

RAPID MONITORING & BE A MARINE BIOLOGIST FOR A DAY



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Students or guests should have:

- a Rapid Monitoring Survey slate
- or Be a Marine Biologist for a Day (BAMBFD) slate available while working through the flipbook.

Flipbook Overview

- Flipbook layout allows students/guests to view the image on the front (facing) page while reading the corresponding text on the back of the previous page.
 - The image in the left-hand corner indicates what is shown on the facing page.
- Be a Marine Biologist for a Day (BAMBFD)**
- Based on the Rapid Monitoring survey.
 - Aligned with the Australian Curriculum and scaffolded for different year levels.
 - Primary & middle school: typically complete the timed swim component.
 - Senior students (15+): usually undertake the full Rapid Monitoring survey.
 - Simplified survey slates are available for younger students as an alternative to the Rapid Monitoring slate.

ACKNOWLEDGMENT OF COUNTRY

We acknowledge the expertise, wisdom, and enduring connections that have informed the guardianship of the Reef for millennia.

We pay our respects to the Traditional Owners as the first managers of this Land and Sea Country, and value their traditional knowledge, which continues to inform the current management and stewardship of the Reef for future generations.



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EYE ON THE REEF

The Reef Authority's Eye on the Reef program enables anyone who visits the Great Barrier Reef to collect and contribute data that will help inform how it is managed.

You can help by:

- Collecting citizen science data as part of a Rapid Monitoring survey.
- Uploading your collected survey data to the Eye on the Reef.
- You can also contribute by submitting sightings in the Eye on the Reef App.



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ACKNOWLEDGMENT OF COUNTRY

(You are welcome to use your own wording).
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Eye on the Reef – Citizen Science

The Reef Authority's Eye on the Reef program enables anyone visiting the Great Barrier Reef to collect data that helps inform Reef management.

- Download the free Eye on the Reef App to:**
- Record reef health observations
 - Submit animal sightings
 - Report incidents
- Visitors can also contribute through the Rapid Monitoring survey, designed for anyone to participate.
- Survey data can also be submitted through the Eye on the Reef App.



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RAPID MONITORING SURVEY

Collects information on:

- Reef health indicators.
- Protected and iconic species.
- Emerging reef health issues.

Used to:

- Monitor the same site regularly to identify trends and changes over time.
- Provide a snapshot of reef health at less frequently visited sites.



RAPID MONITORING SURVEY

The purpose of the Rapid Monitoring survey is to collect information about:

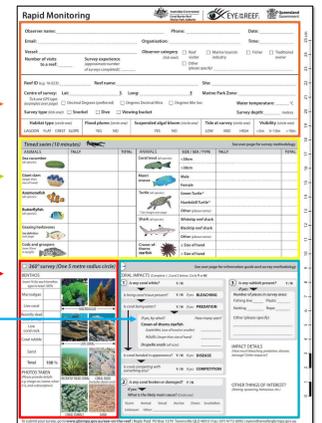
- reef health indicators,
- protected and iconic species,
- emerging reef health issues.

It can be used to monitor the same site regularly and get an idea of trends or changes to that site over time.

Or it can be used to get a basic snapshot of reef health at less frequently visited sites.

RAPID MONITORING SURVEY

1. Observer and site information.
2. A 10-minute timed swim.
3. A 360° benthic survey.
4. Coral impacts and other things of interest.



RAPID MONITORING SURVEY

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RAPID MONITORING SURVEY

The Rapid Monitoring survey includes several sections:

1. Surveyor and site information.
2. A 10-minute timed swim.
3. A 360° benthic survey.
4. Coral impacts and other items of interest.

Be a Marine Biologist for a Day program (BAMBFAD):

- Primary and middle school students usually complete only the 10-minute timed swim.
- This introduces target species identification and how to record observations.
- If only doing the timed swim, skip ahead to Part 2: 10-minute Timed Swim in the flipbook.

PART ONE: OBSERVER AND SITE INFORMATION

Fill out information about:

- Observer details (yourself).
- Organisation (if applicable).
- Survey experience.
- Reef and survey site.
- Environmental conditions at the site.

PART TWO: 10-MINUTE TIME SWIM

- Record the presence of target species by tallying how many you see in 10 minutes.

Support for Survey Completion:

- *Assist students or guests by providing relevant information where needed. Use available resources to identify survey details, including:
- Great Barrier Reef Marine Park Zoning Map
 - Eye on the Reef App
 - Vessel skipper (for Reef ID, Reef name, and Marine Park Zone).

PART ONE: OBSERVER AND SITE INFORMATION

The first part to complete is the observer and site information. Fill out information about:

- Observer (yourself), organisation (if applicable) and your survey experience.
- The reef site you are surveying, and the environmental conditions at the site.

PART TWO: 10-MINUTE TIME SWIM

- During the timed swim you will record the presence of target species by tallying how many you see in 10 minutes.

There are simplified survey slates for Be a Marine Biologist for a Day (BAMBFAD).

- Young primary students: record one target species per group using the BAMBFAD single-species slate. Combine class results to capture all indicator species.
- Older primary & middle school: record all target species using the full BAMBFAD slate.
- Senior students (15+ years): record all target species and complete the 360° benthic survey using the Rapid Monitoring slate.

Choose an option of slate:

- a. Rapid Monitoring survey slate.
- b. BAMBFAD slate – all indicator species.
- c. BAMBFAD single-species slate.

ANIMALS TO COUNT DURING THE 10-MINUTE TIMED SWIM



ANIMALS TO COUNT DURING THE 10-MINUTE TIMED SWIM



Why do we count these species?

- Reef health indicators.
- Endangered status.
- Contribute to reef health.
- Iconic species.
- Commercial value.
- Popular with tourists.

ANIMALS DURING THE 10-MINUTE TIMED SWIM

These are the target species that we record during the 10-minute timed swim:

1. Butterflyfish
2. Anemonefish
3. Cods and groupers
4. Giant clams
5. Turtles
6. Coral trout
7. Sea cucumbers
8. Maori wrasse
9. Grazing herbivores
10. Sharks
11. Crown-of-thorns starfish

- You are unlikely to see all 11 target species during the 10-minute timed swim.
- You may only observe a few of the indicator groups.
- Do not include animals seen after the timed swim in your count.
- Record these sightings in the "Other Items of Interest" section at the bottom of the survey.

SEA CUCUMBERS

Soft cylindrical body. Most look-like large worms or caterpillars

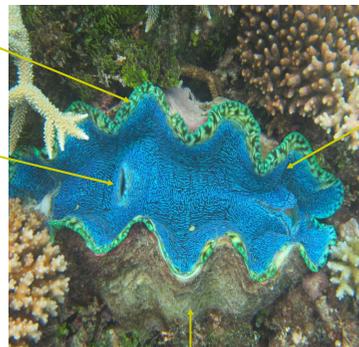
Size: up to 100cm, Typically: 25cm

Breathe by taking in water through their anus

Move using tube feet and rhythmic contractions

GIANT CLAMS

The colours and patterns in the mantle are produced by symbiotic algae and light refraction in indocyste cells.



Symbiotic algae in the mantle produce nutrients through photosynthesis.

Inhalant siphon draws in water to filter for food and oxygen.



Shell is made of two thick wavy valves.

Do not count burrowing clams

GIANT CLAMS

The colours and patterns in the mantle are produced by symbiotic algae and light refraction in indocyste cells.

Symbiotic algae in the mantle produce nutrients through photosynthesis.

Inhalant siphon draws in water to filter for food and oxygen.

Exhalant siphon expels filtered water.

Size: up to 140 cm Weight: up to 250kg Age: 70 years+

Record all giant clams larger than the size of your hand

Do not count burrowing clams.

Fun Facts:

- Giant clams are molluscs, related to sea snails, octopus and squid.
- They are the largest species of bivalve (meaning "two-doors" shells).
- Most of their energy comes from symbiotic algae (Symbiodinaceae) in their tissues that produce sugars through photosynthesis.
- They also filter feed, drawing water in through an inhalant siphon and expelling it through an exhalant siphon.
- A single giant clam can filter hundreds of litres of water each day.

GIANT CLAMS

Why do we count them?

- Giant clams are protected and iconic reef species.
- They filter water and remove excess nutrients, helping limit algal growth.
- Giant Clams can bleach when stressed.
- Because they are long-lived and don't move, declines may indicate reef health issues.
- Empty shells can signal past stress events such as bleaching, flood plumes or extreme weather.

Where to look:

- Found on the hard reef or sandy seafloor to a depth of up to 20 metres.

Additional information:

- Reminder: only count giant clams larger than your hand.
- Don't count the burrowing clams in coral or coral rock. They are much smaller than giant clams and only grow to around 20 cm.

SEA CUCUMBERS



Fun Facts:

- Sea cucumbers are echinoderms, related to sea stars and sea urchins.
- They occupy an ecological niche like earthworms on land, helping to recycle nutrients.
- They breathe by drawing water in and out of their anus using an organ called a respiratory tree.
- For defence, they can eject sticky tubules or internal organs to deter predators.
- Some species are commercially harvested for food (trepanng or bêche-de-mer).

SEA CUCUMBERS

Why do we count them?

- Sea cucumbers act like the vacuum cleaners of the sea.
- They digest organic matter from sand, helping remove nutrients and keep the seabed clean.
- They don't migrate, so if they go missing, it tells us something is wrong.

Where to look:

- Usually found on the sandy seafloor.
- Sometimes on coral rock and coral crevices.
- Some burrow under the sand and are difficult to spot.
- Look for a cylindrical caterpillar-like animal.
- If there is little or no sand at your site, you might not see many.

Additional information:

- They come in a variety of colours and sizes.
- Some species can grow over 1 metre, but most are around 50-60 cm in length.
- Record all that you see.

ANEMONEFISH

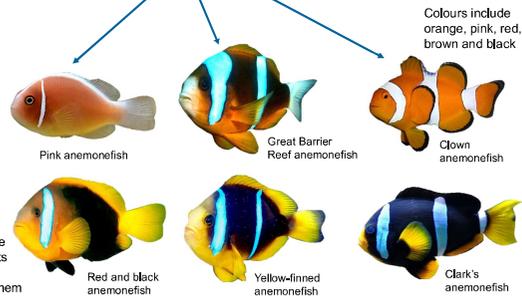
Have one, two, or three, white stripes

Live in sea anemones

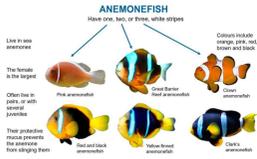
The female is the largest

Often live in pairs, or with several juveniles

Their protective mucus prevents the anemone from stinging them



Colours include orange, pink, red, brown and black



Fun Facts:

- Anemonefish and anemones have a symbiotic (mutually beneficial) relationship.
- The anemone provides protection with its stinging tentacles.
- The anemonefish cleans, defends, and provides food to the anemone.
- Each anemone hosts a family group of non-related anemonefish.
- The largest fish is the female, followed by the breeding male; others are immature males.
- If the female dies, the dominant male changes sex to become the female (within about a month).

ANEMONEFISH

Why do we count them?

- Anemonefish only live in sea anemones.
- They are an iconic reef fish (e.g. Nemo from Finding Nemo).
- Anemones are long-lived and are susceptible to bleaching. If anemones go missing or die, anemonefish will have nowhere to live.
- Seeing anemonefish can be a sign that the reef is not heavily impacted by human activity or environmental stressors.

Where to look:

- Anemonefish are territorial, usually found within 1m of their host anemone, often hidden amongst the coral and coral rock.
- When threatened, anemonefish will hide in the anemone for protection.

Additional information:

- Remember to count the anemonefish (not the anemone).
- There are 7 species of anemone fish found on the Great Barrier Reef.
- Count all species that you see.

BUTTERFLYFISH

Most have an eye-stripe, and many have a false eye-spot near their tail to confuse predators

Have a flat, disc-shaped body, pointed nose, and small mouth

Most are black, white, and yellow. Patterns of lines, dots and dashes are common

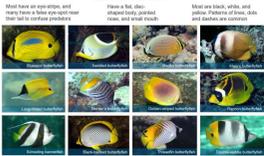


Size: < 30 cm

Usually in pairs, or small schools

Most eat coral (Coralivores)

BUTTERFLYFISH



Fun Facts:

- Most species patrol a home range by the day.
- At night they sleep in reef crevices, and their colours fade to blend with the reef.
- Some species communicate using sounds such as tail slaps, fin flicks and jumps.
- Their swim bladder and lateral line help detect and amplify these sounds.
- Many butterflyfish form lifelong pairs.

BUTTERFLYFISH

Why do we count them?

- Most butterflyfish eat coral (coralivores).
- Over one-third are obligate coralivores - relying on coral for food - with a diet >80% coral.
- A high abundance of butterflyfish can indicate a high abundance of coral.
- Some butterflyfish only eat certain species of coral.
- High butterflyfish diversity can indicate high coral diversity.

Where to look:

- Look for pairs or small groups, swimming close to or feeding on coral.

Additional information:

- They are easy to identify - flat disc-shaped bodies, a pointed nose and small mouth.
- Most are black, white and yellow with a variety of stripes and patterns.
- Often have a black stripe over the eye and/or a black spot near the tail.

GRAZING HERBIVORES



GRAZING HERBIVORES



Fun Facts:

- Parrotfish** can:
 - Swim by flapping their pectoral fins in a flying motion.
 - Their beak-like fused teeth.
 - Bright parrot-like colours (in males)
 - Can change gender from female to male and change colour during the transition.
- Surgeonfish** have a sharp scalpel-like blade at the base of their tail used for defence.
- Rabbitfish** are named for their downturned, rabbit-like mouth and use venomous fin spines for protection.

GRAZING HERBIVORES

Why do we count them?

- Grazing herbivores act like the Reef's lawnmowers by grazing on algae, helping to keep it under control.
- They reduce algae-coral competition, such as algae overgrowth, to keep reefs healthy and resilient.
- By removing algae, they increase the availability of space and light for coral growth and recruitment.

Where to look:

- Look for schools of fish, often of similar size and appearance, moving slowly along the reef.
 - Often seen face down, grazing, scraping and biting at algae growing on the coral rock.
 - They include Parrotfish (*Labridae / Scarinae*), Rabbitfish (*Siganidae*) and Surgeonfish (*Acanthuridae*).
 - Record all that you see.
- Additional information:**
- Listen for the sounds of parrotfish's beaks scraping on the rocks as they feed.

CODS AND GROUPEERS

Camouflage colours of black, brown, grey, tan and white

Patterns of spots, blotches and irregular bars

Size: up to 300 cm
Weight: up to 300 kg
Record all over 50cm



Most have a C-shaped tail

Large upturned mouth with big lips, and multiple rows of small teeth

Medium to large, torpedo-shaped body

CODS AND GROUPEERS



Fun Facts:

- Barramundi cod, potato cod and Queensland grouper were once overfished but are now protected on the Reef.
- They start life as females and later change to males.
- Most are solitary, except during spawning aggregations.
- In areas outside of the Great Barrier Reef Marine Park, where they are not protected, they are often taken in large numbers during spawning.
- The Queensland grouper is the largest bony fish on the Reef.

CODS AND GROUPEERS

Why do we count them?

- They are protected species.
- Slow growing and long lived.
- Important predators that help maintain balanced food webs.

Where to look:

- This group includes barramundi cod, potato cod and the Queensland grouper.
- They are often solitary and territorial.
- Look for them resting on the bottom or hiding under ledges or large plate corals.

Additional information:

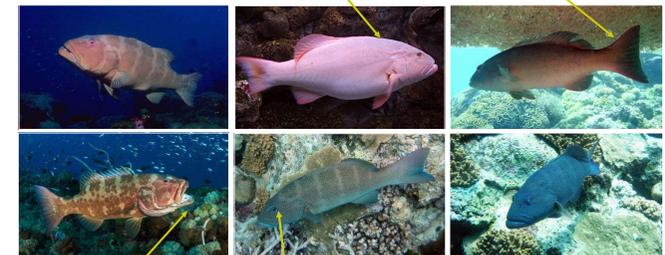
- Reminder only record cod and grouper >50 cm.
- Many are ambush predators, their colours help them to blend in with their surroundings as they wait for prey to come by.
- Some are residents on a particular reef for a long time, sometimes for over 20 years.

CORAL TROUT

Colours vary from blue, brown, red, pink, black and white

Small blue spots all over the body

Straight tail



Canine teeth protrude from the lower jaw

Blue ring around each eye

Record fish < 38 cm and > 38cm separately



CORAL TROUT

Colours vary from blue, brown, red, grey, black and white. Small blue spots around the body. Straight tail. Carcass dark purple from the coral glue. Black ring around each eye. Headless fish < 38 cm with a black horizontal line.

Fun Facts:

- Coral trout are solitary and territorial, usually staying on one reef.
- They change gender from female to male at 42 cm.
- Adults are fish-eating predators (piscivores).
- They hunt by ambushing prey or slowly prowling before a fast attack.
- Coral trout have been observed hunting cooperatively with moray eels.
- Tail shape helps identify them:
 - Coral trout: flat or T-shaped tail
 - Coral cod: C-shaped tail

CORAL TROUT

Why do we count them?

- They are targeted by recreational and commercial fishers.
- We record different sizes to calculate sustainable catch limits from accurate estimates of population size.
- Size < 38cm = under legal catch size.
- Size > 38cm = minimum legal catch size.

Where to look:

- Look for them hiding under ledges or amongst the coral crevices.

Additional information:

- The name "Coral trout" includes different species:
 - Common coral trout or Leopard trout (*Plectropomus leopardus*).
 - Blue-spot trout (*Plectropomus leavis*).
 - Footballer trout – a different colour morph of the blue-spot trout.
 - Bar-cheeked trout or Island trout (*Plectropomus maculatus*).
 - Passionfruit trout or leopard trout (*Plectropomus areolatus*).
- Count all that you see.
- Record fish less than 38 cm and more than 38 cm separately.
- * See ruler on side of slate.

MĀORI WRASSE



Female

Male

Females are grey-brown in colour with a barred pattern

- Big fleshy lips
- Scribbled patterns on face
- Black horizontal lines behind eye

Males have a large hump on head

Males are blue-green in colour



MĀORI WRASSE

Males have a large hump on head

Fun Facts:

- Named for the wavy facial markings resembling Māori facial tattoos of New Zealand people.
- Start life as females; some change to males at ~5-15 years, also changing colour and developing a larger head hump.
- One of the largest reef fishes, growing up to 2.3 m and 190 kg.
- Feed on snails, sea urchins, sea stars, brittle stars and crustaceans.
- Have pharyngeal jaws in their throat to help crush prey.

MĀORI WRASSE

Why do we count them?

- Māori wrasse are listed as endangered.
- Once overfished, they are now protected on the Reef.
- They are iconic and popular with tourists.
- They help corals by feeding on Crown-of-thorns starfish.
- Recording males and females separately can be used as an indicator of recruitment.

Where to look:

- Look for them around the edges of reefs.
- Males are blue-green in colour with a large hump on the head.
- Females are grey-brown in colour, with no hump.

Additional information:

- They are also called Napoleon wrasse.
- They are territorial and can be found on the same reef for decades.
- Some are friendly and may approach you, but please do not touch.

SEA TURTLES



SEA TURTLES

Fun Facts:

- Sea turtles are air-breathing reptiles that must surface to breathe.
- They can rest or sleep underwater for several hours on one breath.
- Most reach sexual maturity at 20–50 years and may live over 100 years.
- Females lay eggs in nests above the high-tide mark.
- Sand temperature determines the hatchlings' sex:
 - Cooler nests (<25°C): males
 - Warmer nests (>31°C): females
 - 27–29°C: mix of males and females.

SEA TURTLES

Why do we count them?

- All sea turtle species are protected in Australia.
- Their numbers have declined due to climate change, marine debris, hunting and habitat loss.
- They are threatened species and iconic.

Where to look:

- Six of the seven sea turtle species are found on the Reef: Hawksbill, Green, Loggerhead, Leatherback, Olive-Ridley and Flatback.
- Green and Hawksbills are the most often seen.
- Look for them moving between the surface, where they breathe, to the reef substrate where they rest and feed.

Additional information:

- Record all sea turtles that you see.
- But record Green and Hawksbill turtles separately.

SHARKS

- Record all sharks that you see
- Record blacktip reef sharks and whitetip reef sharks separately



Most benthic sharks use spiracles to breathe



SHARKS

- Record all sharks that you see
- Record blacktip reef sharks and whitetip reef sharks separately

Fun Facts:

- Reef sharks range from small epauvette sharks to large migratory species like whale sharks.
- Some pelagic species (e.g. blacktip reef sharks) must keep swimming to breathe. If they stop swimming, they will drown.
- Bottom-dwelling sharks (e.g. leopard sharks) use spiracles to pump water over their gills, allowing them to rest on the seafloor.
- Sharks have multiple rows of teeth, which are continually replaced when lost.

SHARKS

Why do we count them?

- Sharks are apex predators at the top of the food chain.
- They are a keystone species that help regulate prey numbers and maintain ecological balance.
- Without sharks, food webs quickly become unbalanced.
- Many shark species are endangered.
- Sharks are iconic species and important to tourism.

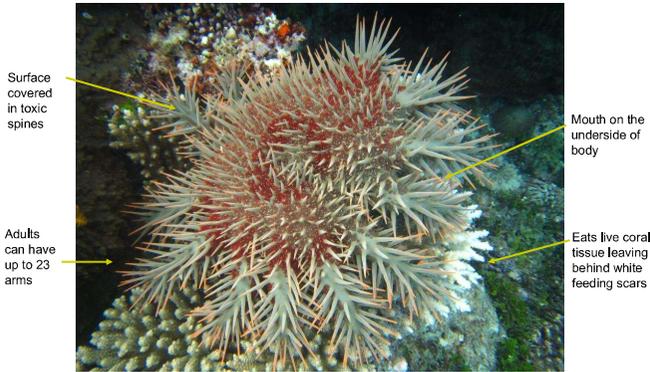
Where to look:

- Leopard sharks often rest on sand at the reef slope.
- Whitetip reef sharks may rest on the seafloor during the day.
- Wobbegongs, epauvette and carpet sharks often rest among coral.
- Blacktip reef sharks are usually seen swimming.

Additional information:

- Record all sharks that you see. But record blacktip reef sharks and whitetip reef sharks separately

CROWN-OF-THORNS STARFISH (COTS)



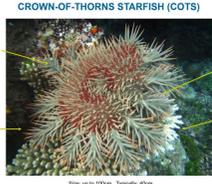
Surface covered in toxic spines

Mouth on the underside of body

Eats live coral tissue leaving behind white feeding scars

Adults can have up to 23 arms

Size: up to 100cm Typically: 40cm



CROWN-OF-THORNS STARFISH (COTS)

Fun Facts:

- Crown-of-thorns starfish (COTS) eat coral, preferring branching and plate corals, but will eat most types when hungry.
- They push their stomach out through their mouth to digest coral tissue and can consume an area about their own size each day.
- Feeding leaves large white patches of exposed coral skeleton.
- COTS outbreaks have been a major cause of coral decline on the Reef over the past 40 years.
- A dedicated COTS control program operates on the Great Barrier Reef.

CROWN-OF-THORNS STARFISH (COTS)

Why do we count them?

- Crown-of-thorns starfish (COTS) are natural predators of coral.
- In high numbers (during outbreaks), they can eat coral faster than it can grow.
- All COTS sightings are recorded to monitor outbreaks.

Where to look:

- COTS often hide during the day underneath the coral.
- If you see feeding scars (large white patches) on coral, look around as a COTS may be close by.
- During an outbreak they may be seen feeding during the day.

Additional information:

- Count the adults and the juveniles separately.
- Juveniles are smaller than your hand.
- Seeing several adults may indicate that a COTS outbreak is occurring at that site.
- Seeing several juveniles may indicate that an outbreak is about to occur.

CONDUCTING THE 10-MINUTE TIMED SWIM

Set a timer for 10 minutes and snorkel slowly in one direction.

- Use a tally system and record numbers as accurately as possible.
- If unsure: ask, take a photo, or don't record it.
- For large schools of fish, estimate numbers.
- Move quietly and slowly to avoid scaring animals.
- Talk quietly, use hand signals, and avoid splashing.
- Only record what you see during the 10-minute survey.
- Record other sightings in "Other things of interest."
- Do not touch animals.

ANIMALS	TALLY	NUMBER	ANIMALS	TALLY	NUMBER
Parrotfish	III	8	Clownfish		2
Blue tang		3	Shrimp		
Orangehead parrotfish		4	Starfish		1
Clownfish		4	Sea slug		
Yellow tang	+ 5	18	Crab		
Green tang	30 + 5	47	Other invertebrate		
Other fish		2	Other invertebrate		
Other things of interest			Other invertebrate		

CONDUCTING THE 10-MINUTE TIMED SWIM

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ANIMALS	TALLY	NUMBER	ANIMALS	TALLY	NUMBER
Parrotfish	III	8	Clownfish		2
Blue tang		3	Shrimp		
Orangehead parrotfish		4	Starfish		1
Clownfish		4	Sea slug		
Yellow tang	+ 5	18	Crab		
Green tang	30 + 5	47	Other invertebrate		
Other fish		2	Other invertebrate		
Other things of interest			Other invertebrate		

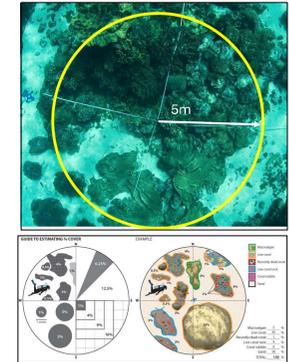
- Additional information:**
- Complete safety, buddy, and equipment checks before entering the water.
 - Some groups may only do the timed swim component.
 - Next is the 360° Benthic Survey.
 - This is recommended for 15+ year olds.

CONDUCTING THE 10-MINUTE TIMED SWIM

- Use a timer, or someone with a watch, to start timing the 10 minutes.
- Swim slowly in one direction (no backtracking); look up occasionally so you know where you are.
- Stay on one habitat type (reef flat, lagoon, crest, slope).
- Use tally system to record what you see, (four lines + diagonal = 5).
- After the 10 minutes, total the numbers for each target species.
- This can be done back on the boat.
- For large schools of fish, estimate numbers.
- Record numbers as accurately as possible.
- If you're not sure, point it out and ask, take a photo or don't record it.
- Move quietly and slowly to avoid scaring animals.
- Talk quietly, use hand signals, and avoid splashing.
- Only record what you see during the 10-minute survey.
- If you see something interesting outside of this time, you can record it in the *other items of interest* section at the bottom of the form.
- Do not touch the animals.

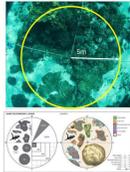
360° BENTHIC SURVEY - AN ESTIMATE OF % COVER

- Swim around the habitat to select a representative survey area.
- Use a 5m radius circle for the survey area.
- Do a quick presence / absence check.
- Record the largest / most obvious category first, then down to the smallest.
- Use whole numbers only, e.g. 10, not 10.5
- Do a final swim around to adjust estimates.
- Benthic categories must total 100% across the six (6) categories.



360° BENTHIC SURVEY - AN ESTIMATE OF % COVER

- Swim around the habitat to select a representative survey area.
- Use a 5m radius circle for the survey area.
- Do a quick presence / absence check.
- Record the largest / most obvious category first, then down to the smallest.
- Use whole numbers only, e.g. 10, not 10.5
- Do a final swim around to adjust estimates.
- Benthic categories must total 100% across the six (6) categories.



360° BENTHIC SURVEY - AN ESTIMATE OF % COVER

- The 360° benthic survey is an estimate of what the benthos (bottom of the seafloor) is made up of.
- Swim around the site to choose a representative area.
- Remember this needs to be representative of the site, not just a "best bit".
- Use a 5 m radius circle for the survey. Use your body length to help you estimate 5 metres.
- Do a quick presence / absence check.
- Mark down anything that you don't see as zero.
- Record the largest / most obvious category first, down to the smallest.
- Use whole numbers only (e.g., 10%, not 10.5%).
- Do a final swim-around to adjust estimates.
- Benthic categories must total 100% across the six (6) categories.

MACROALGAE

- Seaweeds can be green, brown or red.
- They have many forms – filamentous, leafy, bushy, etc.
- Found naturally on most reefs attached to the substrate.
- The presence and abundance of macroalgae can be used as an indicator of certain environmental factors (e.g. water quality) and the overall health of the Reef.

360° survey (One 5 metre radius circle)

BENTHOS	PHOTOS TAKEN
Macroalgae	RECENTLY DEAD CORAL
Live coral	CORAL ROCK
Recently dead coral (white)	CORAL RUBBLE
Live coral rock	SAND
Coral rubble	
Sand	
Total 100%	



MACROALGAE

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Why monitor Macroalgae?

- Macroalgae occur naturally on reefs, but high levels can indicate an imbalance – linked to a low abundance of herbivores (fish, urchins) or high nutrient levels.
- Macroalgae may:
 - It can compete with corals for space, overgrowing coral and preventing coral larvae from settling.
 - It can also shade (reducing light needed for corals to perform photosynthesis) and smother corals, trapping sediments and reducing coral health.

MACROALGAE

- Macroalgae are photosynthetic organisms in the phylum Protista, they are not plants.
- Common colours include green, brown and red.
- They are naturally found on reefs, attached to the substrate.
- Their presence and abundance can indicate water quality and overall reef health.

How to identify Macroalgae:

- General rule: algae longer than your thumbnail.
- Large, leafy, or bushy growth – (unlike short turf algae).
- It can compete with corals for space, overgrowing coral and preventing coral larvae from settling.
- It can also shade (reducing light needed for corals to perform photosynthesis) and smother corals, trapping sediments and reducing coral health.
- Look for visible structures – stems, blades, fronds, or branches.
- Sways freely in water.
- Not encrusting or rigid like coralline algae.
- Record all macroalgae observed (species ID not required)

LIVE CORAL

- Corals form essential habitats on coral reefs. Estimating live coral cover is important for assessing reef health.
- Group all types of living coral that you see as Live Coral.



360° survey (One 5 metre radius circle)

BENTHOS	PHOTOS TAKEN
Macroalgae	RECENTLY DEAD CORAL
Live coral	CORAL ROCK
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Live coral rock	SAND
Coral rubble	
Sand	
Total 100%	

LIVE CORAL

- Corals form essential habitats on coral reefs. Estimating live coral cover is important for assessing reef health.
- Group all types of living coral that you see as Live Coral.



- Why monitor Live Coral?** Corals are the basis of a coral reef. They:
- Create the physical reef framework.
 - Provide shelter and food for reef species.
 - Support biodiversity and healthy ecosystems.
 - Help protect coastlines from waves and storms.

LIVE CORAL

- Corals form the structure and habitats of coral reefs.
- Estimating live coral cover is important for assessing reef health.
- Group all types of living coral that you see as live coral.
- You don't need to record which type of coral it is for this survey.

How to identify Live Corals:

- Visible texture: bumps, ridges, valleys, cups.
- Visible tissue: polyps or tentacles may be extended.
- Coloured: brown, tan, orange, green, red, pink, purple or blue.
- Hard corals: rigid and unmoving in the current.
- Soft corals: sway or bend in the current.
- Surface appears clean and free of algae.

RECENTLY DEAD CORAL



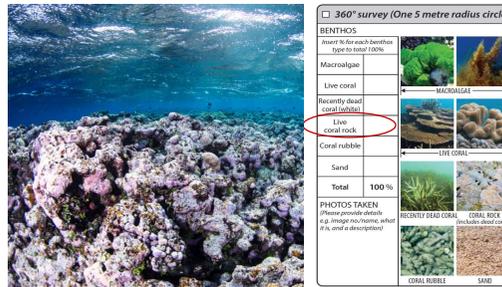
- Recently dead coral turns cream, green or brown as algae begins to grow over it.
- If the coral skeleton is still visible beneath a light algal layer, record it as recently dead coral.
- Recently dead coral can indicate early signs of environmental stress.

360° survey (One 5 metre radius circle)

BENTHOS	PHOTOS TAKEN
Macroalgae	RECENTLY DEAD CORAL
Live coral	CORAL ROCK
Recently dead coral (white)	CORAL RUBBLE
Live coral rock	SAND
Coral rubble	
Sand	
Total 100%	

LIVE CORAL ROCK

- Solid, stable substrate (bare rock, old coral skeletons, or cemented rubble).
- Substrate available for coral settlement and recruitment.

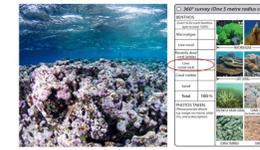


- Tip:**
- If algae is shorter than your thumbnail, record it as live coral rock.
 - If algae is longer than your thumbnail, record it as macroalgae.

FACING PAGE:

LIVE CORAL ROCK

- Solid, stable substrate (bare rock, old coral skeletons, or cemented rubble).
- Substrate available for coral settlement and recruitment.



Tip:

- If algae is shorter than your thumbnail, record it as live coral rock.
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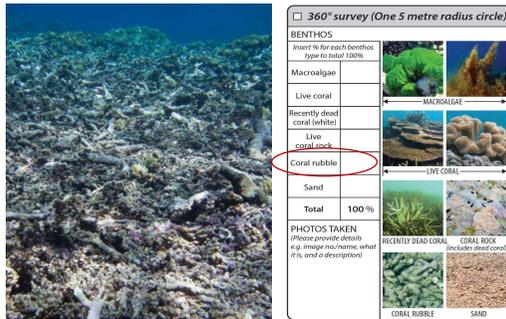
LIVE CORAL ROCK

- How to identify Live Coral Rock:**
- Solid, hard substrate made of ancient coral skeleton.
 - Mostly bare rock with limited algae cover.
 - May have small patches of live coral, sponges, or encrusting life.
 - May have a covering of short, fuzzy algae.
 - Natural texture: holes, grooves, and rough surfaces.

- Why monitoring Live Coral Rock is important:**
- Provides stable habitat for corals, algae, and invertebrates.
 - Acts as a foundation for new coral growth and reef recovery.
 - Supports biodiversity through cracks, holes, and surfaces used by reef species.
 - Indicates healthy reef structure and resilience after disturbance.
 - Helps track shifts in benthic cover (e.g., coral vs. algae dominance).

CORAL RUBBLE

- Dead coral, or gravel-sized material, that is loose and can be moved by wave action.
- Coral rubble is natural. Just like the branches of trees on the forest floor.



Tip: When Coral Rubble is cemented together with calcareous algae, it is categorized as Live Coral Rock.



Tip: When Coral Rubble is cemented together with calcareous algae, it is categorized as Live Coral Rock.

- Tip:**
- When coral rubble is cemented together with encrusting coralline algae it is categorized as Live Coral Rock.

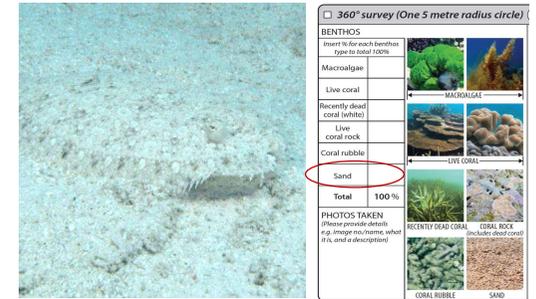
CORAL RUBBLE

- How to identify Coral Rubble:**
- Loose, broken pieces of dead coral lying on the seafloor.
 - Fragments are moveable, not attached or cemented together.
 - Shapes resemble old coral skeleton but are worn or irregular.
 - Often piled or scattered, not forming a solid reef structure.
 - May have light algae, but the structure looks broken rather than intact.

- Why monitoring Coral Rubble is important:**
- May indicate recent physical damage (storms, anchors, cyclones, COTS).
 - Coral rubble does not provide a good settlement substrate for coral larvae to support reef recovery, but has the potential to become consolidated Live Coral Rock over time.

SAND

- Loose, limestone sand from coral skeletons, molluscs, calcareous algae and crustaceans.
- Formed by wave breakdown of coral and shells.
- Also created by bioerosion from parrotfish and burrowing organisms.



FACING PAGE:

FACING PAGE:

SAND

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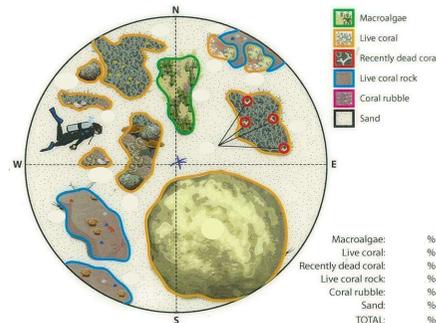


SAND

- How to identify Sand:**
- Loose, fine grains that move easily with currents.
 - Light-coloured, usually white or pale beige.
 - Lacks structure: no hard surface, no coral shapes.
 - Found in pods, channels, and between reef structures.
 - Does not support coral tissue and is easily displaced when touched.

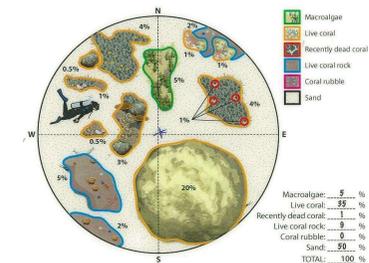
- Why monitoring Sand is important:**
- Indicates sediment movement and changes in reef conditions.
 - Helps detect erosion or deposition that may smother corals.
 - Shows shifts in habitat availability for bottom-dwelling species.
 - Useful for tracking disturbance impacts such as storms or dredging.

360° SURVEY 5m radius circle



Estimate the % cover of each category in the picture shown

Remember: total = 100%



Discuss the answers

360° SURVEY 5m radius circle

- Survey area is a 5m diameter circle.
- It should be representative of the habitat type at that reef.
- Don't pick the best or worst spot.
- Reef habitats are:
 - Reef slope
 - Reef crest
 - Reef flat
 - Reef lagoon
- Have participants try and estimate the % cover of each of the 6 benthic categories.
- Discuss the answers and highlight that a difference (+/-) of 5% is ok.
- Remember: the total must add up to 100%

CORAL IMPACTS - BLEACHING

CORAL IMPACTS - BLEACHING

1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other



CORAL IMPACTS - BLEACHING

Coral Impacts include:

- Bleaching
- Predation
- Disease
- Competition
- Damage
- Marine debris

CORAL IMPACTS - BLEACHING

- Coral Impacts:**
- This section is recommended for Year 12 students, adults, and professionals.
 - You can complete this section during the benthic survey (can be done as a group if needed).
 - To dive deeper, a separate Coral Impact Training Manual is available via Eye on the Reef or Reef Guardian School programs.

Bleaching:

- Coral appears white or very pale, but living tissue remains
- Often affects whole colonies or large sections, not small patches.
- Polyps are still present - coral is alive but stressed.
- May show fluorescent blue, pink or yellow before turning white.
- Not predation: no clean feeding scars or missing tissue.
- Not disease: no discoloured edges, mucus, or patchy tissue loss.

CORAL IMPACTS - PREDATION

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1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other

There are two main coral predators to monitor.

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

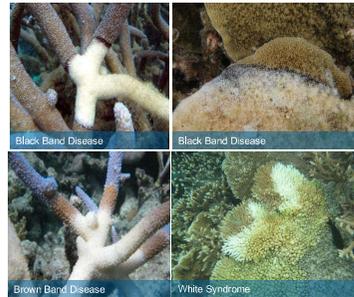
If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other

CORAL IMPACTS - DISEASE

- If a coral shows tissue loss (white or recently dead) and there are no coral predators visible, this may indicate the presence of disease.
- You don't need to identify the specific disease, just distinguish it from bleaching or predation.



CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other

CORAL IMPACTS - DISEASE



CORAL IMPACTS - DISEASE

- If the white coral shows tissue loss and no coral predators are visible, this may indicate the presence of a disease.
- You don't need to identify the specific disease, just distinguish it from bleaching or predation.

CORAL IMPACTS - COMPETITION



- Can be identified by:
- A coloured band between two coral colonies.
 - An even gap separating two coral colonies.
 - One colony may show a coloured edge where it is being stung by sweeper tentacles from the other colony.

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other



CORAL IMPACTS - COMPETITION

Can be identified by:

- A coloured band between two coral colonies.
- An even gap separating two coral colonies.
- One colony may show a coloured edge where it is being stung by sweeper tentacles from the other colony.

CORAL IMPACTS - COMPETITION

- Coral compete with other corals, algae, sponges and invertebrates for space, light, and nutrients.
- Competition is most noticeable in fast-growing species.
- Often seen as a coloured band between two coral colonies.

Key visual sign: Clear interaction zones where two organisms meet - may show tissue recession, sweeper tentacles, or overgrowth.

Common interactions:

- Coral vs. coral: Margins touching, dead patches where one outcompetes another.
- Coral vs. algae: Algae overgrowing or shading coral.
- Coral vs. invertebrates: Sponges or tunicates encroaching on coral tissue.

Impacts on reefs:

- Reduced growth and colony health.
- Increased risk of tissue loss and disease entry points.
- Limits space for coral recruitment and slows reef recovery.

CORAL IMPACTS - DAMAGE

Where any part of a coral is broken, or the coral is displaced or overturned.



CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1 Is any coral white? Y/N

Is living coral tissue present? Y/N **BLEACHING**

Is coral being eaten? Y/N **PREDATION**

If yes, by what? Y/N **COMPETITION**

What is the likely main cause? (Click one)

Storm Animal Vessel Anchor Divers Snorkellers Unknown Other

CORAL IMPACTS- RUBBISH (MARINE DEBRIS)

CORAL IMPACTS - DAMAGE

Where any part of a coral is broken, or the coral is displaced or overturned.

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1) Is any coral white? Y/N

2) Is any coral broken or damaged? Y/N

3) Is any rubbish present? Y/N

Number of pieces in survey area:
Fishing line _____ Plastic _____
Netting _____ Rope _____
Other (please specify) _____

IMPACT DETAILS (How much bleaching, predation, disease, damage? Other impacts?)

OTHER THINGS OF INTEREST? (Mating, spawning, behaviour, etc.)

What is the likely main cause? (Circle one)

Storm Animal Vessel Anchor Divers Snorkellers
Unknown Other: _____

CORAL IMPACTS - DAMAGE
What it is: Breakage or injury to coral from human activity, animals, or natural events.

- Key visual signs:**
- Fresh, white break points on branches or plates.
 - Scarring or scraped tissue.
 - Dislodged or overturned colonies.

- Common sources:**
- Divers/snorkellers: Fin kicks, touching, standing on coral.
 - Anchors/boats: Large breakage, crushed areas, sediment plumes.
 - Storms: Fragmentation, sand abrasion, overturned corals.

- Impacts to reef:**
- Reduced structural integrity and colony survival.
 - Increased vulnerability to disease and algae overgrowth.
 - Slower reef recovery and loss of habitat complexity.



Plastics, fishing line, nets, and other debris can become entangled on coral colonies.

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1) Is any coral white? Y/N

2) Is any coral broken or damaged? Y/N

3) Is any rubbish present? Y/N

Number of pieces in survey area:
Fishing line _____ Plastic _____
Netting _____ Rope _____
Other (please specify) _____

IMPACT DETAILS (How much bleaching, predation, disease, damage? Other impacts?)

OTHER THINGS OF INTEREST? (Mating, spawning, behaviour, etc.)

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OTHER THINGS OF INTEREST? (Mating, spawning, behaviour, etc.)

What is the likely main cause? (Circle one)

Storm Animal Vessel Anchor Divers Snorkellers
Unknown Other: _____

CORAL IMPACTS- RUBBISH (MARINE DEBRIS)
What it is: Plastics, fishing line, nets, and other debris that become entangled on coral colonies.

Key visual sign: Foreign objects resting on or caught within coral branches or surfaces.

- Common signs of impact:**
- Tissue abrasion where debris rubs against coral.
 - Breakage of delicate branches.
 - Shading that limits light for photosynthesis.

- Impacts on the Reef:**
- Slower growth and reduced health.
 - Higher risk of infection at damaged sites.
 - It can cause colony mortality if not removed.

IMPACT DETAILS - OTHER THINGS OF INTEREST

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1) Is any coral white? Y/N

2) Is any coral broken or damaged? Y/N

3) Is any rubbish present? Y/N

Number of pieces in survey area:
Fishing line _____ Plastic _____
Netting _____ Rope _____
Other (please specify) _____

IMPACT DETAILS (How much bleaching, predation, disease, damage? Other impacts?)

OTHER THINGS OF INTEREST? (Mating, spawning, behaviour, etc.)

What is the likely main cause? (Circle one)

Storm Animal Vessel Anchor Divers Snorkellers
Unknown Other: _____

IMPACT DETAILS
Example:

- Half the area was affected by bleaching;
- The whole area was affected by COTS.

OTHER THINGS OF INTEREST?
Example: Sightings of protected species, mating or spawning behaviours.



IMPACT DETAILS - OTHER THINGS OF INTEREST

CORAL IMPACTS (Complete 1, 2 and 3 below. Circle Y or N)

1) Is any coral white? Y/N

2) Is any coral broken or damaged? Y/N

3) Is any rubbish present? Y/N

Number of pieces in survey area:
Fishing line _____ Plastic _____
Netting _____ Rope _____
Other (please specify) _____

IMPACT DETAILS (How much bleaching, predation, disease, damage? Other impacts?)

OTHER THINGS OF INTEREST? (Mating, spawning, behaviour, etc.)

What is the likely main cause? (Circle one)

Storm Animal Vessel Anchor Divers Snorkellers
Unknown Other: _____

Reminder: Submit the data from your survey into Eye on the Reef

Impact Details and Other things of interest:
Impact details: Record of impacts for example

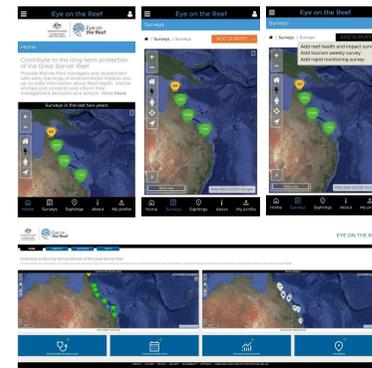
- Half the area was affected by bleaching,
- The whole area was affected by COTS.

Other things of interest: Relevant site information

- Site conditions, storms, sightings of protected species, mating or spawning behaviour.

- Reminder: Submit the data from your survey into Eye on the Reef

REMINDER – ENTER DATA INTO EYE ON THE REEF



- Enter your data via the QR Code
- New users will need to register for an account.
- From home toggle across to Surveys then add Survey on top right corner
- Add Rapid Monitoring Survey
- Sign into your account.
- Eye on the Reef is also available on desktop (preferred way of submitting your data).

REMINDER – ENTER DATA INTO EYE ON THE REEF

Enter your data via the QR Code

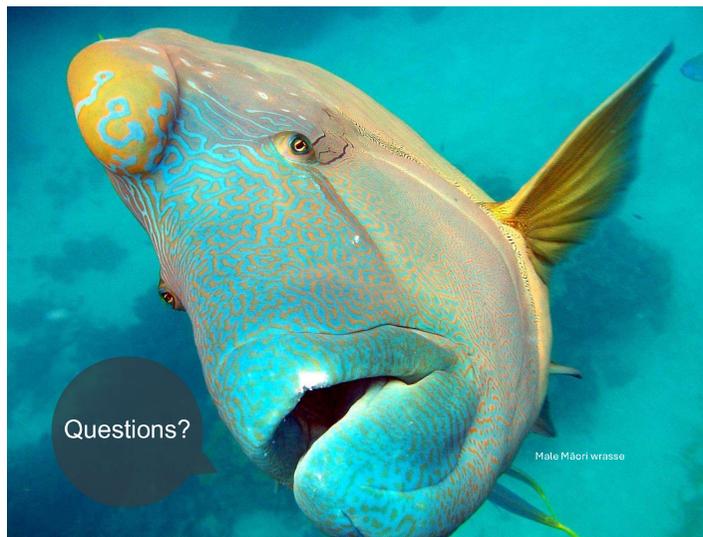
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Additional information:

- This is arguably the most important component.
- The data you collect and contribute can be used to inform how the Great Barrier Reef is managed.
- The data goes into the Eye on the Reef system, the official Reef management system for the Great Barrier Reef Marine Park Authority, the Australian Government's lead agency for managing the Great Barrier Reef.
- Based on reviews, data entry scores high for value, well-being, and sense of contribution.
- The difference between Primary and Citizen Science data is how it is shared.
- Citizen Science data is entered into a collective dashboard, whilst Primary data is not.

ENTER DATA INTO EYE ON THE REEF

- Enter your data via the QR Code
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Questions?