SPECIES **82** IDENTIFIERS **58** OBSERVERS [Stats](#)

[Map](#) [Grid](#) [List](#) [Identify](#) [Search](#) [Export Observations](#)

**Hooded Shrimp**  
Order Cumacea 2 2d

**Brown Periwinkle**  
*Austrolittorina cincta* 2 2d

**Pipi**  
*Paphies australis* 4 1mo

**Morning Star Shell**  
*Tawera spissa* 5 1mo

**Purple Sunset Clam**  
*Gari stangeri* 6 1mo

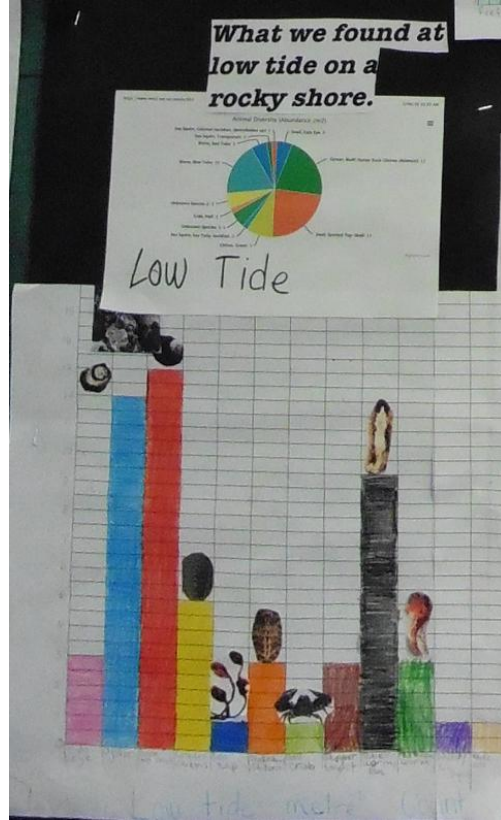
**Smooth Dosinia**  
*Dosinia subrosea* 6 1mo

**New Zealand Bull Kelp**  
*Durvillaea antarctica* 1 1mo

**Genus *Marginariella***  
1 1mo



# Moving beyond data donation...



**Where?** Describe features of a suitable study site.

**Why?** Who might be concerned about the dredging of the harbour and why?

**Sediment and Seashores**  
**Research Plan**  
**Our Question:**

**What?** What should we measure / record?

**When?** When should we go and what equipment / resources do we need?

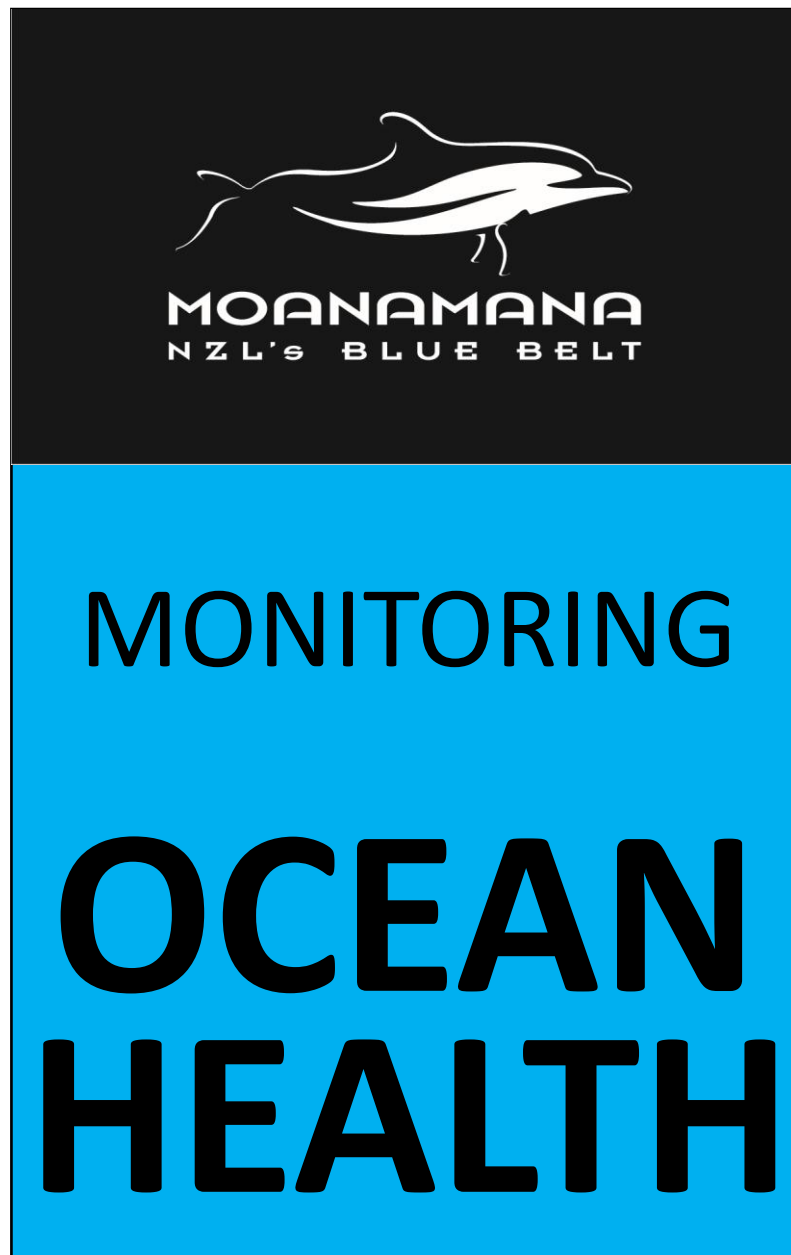
Fascinating Facts: \* We were surprised how many brown chitons (32)  
\* We thought there would be more Neptune neckless

Wondering: \* We wondering if we can have marine riseve in Otago

Next Steps: Is to know how are info to help others.

Asking questions of local relevance...





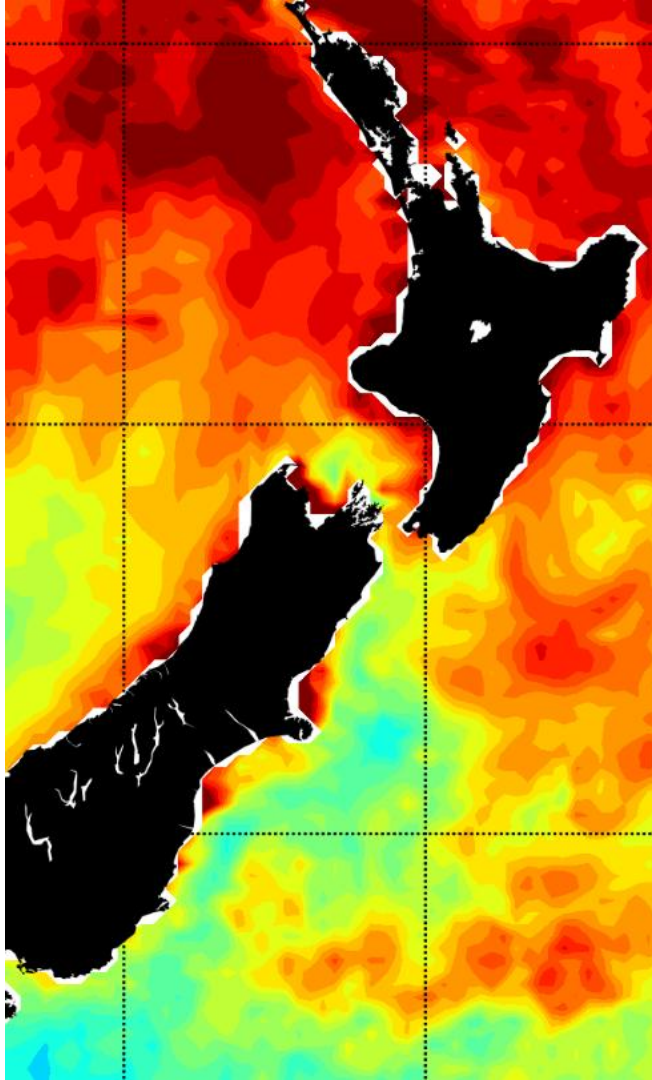
## What can our akonga do to help?

Your mission is to work with your community as citizen scientists to monitor changes that are taking place in your local marine environment, and use this knowledge to create a NZL Blue Belt site that helps restore mana to the moana at your place.



# Measuring Environmental Conditions

Temperature



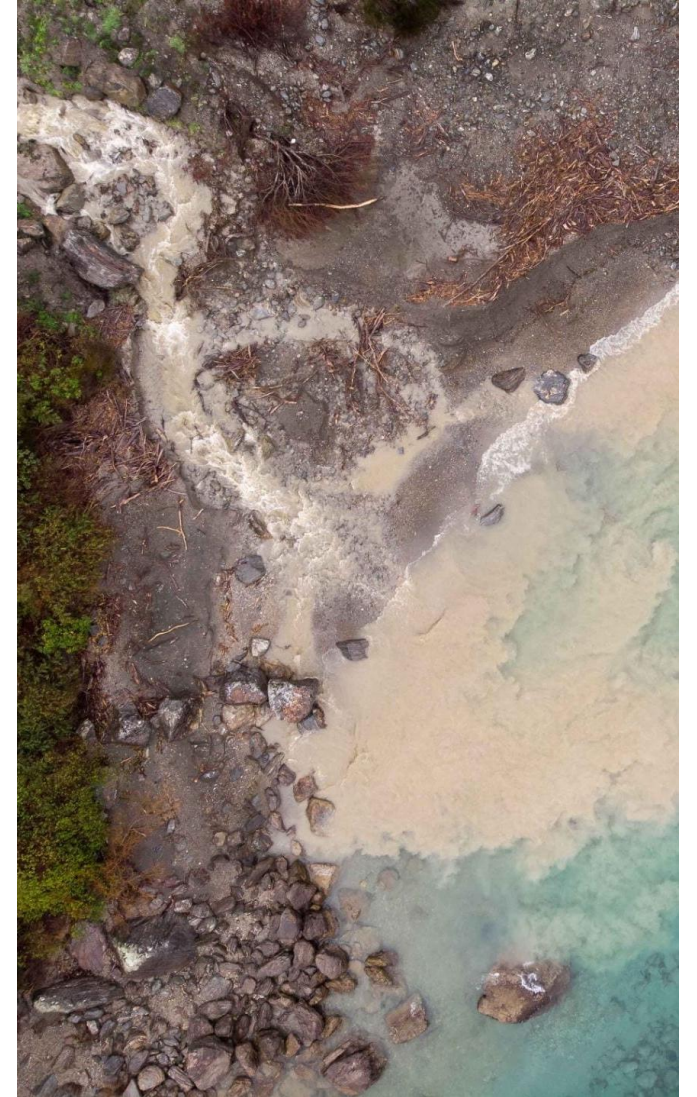
[www.moanaproject.org](http://www.moanaproject.org)

Salinity



**Moanamana App** – under development

Clarity



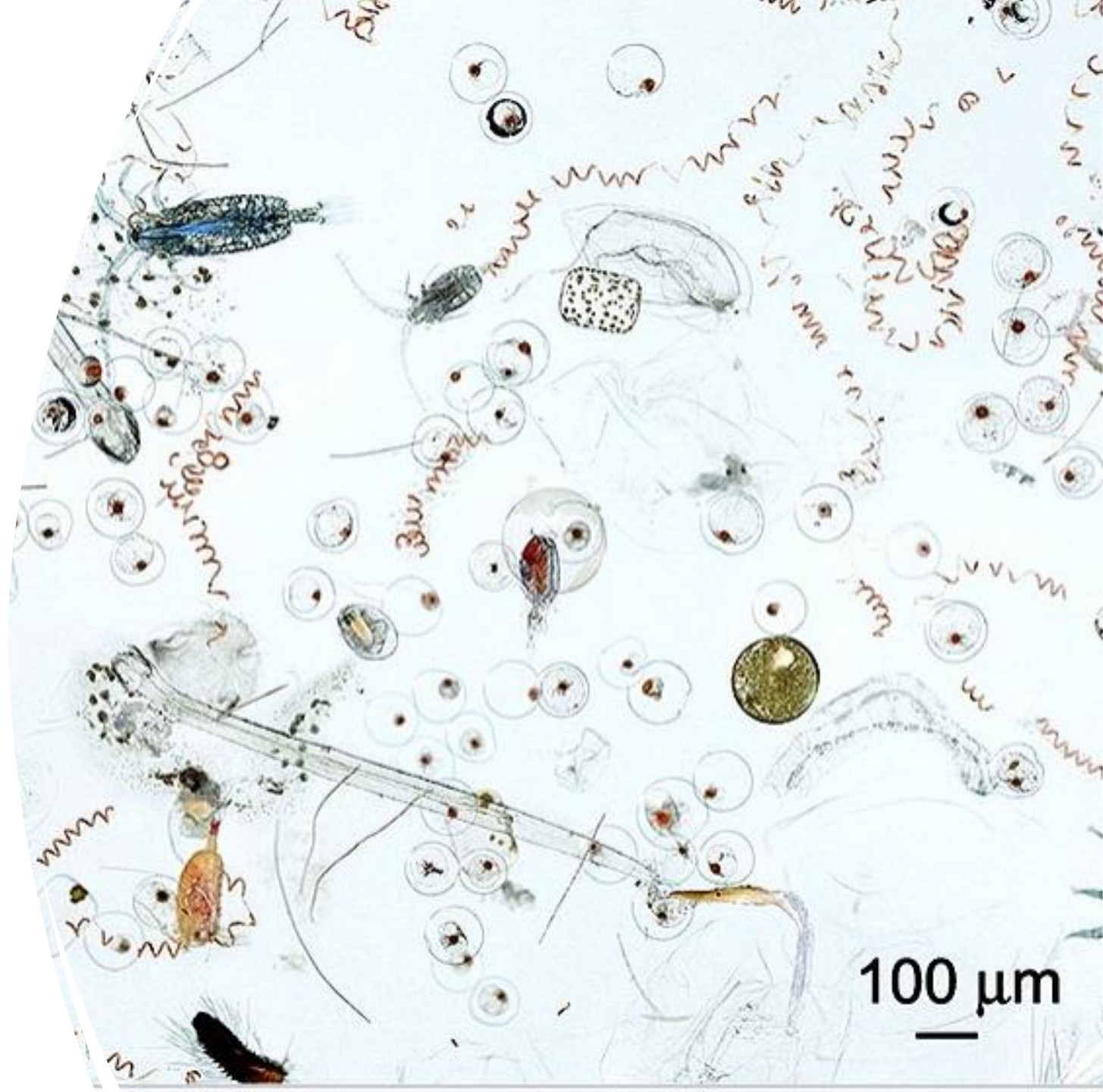
[www.secchidisk.org](http://www.secchidisk.org)



# Monitoring Biological Communities

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- **Marine Metre Squared** surveys to monitor biodiversity in intertidal areas.
- **Photogrammetry models** to create digital 3D representations of the shoreline.
- **Underwater transect surveys** to record species along designated marine zones.
- **Plankton surveys** to monitor diversity of microscopic marine life.
- **Baited remote underwater video (BRUV) surveys** to monitor subtidal communities.
- **Settlement plate surveys** to monitor settlement of marine larvae over time.





# Photogrammetry - Mapping our shoreline one square metre at a time











# Teacher Feedback..

*“**Inspiring** and well thought-out.”*

*“Excellent to see the resources available for Moanamana and **build links** with the yacht club.”*

*“It is so **accessible to so many levels** and abilities with so many resources to support it.”*

*“Opportunity to consider how the Rūna resources, Sailing experience with local club and other EOTC activities can fit together more coherently with with **greater purpose.**”*

*“The **practical science** would be great to introduce and commit to long term - collecting **meaningful data** to a local area.”*



# Getting Started...

- Explore partnerships and collaboration (facility use during winter)
- Connect with local experts / offer workshops (Shark spy, Love Rimu, Rimu)
- Engage with community events (Penguin project)
- Present to club members
- Leverage school and parents
- Share your stories (newspaper, social media)
- Clean Club (audit and tools)

## Primary pupils on quest to protect marine area around Worser Bay Boating Club

8:07 pm on 13 June 2024

Share this



Pretoria Gordon, Journalist  
✉ [pretoria.gordon@rnz.co.nz](mailto:pretoria.gordon@rnz.co.nz)



Worser Bay School students have been looking into the marine ecosystems around Worser Bay Boating Club in Seatoun. Photo: Supplied

<https://www.rnz.co.nz/news/national/519486/primary-pupils-on-quest-to-protect-marine-area-around-worser-bay-boating-club>



# YNZ Clean Club programme

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- **Builds on Clean Regatta Momentum**  
A natural next step for clubs already engaged with Sailors for the Sea's Clean Regatta initiative.
- **Practical Audit & Goal-Setting Tool**  
Helps clubs assess current environmental practices and set achievable sustainability goals.
- **Focus on Core Environmental Practices**  
Encourages clubs to get the basics right—especially in waste reduction and resource management.
- **Demonstrates Club Leadership**  
Showcases your club's commitment to sustainability, setting an example for members and the wider community.

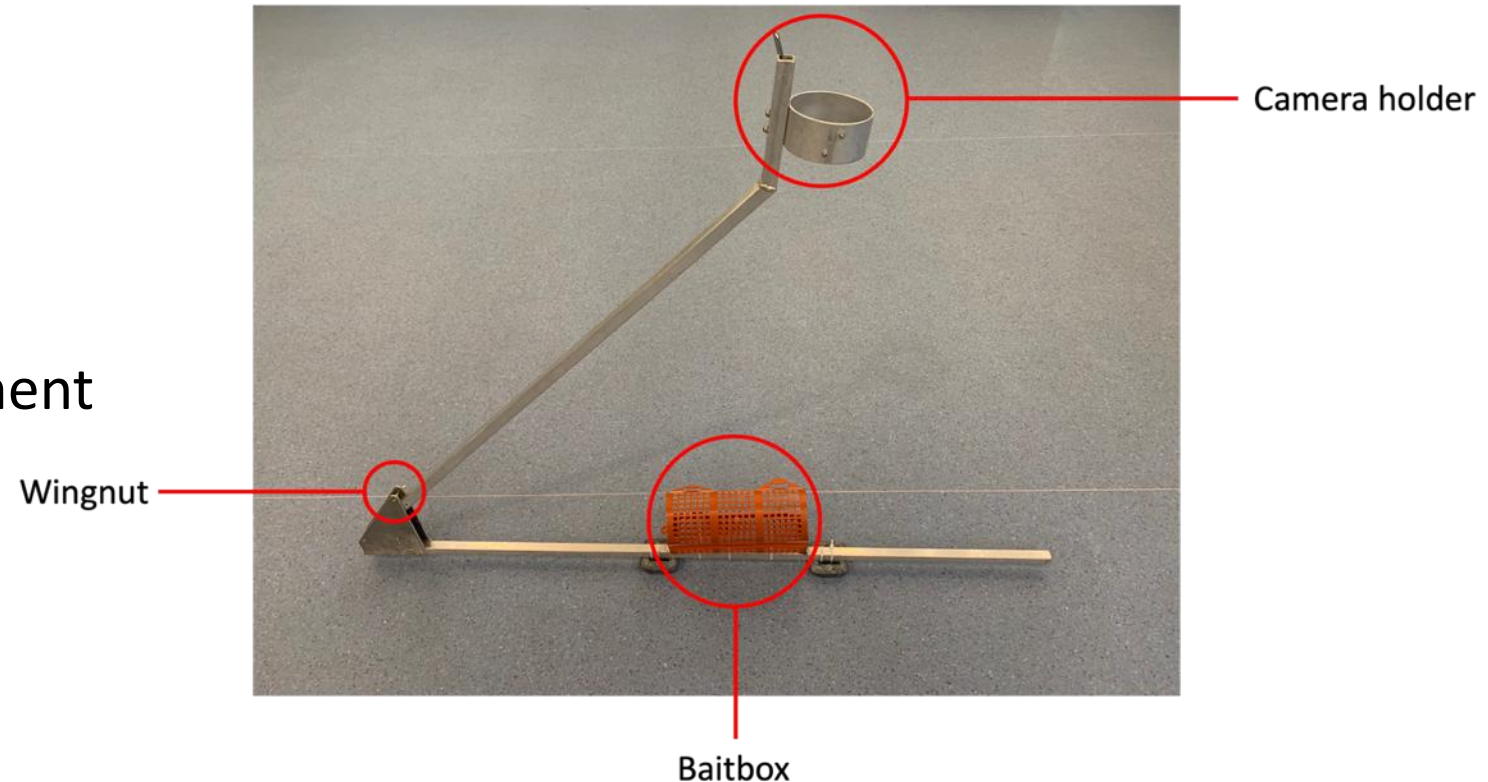




# Challenge – Skills for Subtidal Monitoring

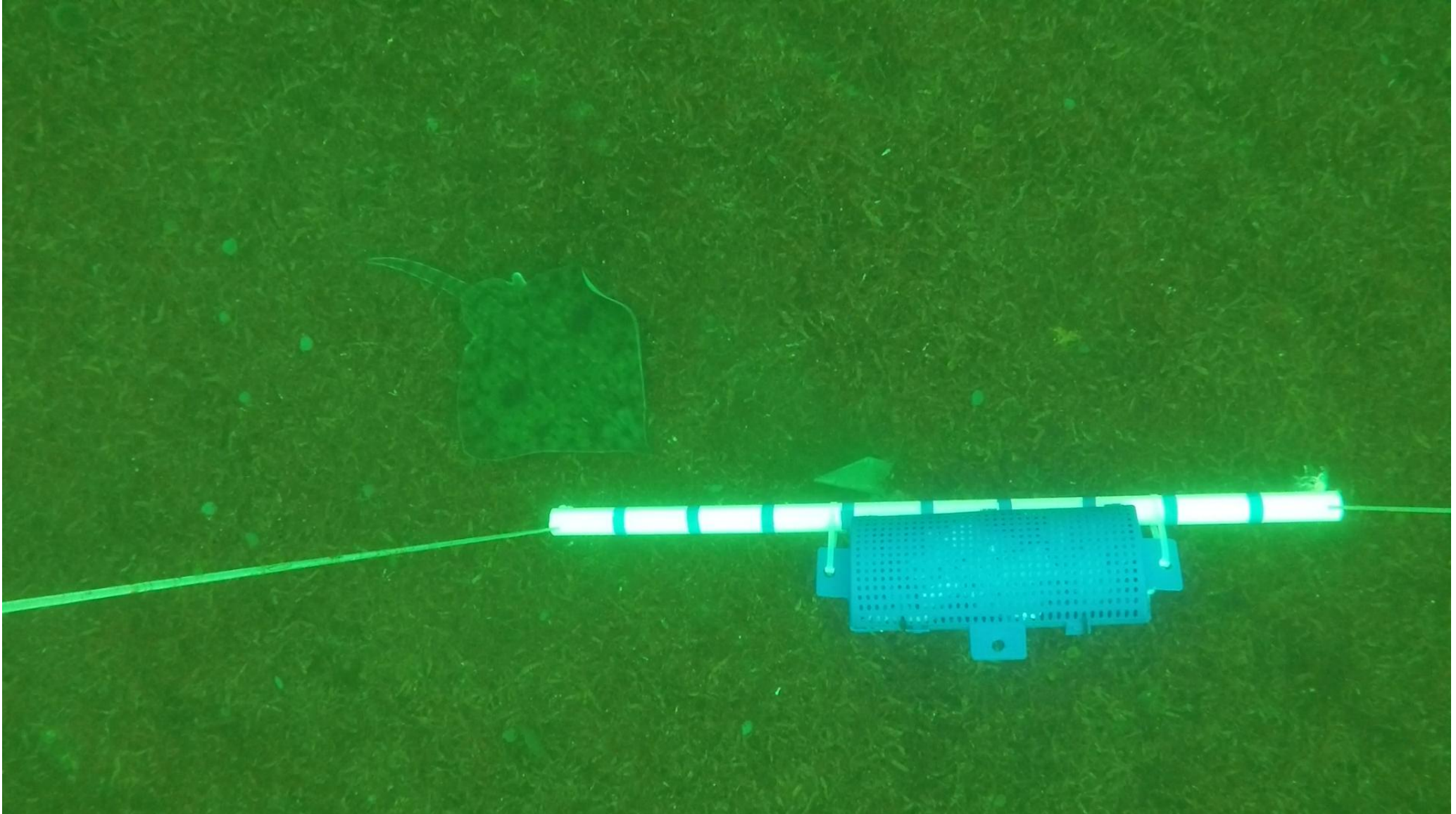
## – *Build your environmental awareness*

- Work as a team (2-4)
- Observe videos from BUV
- Record
  - Types of fish see
  - Max number of each species
  - Observations about environment





# BUV #1 –Rakiura



Rakiura, Bull Point



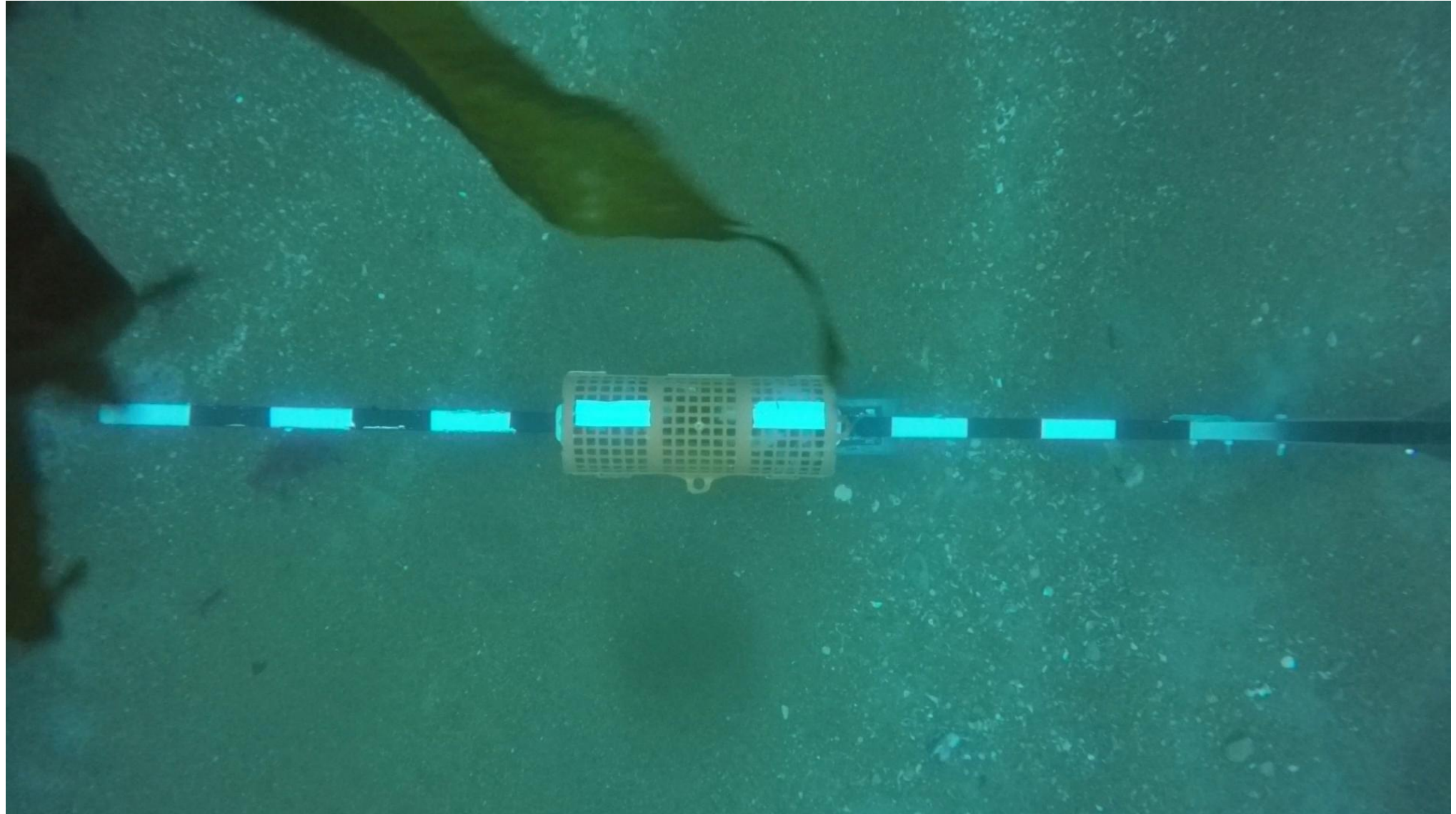
# BUV #2 – Taranaki



Taranaki, Urenui



# BUV # 3 - Otago



Otago, Shag Point



# Check your observational skills...

Rakiura, Bull Point			Taranaki, Urenui			Otago, Shag Point	
Species	MaxN		Species	MaxN		Species	MaxN
Rough skate	1		Snapper	4		Bluecod	63
Spiny dogfish	1		Spotty wrasse	1			
Sevengill	2		Silver Sweep	5			
Blue cod	1		Bluecod	1			
Richness	4			4			1
Shannon-Weiner	1.33			1.16			0
Simpsons	0.72			0.64			0

## Scoring:

- 1 point for each fish species identified correctly
- 1 point for correct Max count
- A bonus point for additional observations

Highest Score wins!



# Signs of the Sea

Simple (and quick) activities that build environmental awareness

<https://www.otago.ac.nz/marine-studies/resources/signs-of-the-sea>

## WHAT IS 'NATURAL'? HE AHA TE MĀORI?

Look around: near and far, into the water, up at the sky, out to the trees and houses, birds and boats, the life near your feet...



What has been added or changed by humans?



How many parts of the landscape do you describe as "natural"?



What importance do you place on things that are "natural"?



Take another look tomorrow: how does the weather, the time of day, or your mood affect what you see and value?

## IF THE OCEAN WERE A PERSON, WHAT'S THEIR MOOD TODAY? ME HE TANGATA TE MOANA



Notice their colour and energy level: are they angry, peaceful, happy, lazy, sad, threatening, secretive, or...



Mimic their mood with your own facial expression or body movement.



Capture their mood in a poem. Try a haiku:

*A<sup>1</sup>three<sup>2</sup>line<sup>3</sup>poem.<sup>5</sup>  
Five<sup>1</sup>syllables<sup>2</sup>in<sup>3</sup>the<sup>4</sup>first,<sup>7</sup>  
then<sup>1</sup>seven<sup>2</sup>, then<sup>4</sup>five.<sup>5</sup>*



Sing it as a song (be a "busker for the sea").



## COUNTING CRITTERS KAUTE KĪREHE

Marine animals can live in high numbers. Sometimes they seem too many to count, but it's important to monitor a population's health.

Test your skills at estimating numbers of animals: birds in a flock, numbers of snails, or worm holes....



Count a cluster of 5-10 individuals near the edge of the group, then count how many clusters of equal size there are.



Take a photo, zoom in and count: were you close?

There are  $5 \times 7 = 35$  snails on these rocks!

Use this helpful guide to train your eye!

1000

200

100

50

10





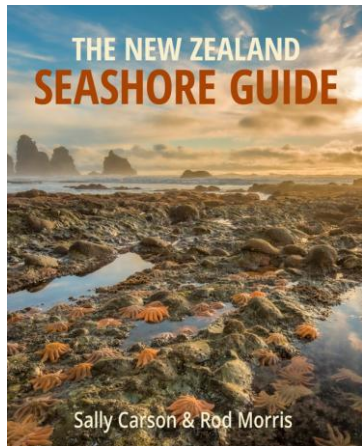
# Resources Available...



NZMSC



BLAKE NZ-VR



[www.marine.ac.nz](http://www.marine.ac.nz)



Experiencing Marine Reserves

The screenshot shows the Marine Metre 2 website interface. At the top, there's a navigation bar with links like 'Get Involved', 'About', 'Resources', 'Stories & Case Studies', and 'Explore Data'. Below this is a 'Resources' section with a search bar and filters for 'All Audiences', 'All Survey Types', 'All Categories', 'All Shore Types', and 'All Languages'. The main content area displays several resource cards: 'Intro to Mm2 Poster' (Poster), 'Mudflat Mysteries' (Video), 'How to carry out a survey on a sandy or muddy shore' (Poster), 'Estimating percentages with a 10cm square' (Guide), 'Marine pest profile template' (Data Sheet), and 'Mm2 data analysis template' (Data Sheet).

[www.mm2.net.nz](http://www.mm2.net.nz)



Range of museums, outdoor education centres, aquarium, wildlife centres etc.

<https://www.runa-yachtingnz.org.nz/moanamana->



- Shared questions / interest provides motivation for further monitoring
- Facilitation supports local application of tools

- Project provides a reason to engage with their local environment
- Local relevance increases motivation to engage in environmental citizenship behaviours.

- Connecting data with larger environmental issues
- opportunity for participants to extend and grow involvement