

Benthic Habitat Mapping in the Central Coral Sea Marine Park:

Preliminary voyage report for December 2022 survey



East Diamond Islet in Tregrosse Reef

Samantha Tol, Rob Coles, Lloyd Shepherd, Abbi Scott, Luke Hoffmann, Paul Leeson, Merrick Ekins, Mary Clarke, Alana Grech, Michael Rasheed and Paul York

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For further information contact:

Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER)
James Cook University
PO Box 6811
Cairns QLD 4870

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EXECUTIVE SUMMARY

The Coral Sea Marine Park (CSMP) is the largest marine reserve in Australia, located off the coast of north-east Queensland. Five reef systems in the central part of the CSMP (Lihou Reef, Tregrosse Reef, Herald Cays, East and West Holmes Reef and Flinders Reef) were surveyed to map the benthic habitats in the reef lagoons during December 3rd to 17th 2022.

This research was led by a team from the Centre for Tropical Water and Aquatic Ecosystem Research (TropWATER) at James Cook University (JCU). This research team was accompanied by two Octocoral researchers (Dr Merrick Ekins from the Queensland Museum Network and Stefano Borghi a PhD candidate at JCU), two sea turtle researchers (Dr Ellen Ariel and Tory Stoddard from JCU), a citizen scientist for sea birds (Mary Clarke) and two Parks Australia employees.

The objectives of the survey were to: **(1)** map the benthic habitat in the reef lagoons, concentrating on the deepwater locations; **(2)** identify and map any seagrass meadows, confirm species, and collect specimens to provide the first herbarium samples for the CSMP; and **(3)** determine the demersal fish communities within the different benthic habitats (i.e., deep, and shallow seagrass and algae habitats).

Key Points:

- Five reef systems in the central CSMP were surveyed; this included one extra reef system than originally planned.
- 621 sites were surveyed for benthic habitats by either drop camera or free diving method, covering approximately nearly 3,000 km² in area.
- Benthic habitats recorded during this survey include deepwater mixed species algae beds, seagrass meadows, soft and hard coral shallow water reefs, deepwater soft and hard coral reefs and exposed sediment with a thin layer of microphytobenthos.
- Seagrass was confirmed to occur in three different reef systems (four different reef lagoons – Tregrosse Reef, Herald Cays, and East and West Holmes Reefs).
- Four deepwater meadows were identified (Tregrosse Reef, Herald Cays, and East and West Holmes Reefs), and one shallow meadow was identified (West Diamond Islet in Tregrosse Reef).
- Two different seagrass species were identified (*Halophila ovalis* and *Halophila decipiens*).
- The first herbarium specimens of seagrass collected in the CSMP were collected, with three press specimens to be sent to the Canberra Herbarium.
- 54 Remote Underwater Video Stations (RUVS) were deployed across the five different reef lagoons; 24 in deepwater (> 35 meters) and 30 in shallow water (< 35 meters) habitats.

- Octocoral researchers collected 159 soft coral specimens throughout the voyage, covering 35 confirmed genera.
- Seabird data was recorded on five cays and from the vessel during transit.

Analysis of survey data (map meadow creation and RUVS analysis) will continue, with a final report to be delivered by 28th June 2024. Samantha Tol is aiming to present the findings from this survey on the benthic habitat mapping at the 57th Annual Australian Marine Science Association (AMSA) conference on the Gold Coast in July 2023. She will also aim to present the results from the RUVS footage analysis at the 58th AMSA Conference to be held in Tasmania in 2024.

INTRODUCTION

Background and Rationale for Survey

The Coral Sea Marine Park (CSMP) is Australia’s largest marine reserve, covering an area of 989,836 km² off the eastern coast of Queensland (Figure 1). The CSMP consists of 34 vast reef areas (some of these being the largest reefs in Australian waters) and contains 67 cays and islands. It is also one of the most remote marine reserves in Australia, with the closest reef to the Australian coastline approximately 200 kms away (Flinders Reef), and the most outer reef (Mellish Reef) approximately 1,000 km away from the outer limits of the Great Barrier Reef Marine Park (GBRMP). The combination of size and remote location makes surveying these reefs difficult.

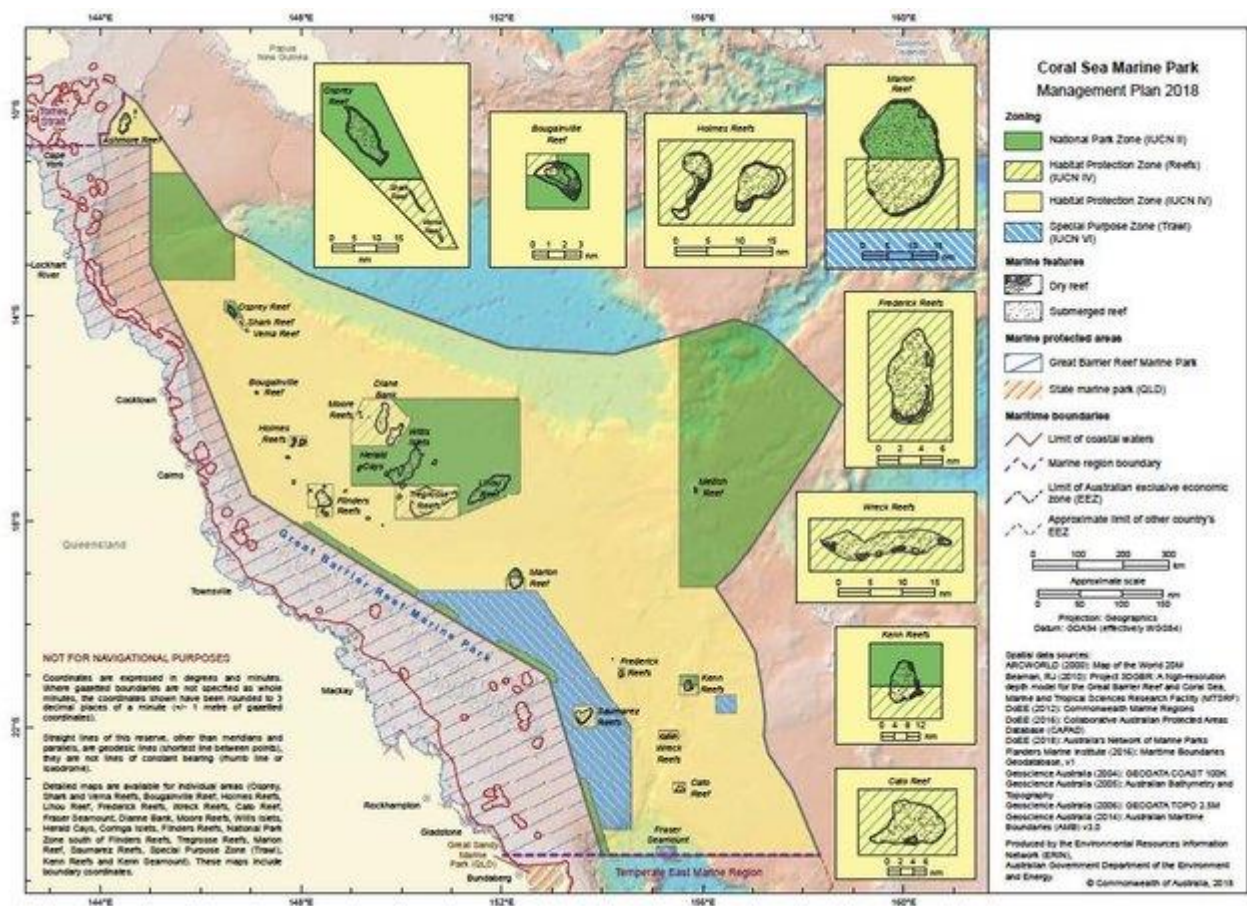


Figure 1: Map of the Coral Sea Marine Park, showing management zones implemented in July 2018 (Source: parksaustralia.gov.au).

The reef, cays, and islands in the CSMP are home to a high diversity of marine life. Many of the cays and islands are home to some of the largest sea bird rockeries in Australia and contain the highest diversity of sea birds within a marine park in Australian territory. Additionally, many of the sand cays and islands provide nesting sites for sea turtles, especially the endangered green sea turtle (*Chelonia mydas*).

The marine park is managed by Parks Australia, under the Australian government's Department of Climate Change, Energy, the Environment and Water, with the goal of conserving the area's unique and valuable marine ecosystems, and ensuring their ecological, social, and economic values are protected for future generations. The park is also an important area for scientific research, recreation, and tourism, and is recognized as a key part of the world's marine heritage. This voyage was funded under the 'Our Marine Parks Grant – Round Three' grant to assist Parks Australia in their management of the CSMP, by surveying the biodiversity of the reef lagoon habitats.

The objectives of this survey:

1. Map the benthic habitats in the reef lagoons of Lihou Reef (we aimed to map one quarter of the reef lagoon), the lagoon between the four Diamond Islets in Tregrosse Reef (East, Central, West, and South), Herald Cays (North and South) and East and West Holmes Reef.
2. Identify the location, extent, and diversity of seagrass meadows.
3. Identify the diversity and density of fish populations between the deep and shallow benthic habitats.
4. Provide observational information on species sighted within the reef lagoons, and species which are dependent on seagrass and algae habitats (such as green sea turtles).

Additional research conducted on this voyage included:

1. Green Sea turtle observational data on nesting track density, nest location and individual sightings at cays and islands, by Ellen Ariel from the James Cook University Turtle Health Unit.
2. Octocoral diversity at cays and islands, by Merrick Ekins from the Queensland Museum and Stefano Borghi from the James Cook University Centre of Excellence for Coral Reef Studies.
3. Sea bird species identification, and density estimates by Mary Clarke, a citizen scientist.
4. An extra reef lagoon was surveyed due to favourable weather conditions; Flinders Reef.

SURVEY AREA

Location and Description

The survey was conducted in the central section of the CSMP (Figure 1), which included two out of the four management zones: National Park Zone and Habitat Protection Zone (Reefs). We originally planned to survey four different reef/cay sites, but due to favourable weather we were able to survey an additional reef. In total, we surveyed the reef lagoons of Lihou Reef (Figure 2), Tregrosse Reef (Figure 3), Herald Cays (Figure 4), East and West Holmes Reef (Figure 5) and Flinders Reef (Figure 6).

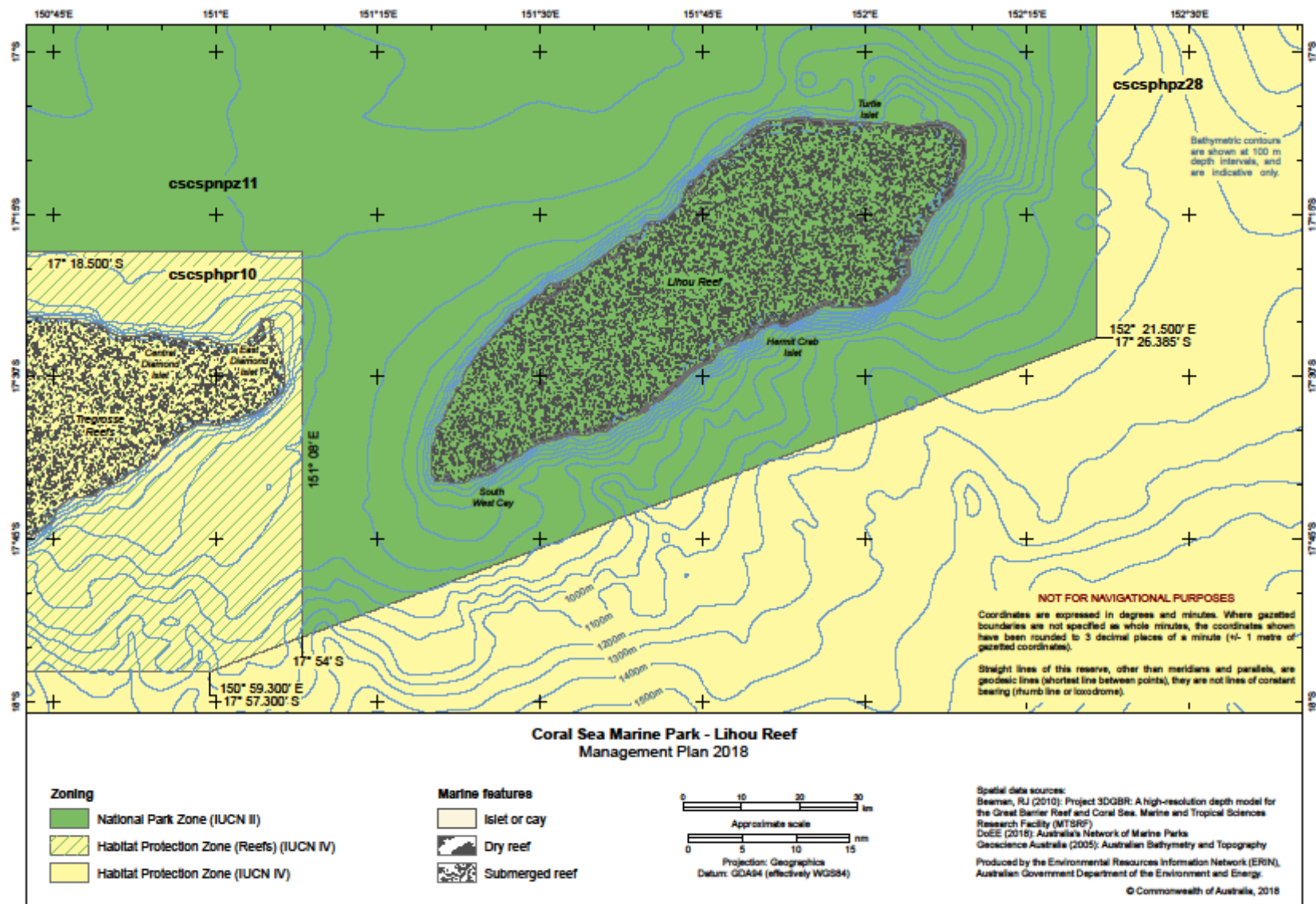


Figure 2: Map of Lihou Reef, in the Coral Sea Marine Park. Map courtesy of Parks Australia: <https://parksaustralia.gov.au/marine/parks/coral-sea/maps/>

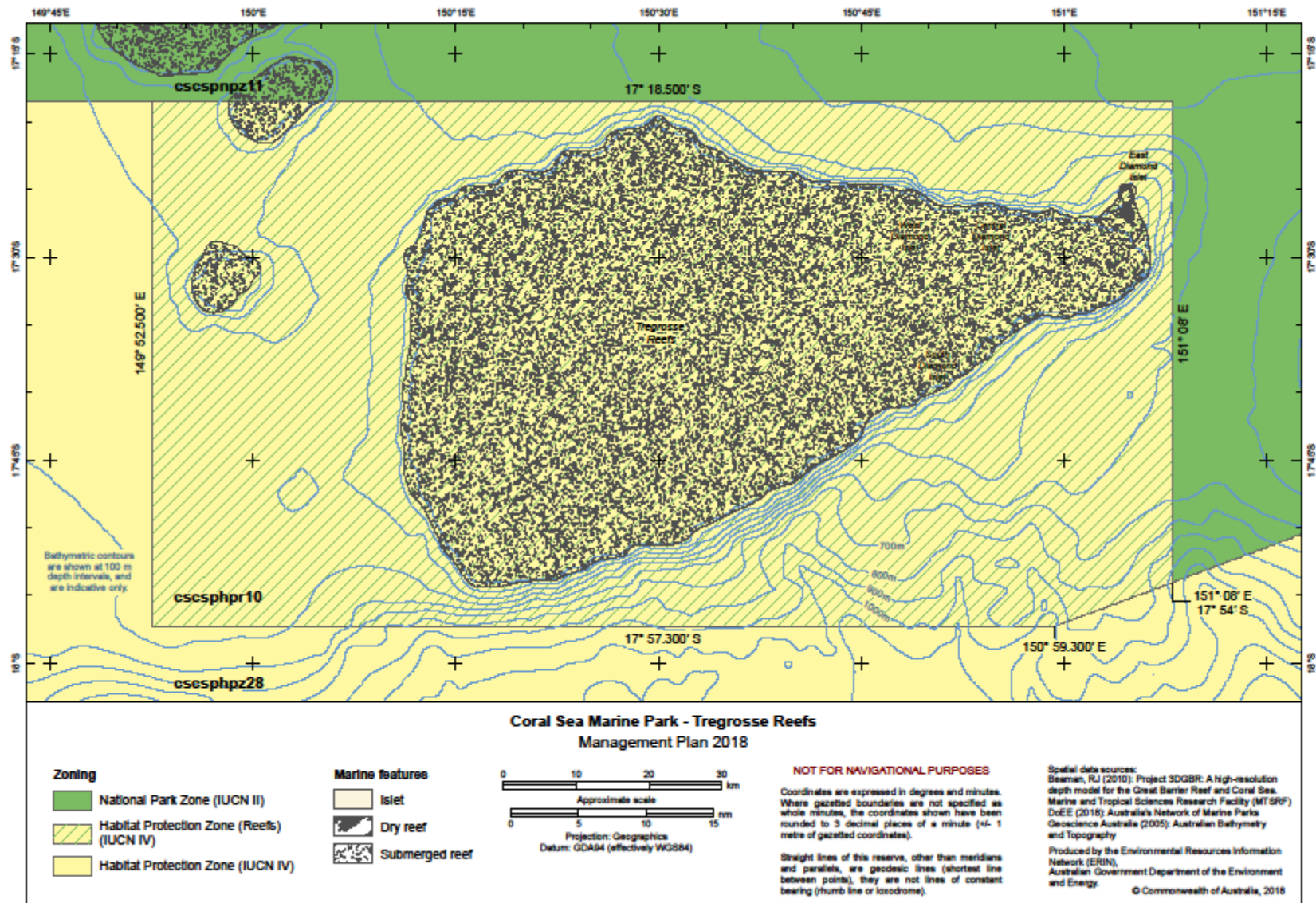


Figure 3: Map of Tregosse Reef, in the Coral Sea Marine Park. Map courtesy of Parks Australia: <https://parksaustralia.gov.au/marine/parks/coral-sea/maps/>

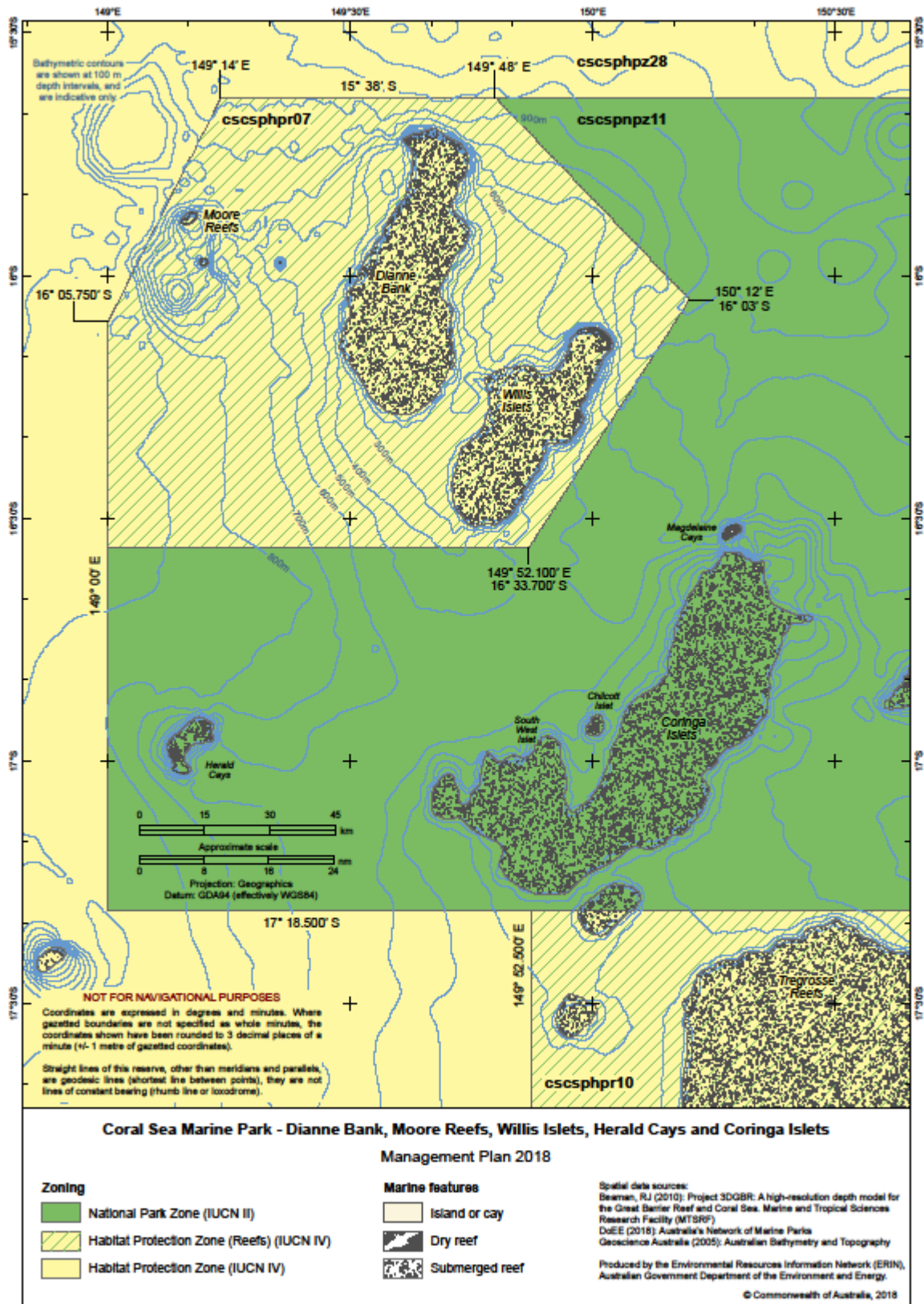


Figure 4: Map of Herald Cays, in the Coral Sea Marine Park. Map courtesy of Parks Australia:

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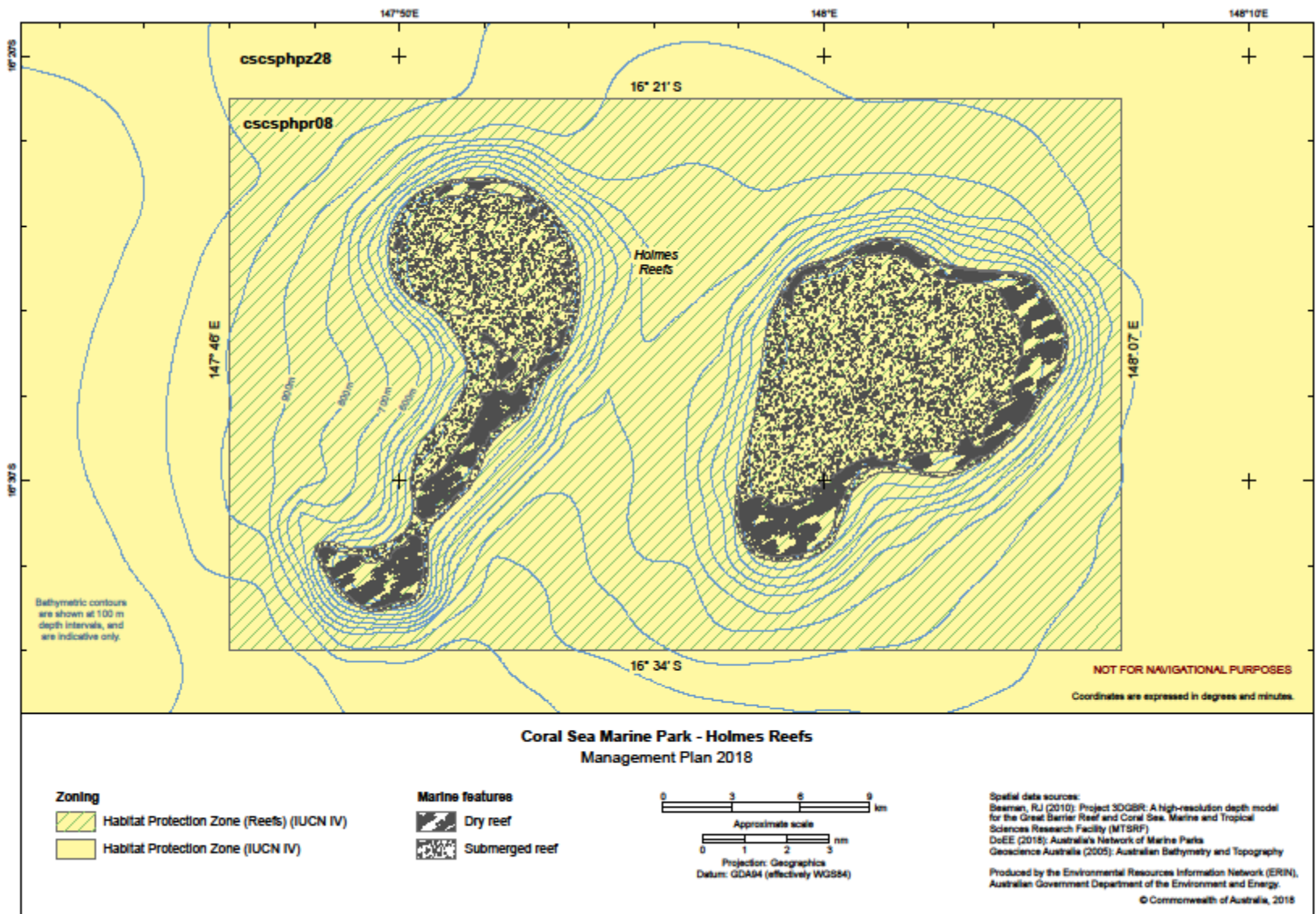


Figure 5: Map of Holmes Reef, in the Coral Sea Marine Park. Map courtesy of Parks Australia: <https://parksaustralia.gov.au/marine/parks/coral-sea/maps/>

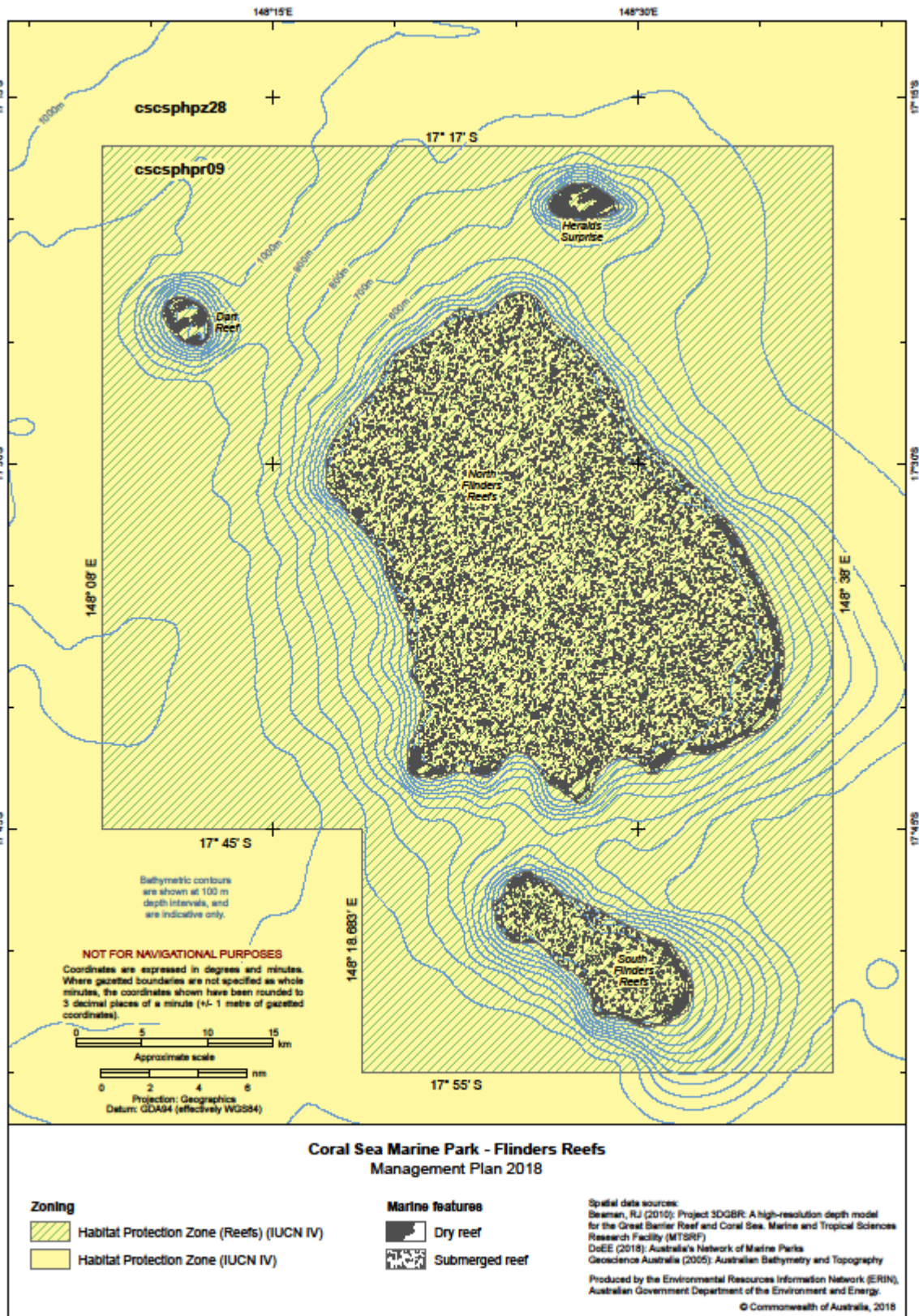


Figure 6: Map of Flinders Reef, in the Coral Sea Marine Park. Map courtesy of Parks Australia:

<https://parksaustralia.gov.au/marine/parks/coral-sea/maps/>

Reef Lagoon Benthic Habitat Mapping

Benthic habitat assessments were conducted at 621 sites covering an area of approximately 3,000 km²: 215 sites at Lihou Reef covering approximately 1,050 km² (Figure 7a), 116 sites at Tregrosse Reef covering approximately 650 km² (Figure 7b), 101 sites at Herald Cays covering approximately 75 km² (Figure 7c), 132 sites at Holmes Reef covering approximately 200 km² (Figure 7d), and 57 sites at Flinders Reef covering approximately 750 km² (Figure 7e). Survey site coordinates and survey dates are provided in Appendix 2. Depth sounders during the survey recorded sites between 4.8 to 71.8 m deep for Lihou Reef, 3.3 to 77.0 m deep for Tregrosse Reef, 1.6 to 55.0 m deep for Herald Cays, 1.7 to 80.0 m deep for Holmes Reefs, and 7.0 to 74.4 m deep for Flinders Reefs; depth below mean sea level is currently being calculated for each survey site. The deepest site surveyed was at Western Holmes Reef (80.0 m), on the reef wall outside the lagoon.

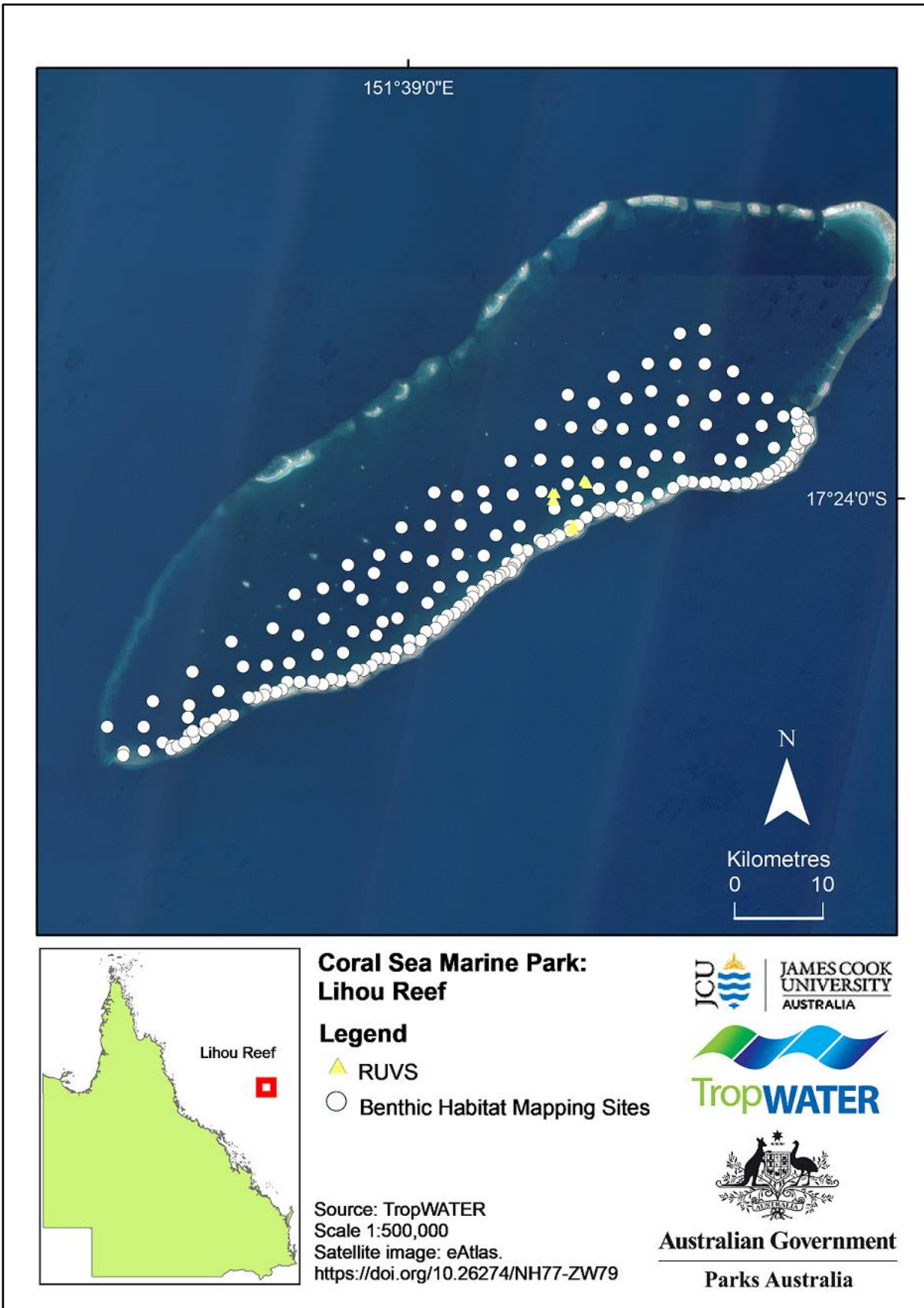


Figure 7: Survey sites in the central Coral Sea Marine Park at Lihou Reef; total of 215 sites covering approximately 1,050 km².

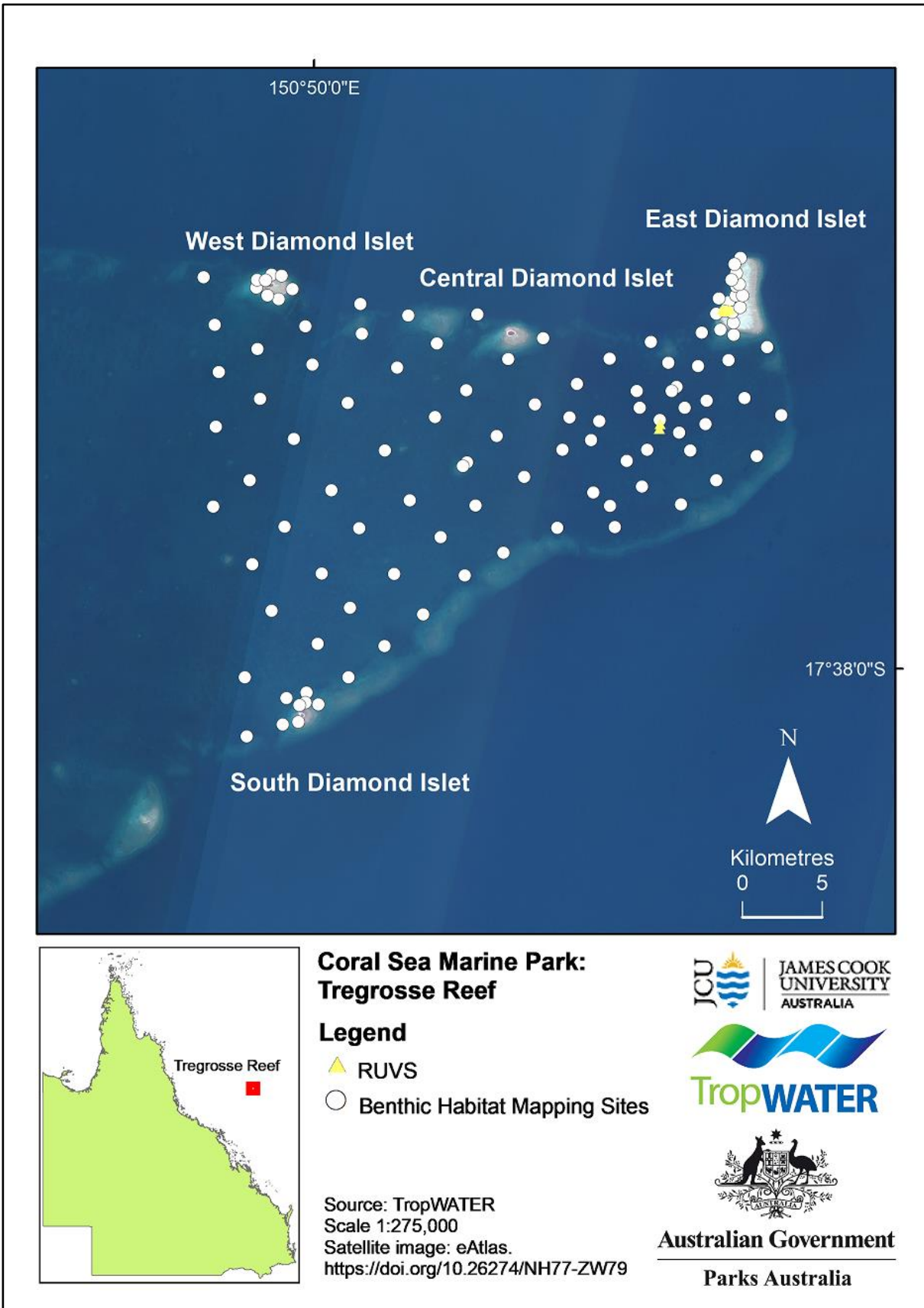


Figure 8: Survey sites in the central Coral Sea Marine Park at Tregrosse Reef; total of 116 sites covering approximately 650 km².

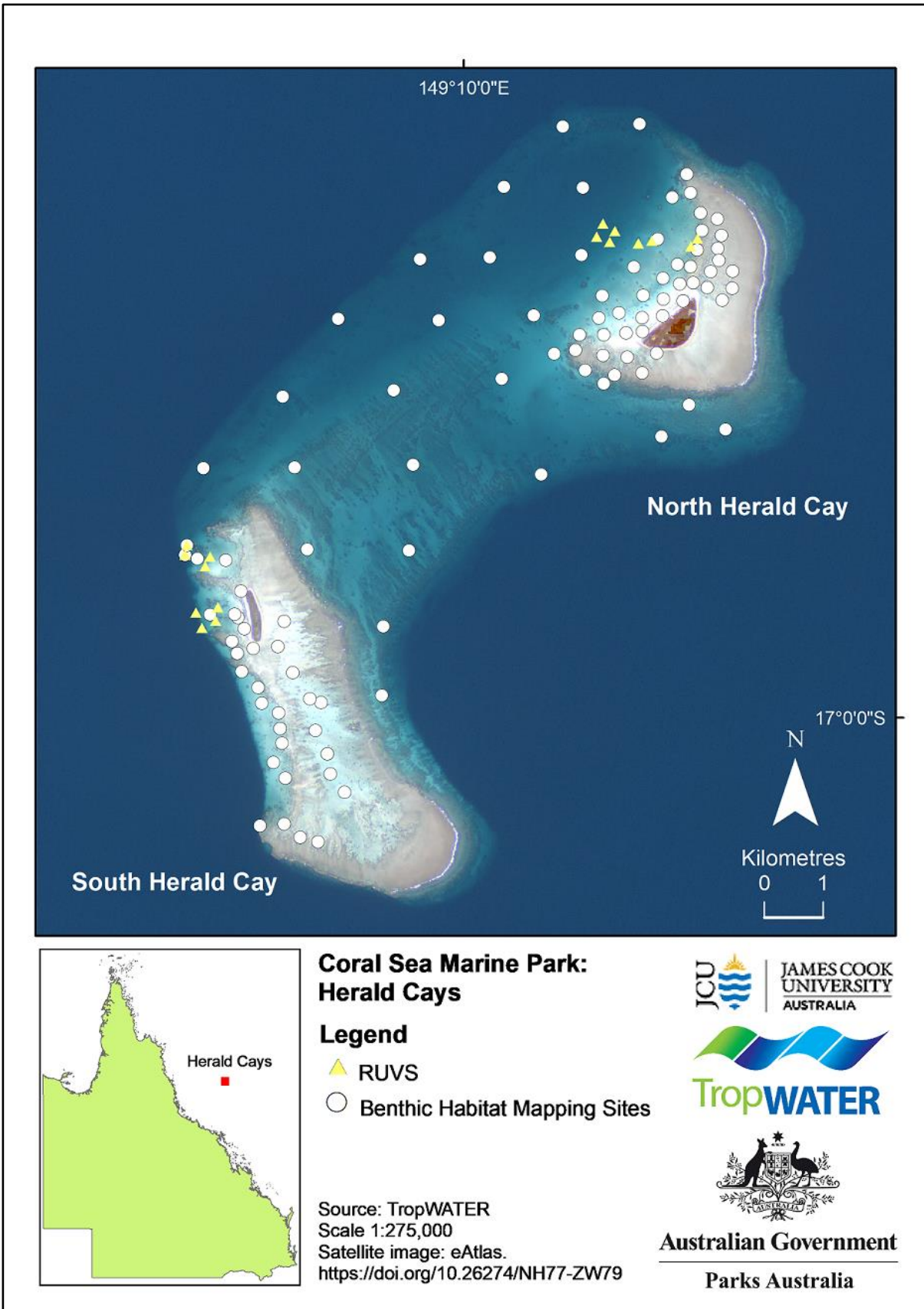


Figure 9: Survey sites in the central Coral Sea Marine Park at Herald Cays; total of 101 sites covering approximately 75 km².

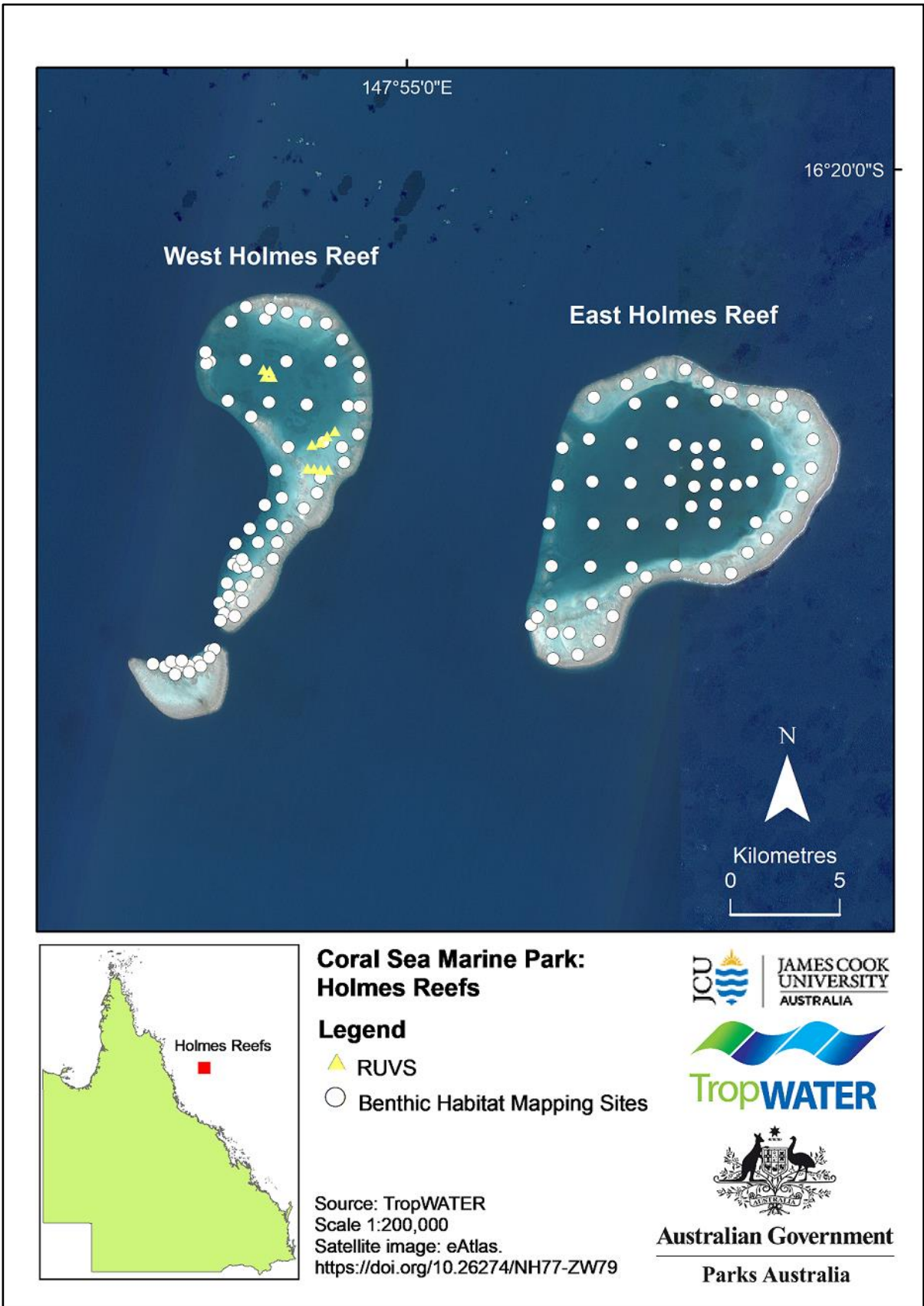


Figure 10: Survey sites in the central Coral Sea Marine Park at Holmes Reef; total 132 of sites covering approximately 200 km².



Figure 11: Survey sites in the central Coral Sea Marine Park at Flinders Reef; total of 57 sites covering approximately 750 km².

Demersal Fish Community Observations

Fish community observations were conducted through the deployment of Remote Underwater Video Stations (RUVS) (Figure 12). We chose to use un-baited RUVS over baited, as the use of bait can attract species from different habitats and estimate an inflated species diversity (Colton and Swearer, 2010, Harvey et al., 2007). We aimed to deploy a minimum of four RUVS within deep water (> 35 meters) and four within shallow water (< 35 meters) at each reef site.

A total of 54 RUVS were deployed across the five reef sites surveyed (Table 2 and Appendix 2). We were only able to deploy two deepwater RUVS at Tregrosse Reef as the current was too strong; we already had one RUVS dragged under the water due to strong currents (it took two hours to rescue the equipment). Deepwater RUVS proved to be more difficult due to strong currents pushing the camera systems over.

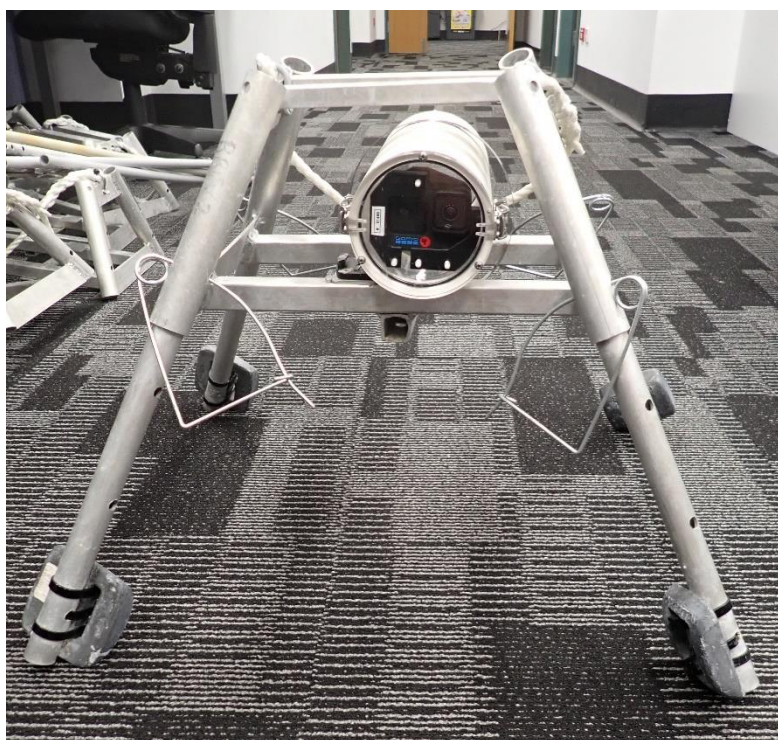


Figure 12: Underwater Remote Video Station (RUVS) – mono camera system set-up.

Table 2: Number of Remote Underwater Video Stations (RUVS) deployed at each reef/cay site for deepwater (> 35 meters) and shallow water (< 35 meters).

Location	Deepwater	Shallow
Lihou Reef	6	6
Tregrosse Reef	2	4
Herald Cays	8	8
Holmes Reef	4	8
Flinders Reef	4	4

Sea Turtle Observations

Unfortunately, the permit for sea turtle data collection was not available before the voyage began. To enable some collection of data, an observational only permit was provided under the guide of Parks Australia personnel. All sea turtle data collected was provided to Parks Australia staff during the voyage.

Octocoral Diversity

A total of 18 dives were performed throughout the voyage covering 11 different cays, islands, and reefs: Herald Passage, Phoenix Cay, and Magdeline Cay in Lihou Reef, East, South and West Diamond Islets in Tregrosse Reef, North and South Herald Cays, Western and Eastern Holmes Reef, and Flinders Reef. Survey site coordinates and survey dates are provided in Appendix 2.

Seabird Observations

Seabirds were observed from the Iron Joy in transit and when at anchor over the duration of the voyage. Two coral cays and three islands were visited; two cays on Lihou Reef, East Diamond Islet in Tregrosse Reef, and North and South Herald Cay. Data was recorded for species, and presence of young and eggs/breeding activity. Birds were photographed for identification and estimates of numbers were made when possible. Due to onboard sickness for most of the voyage, there was limited time available to visit cays which made any quantitative survey of seabirds difficult. A photograph library is currently underway.

METHODS AND DATA COLLECTED

Reef Lagoon Benthic Habitat Mapping

Benthic habitat and fish communities were surveyed following TropWATER's methods used in previous benthic mapping surveys (York et al., 2022, Carter et al., 2021).

Each site had data collected on time, latitude and longitude (by GPS), depth (converted to depth below mean sea level (dbMSL) in metres), sediment type and data collection method. For benthic habitat type, total percentage cover of algae (total percentage cover of five major algal groups – erect macros, erect calcareous, filamentous, turf mat and encrusting), seagrass (species composition and biomass estimate), hard coral, soft coral, sponges, and other benthic macro invertebrates (BMI) was recorded. Each camera drop was recorded for in-office evaluation to enable greater benthic habitat breakdown, and to identify genera and species when possible.

Out of the 621 sites, 80% were surveyed via the drop camera technique. The remaining 20% (122) were surveyed by the free diving technique (Appendix 2). Free dive sites were only conducted in shallow water less than 10 meters, and only occurred in Herald Cays and Holmes Reef. We included free dive sites at these two reef sites, as favourable weather allowed for additional time to conduct more extensive mapping.

Seabed Observations

Drop video: This method was used from the *Iron Joy* tenders. At each site an underwater CCTV camera (SpotX) with a frame that incorporated a 0.25 m² quadrat was lowered from the vessel to the sea floor (Figure 13 a-b). Benthic habitat was observed on a monitor and habitat assessments conducted in real time. Video analysis will be conducted in the office to further breakdown benthic habitat to finer resolution (up to genera and species where possible). When appropriate, the video will be analysed with the 'CoralNet' software for more accurate percentage calculations.

Free diving: This method was used from the *Iron Joy* tenders. At shallow water sites (< 10 meters) one observer would free dive to the sea floor and place a quadrat (0.25 m²) at three locations on the seafloor to obtain a visual estimate of seagrass if present (Figure 13 c-d). The diver would visually estimate the surrounding seabed to estimate the remainder of the benthic habitat data. This technique allows for rapid assessment in shallow locations, providing more sites within the same area compared to the drop camera method, however, is not recorded so cannot be visually assessed post field survey.

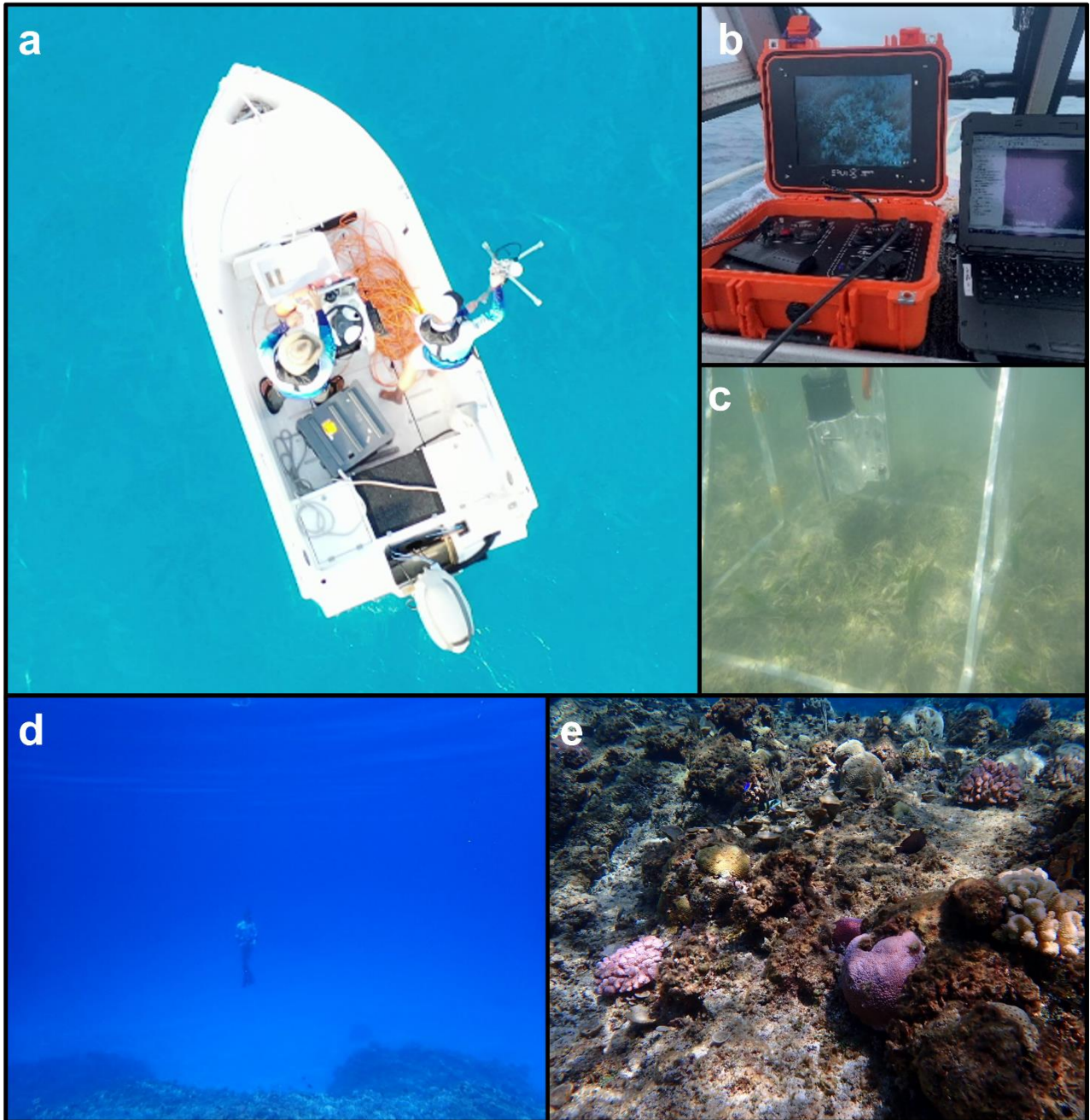


Figure 13: (a) Luke Hoffmann dropping the camera frame from an *Iron Joy* tender; (b) live video screen of drop camera footage; (c) camera on drop frame; (d) Lloyd Shepherd returning from a free dive visual assessment in the shallows at East Diamond Islet; and (e) a photo taken during a shallow free dive visual benthic habitat assessment at East Holmes Reef.

Seabed Sampling

When seagrass was identified by the camera footage, a van Veen grab (grab area 0.0625 m²) was used to collect a small sample to confirm seagrass species identification and to provide the first herbarium specimens for the Coral Sea Marine Park (a total of 10 grabs were performed) (Figure 14a). A total of three grabs were successful in collecting seagrass specimens (Figure 14b). All sediment within the grabs were returned to the water at the collection site. Multiple free dives were conducted in the shallow waters of East Diamond Islet when a small patchy seagrass meadow was observed. All seagrass collected was recorded in a herbarium specimen booklet, and placed in a herbarium press to be mounted and delivered to the Canberra Herbarium for storage.

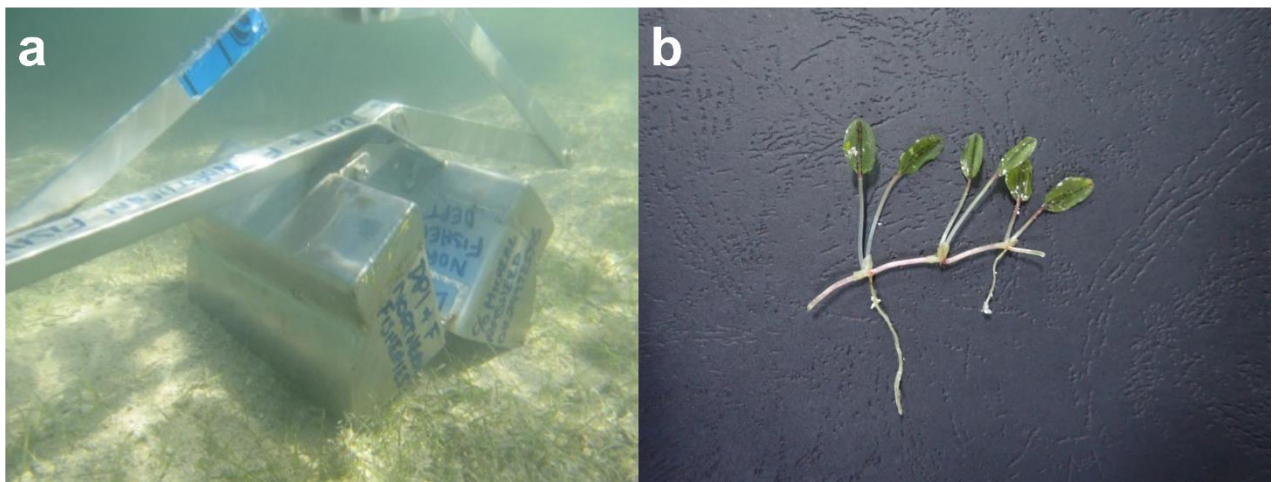


Figure 14: (a) A Van veen grab deployed in the water; and (b) seagrass sample of *Halophila ovalis* to be pressed for a herbarium specimen (taken from East Holmes Reef lagoon).

Demersal Fish Community Observations

Unbaited RUVS were deemed most appropriate to answer the question of which species are living within the reef lagoons, without a bias towards carnivorous fish (Colton and Swearer, 2010, Harvey et al., 2007). RUVS are a non-invasive sampling method that record fish in the field of view of a camera (GoPro), enabling species identification and measurements of species diversity (Figure 15). We followed appropriately modified protocols set out in Langlois et al. (2020) to ensure standardised sampling methods would allow for comparison of fish communities with other RUVS locations/studies, management, and processing. Each deployment was for a minimum of 20 minutes, with the first 5 minutes discarded to avoid sampling when fish would have been scared away from placement of the device. Video footage captured from RUVS is being processed using the *EventMeasure* software to gain counts of each fish species using MaxN. MaxN is the maximum number of each species counted in a single screen shot in each RUVS sample. MaxN is used because it prevents individual fish being counted multiple times so is a conservative estimate of fish abundance.

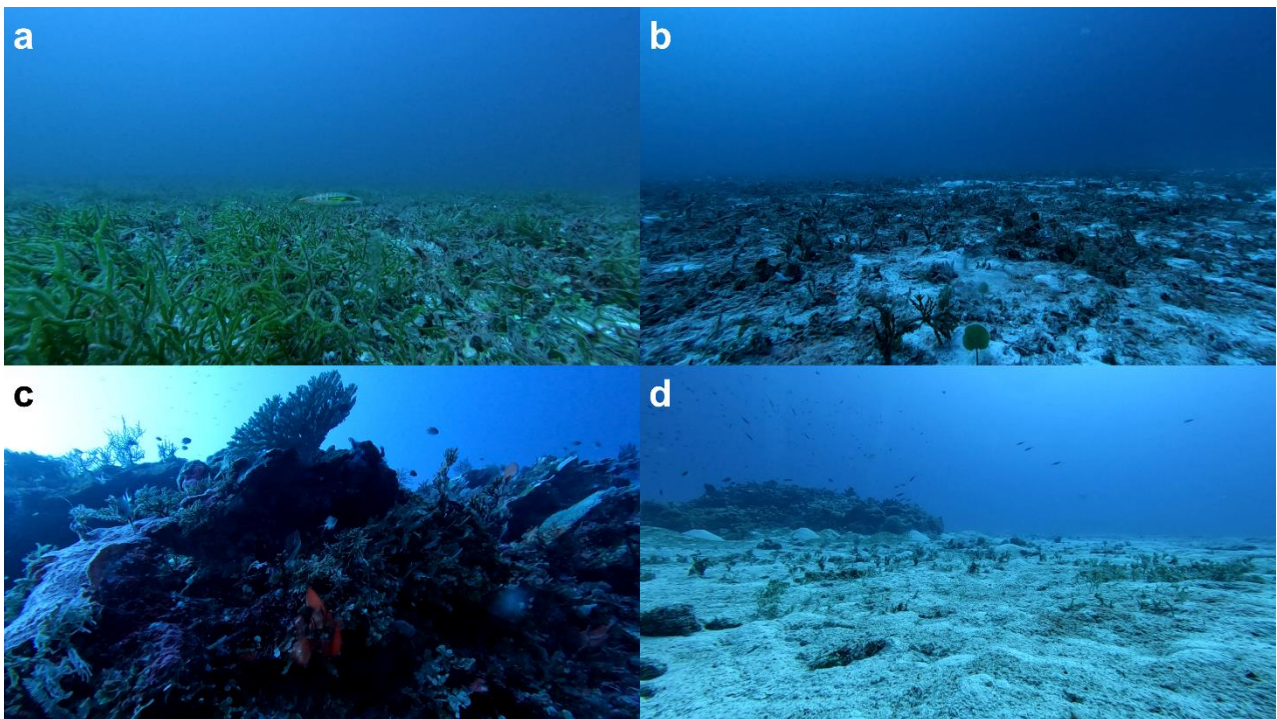


Figure 15: Remote Underwater Video Station (RUVS) deployed in **(a)** Lihou Reef at 50 m; **(b)** in Tregrosse Reef at 58 m; **(c)** in Herald Cays at 42 m; and **(d)** in Holmes Reef at 33 m.

Octocoral Diversity

Dives were restricted to a maximum depth of 15 meters, due to James Cook University dive safety regulations. Most specimens were collected during SCUBA dives at bommies within the reef lagoons or on outer reef walls, however a small number of samples were collected via snorkel close to islands and cays.

A total of 159 specimens were collected within the Phylum Cnidaria (158 specimens) and Tunicata (1 specimen – an unidentified stoloniferous ascidian). Cnidarian specimens showed a high diversity, with a total of 35 confirmed different genera collected (Table 3). The most common genera present was *Siphonogorgia*, with 28 individuals collected (Figure 16a). Identification down to species level is yet to be completed.

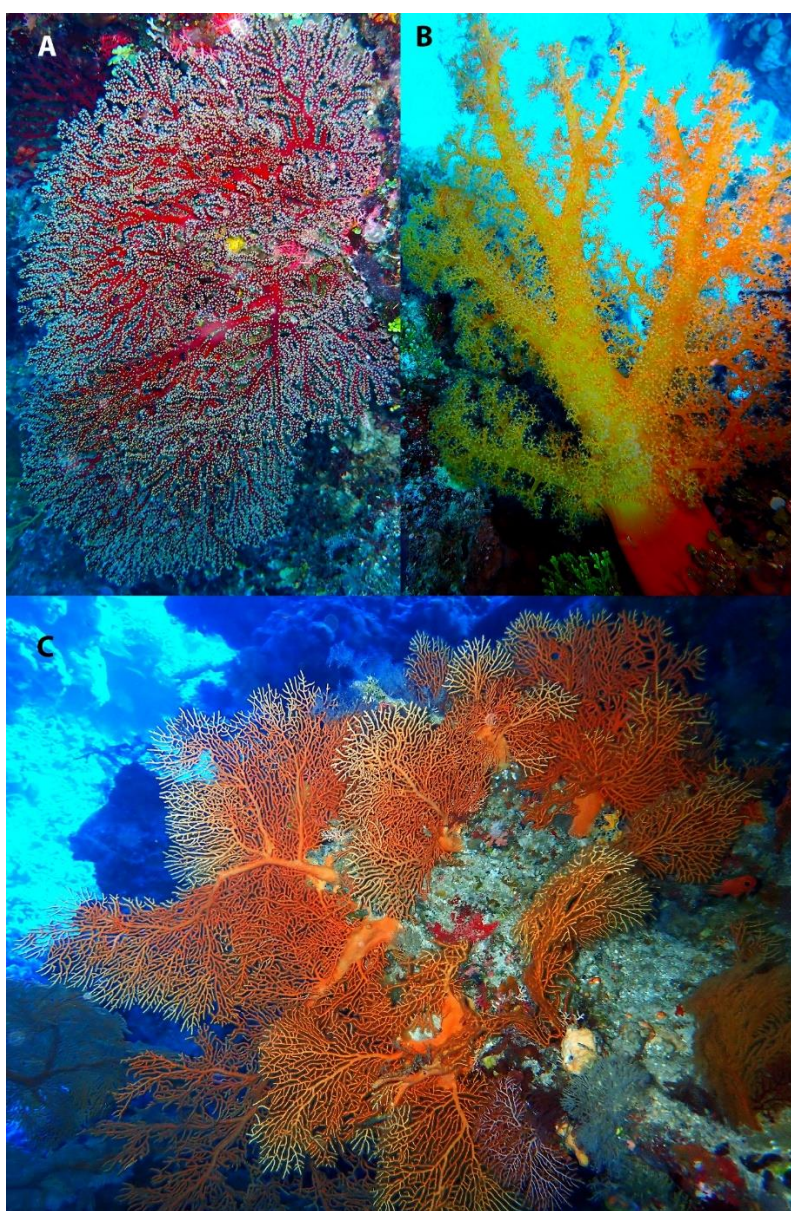


Figure 16: (a) *Siphonogorgia* sample collected at 7m deep at a bommie in North Flinders Reef; (b) *Dendronephthya* collected from 10m from a leeward wall at West Holmes Reef; and (c) *Annella* collected from 15m at Barracudda Bommie, East Diamond Islet.

Table 3: Number of different octocoral genera collected in the Coral Sea.

Genera	Number of Specimens Collected
<i>Acabaria</i>	1
<i>Acanthogorgia</i>	5
<i>Annella</i>	3
<i>Astrogorgia</i>	4
<i>Astrospicularia</i>	2
<i>Briareum</i>	2
<i>Caementabunda nov gen</i>	9
<i>Capnella</i>	3
<i>Cladiella</i>	7
<i>Ctenocella</i>	1
<i>Dendronephthya</i>	1
<i>Dichotella</i>	1
<i>Echinogorgia</i>	1
<i>Efflatounaria</i>	12
<i>Elutherobia</i>	1
<i>Heteroxenia</i>	4
<i>Isis</i>	2
<i>Lobophytum</i>	16
<i>Melithaeidae</i>	3
<i>Menella</i>	1
<i>Nephtya</i>	6
<i>Paracis</i>	1
<i>Paralemnalia</i>	4
<i>Paraminabea</i>	2
<i>Plumigorgia</i>	4
<i>Rhytisma</i>	10
<i>Rumphella</i>	2
<i>Sarcophyton</i>	10
<i>Scleronephthya</i>	2
<i>Sinularia</i>	28
<i>Siphonogorgia</i>	1
<i>Tubipora</i>	2
<i>Umbellifera</i>	1
<i>Viminella</i>	1
<i>Xenia</i>	3

Seabird Observations

Seabird data was collected by visual observation, photography for verification, and a coarse estimation of numbers. The diversity of seabirds was high across the reefs and cays visited; some common species sighted were Brown Booby, Masked Booby, Red-footed Booby, Sooty Tern, Common Noddy, Black Noddy, Black-naped Tern, Crested Tern, Lesser Frigatebird, Great Frigatebird, Pacific Golden Plover, Ruddy Turnstone, Buff-banded Rail, Australian Pelican, Wandering Tattler and Wedge-tailed Shearwater (Figure 17).

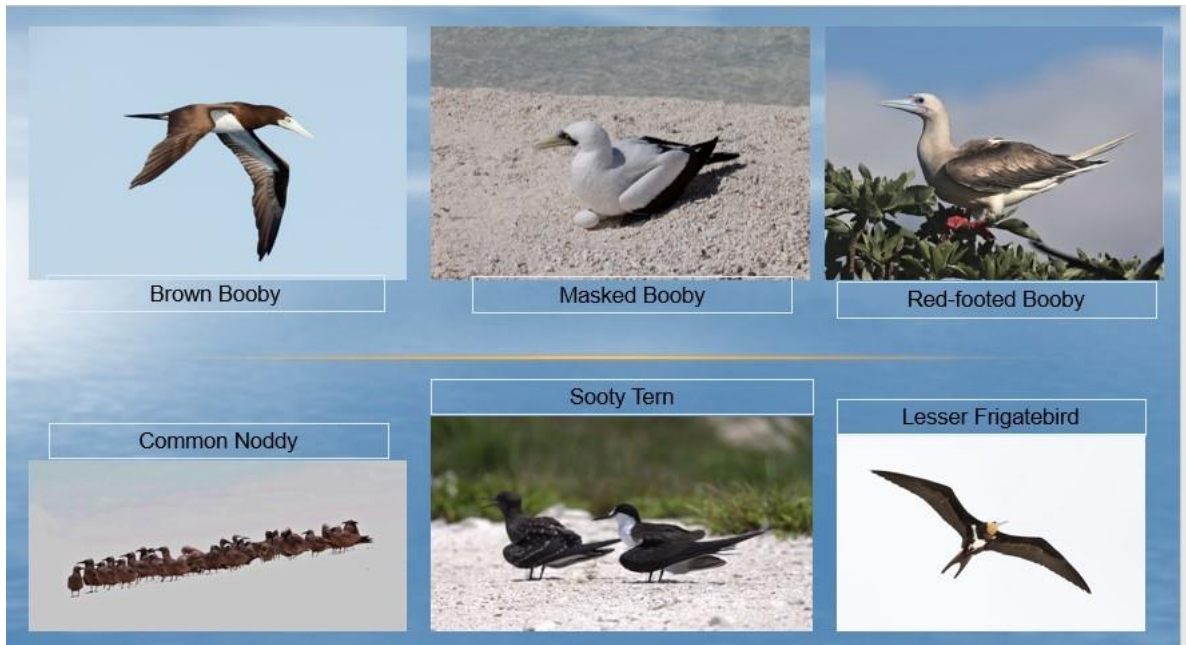


Figure 17: Common seabirds observed in the Coral Sea Marine Park, during a survey in December 2022.

RESULTS AND PRELIMINARY INTERPRETATION

Benthic Habitat Communities

We originally planned to survey only one quarter of the lagoon area at Lihou Reef, however, we realised due to minimal changes in benthic habitat and favourable weather, it would be beneficial to map more area with less site intensity over the same survey time. This led to us successfully mapping nearly half of the area within the Lihou Reef lagoon, nearly double the original plan. Due to favourable weather conditions, we were able to finish mapping the reef lagoon between the four Diamond Islets in two days (rather than the four days scheduled). This allowed us to add Flinders Reef to our survey, after finishing all the original planned reef sites.

Diverse benthic habitats were recorded during the survey. These included algae dominated communities consisting of predominately *Halimeda* species; seagrass meadows of *Halophila* species; invertebrate-dominated communities that included sponges, ascidians, soft and hard corals, sea whips, and gorgonians; and bare substrate with a near invisible coating of microphytobenthos (Figure 18-19). Analysis of benthic video imagery is underway using *CoralNet* software when possible. Seagrass was recorded in Tregrosse Reef (10 sites), South Herald Cay (2 sites), and in East (1 site) and West Holmes Reef (3 sites; Figure 20-22); all except one site was recorded in deepwater. Within Tregrosse Reef, seagrass was found in shallow waters at West Diamond Islet (Figure 20). Seagrass was present in two marine park zones, 'Habitat Protection' and 'National Park'. Overall, seagrass presence was patchy and characterised by low-biomass *Halophila* species, typical of deepwater meadows. Seagrass meadow area and biomass estimates are still being calculated, and final maps showing algae and seagrass meadow boundaries are underway.

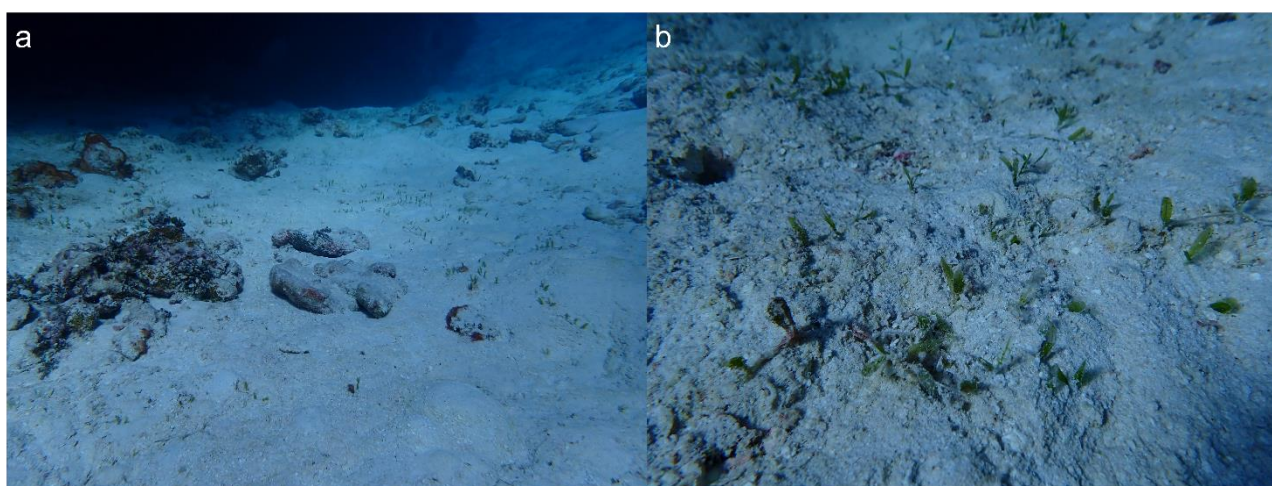


Figure 18: (a) Shallow water *Halophila decipiens* meadow at 8m, at West Diamond Islet in Tregrosse Reef lagoon; and (b) close-up of the seagrass leaves.

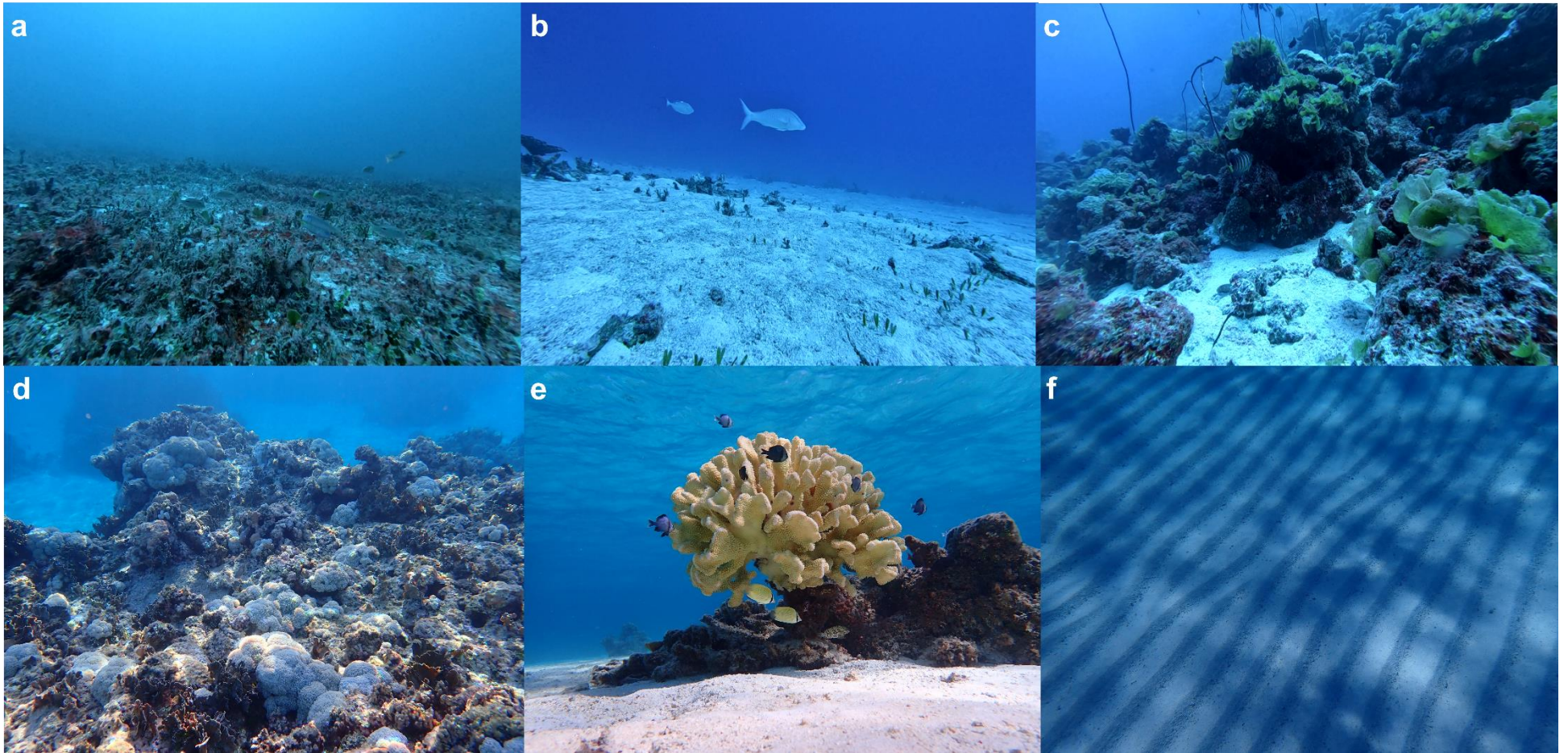
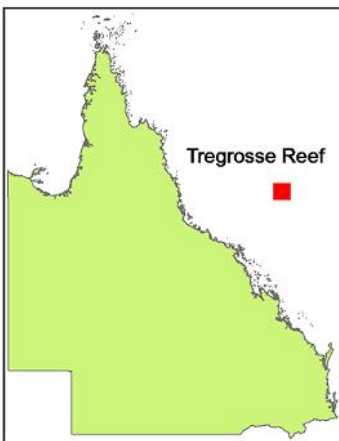
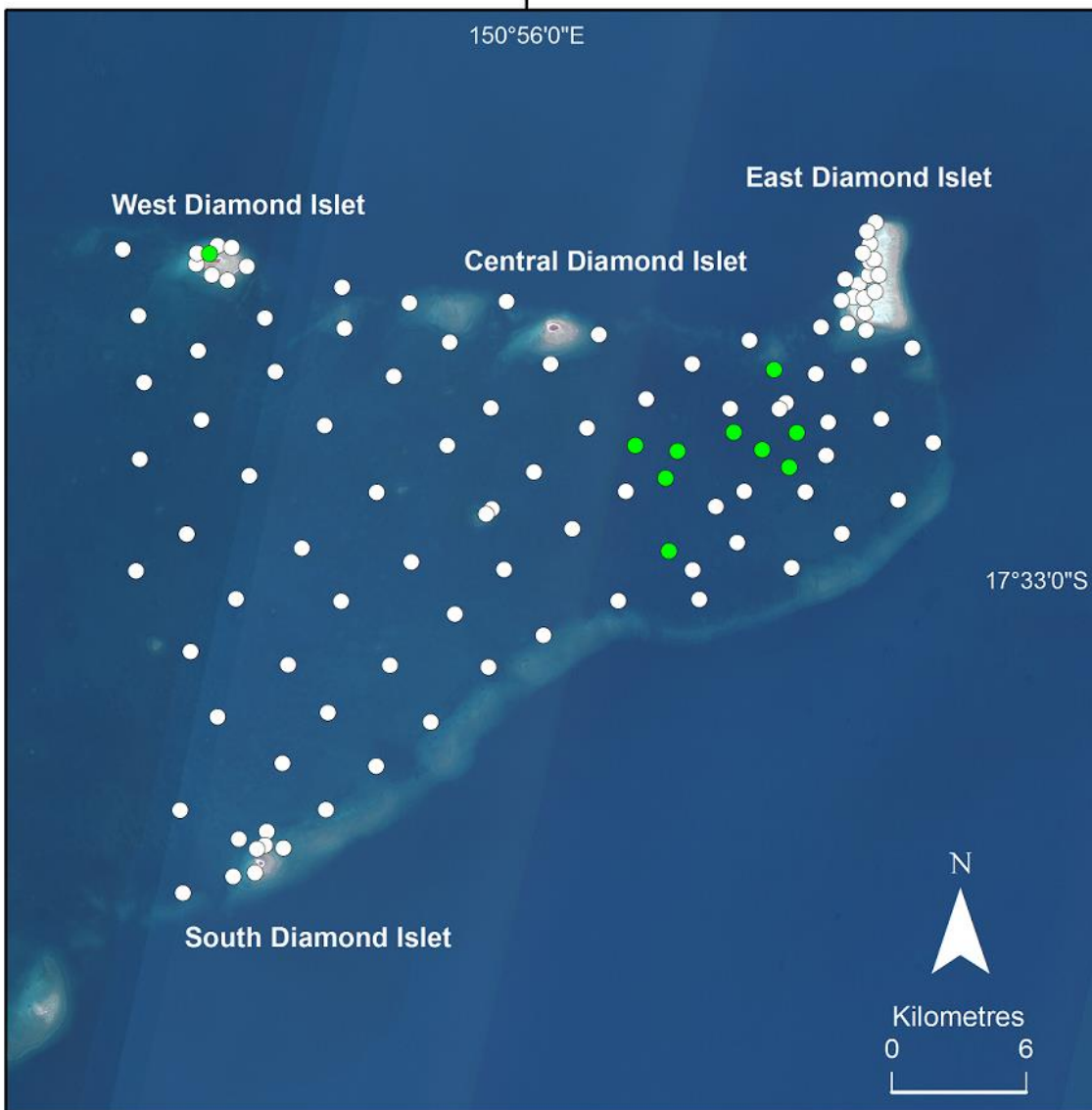


Figure 19: Benthic habitats in the Coral Sea Marine Park **(a)** deepwater algae beds dominated by *Halimeda spp.*; **(b)** deepwater *Halophila decipiens* meadow; **(c)** deepwater coral bommie with sea whips; **(d)** shallow water soft coral reefs.; **(e)** shallow water hard coral reef; **(f)** shallow water bare sediment with ripples.



**Coral Sea Marine Park:
Tregrosse Reefs**

Legend

Seagrass

- Absent
- Present

Source: TropWATER
 Scale 1:250,000
 Satellite image: eAtlas.
<https://doi.org/10.26274/NH77-ZW79>



Australian Government
Parks Australia

Figure 20: Seagrass presence/absence survey sites at Tregrosse Reef, in the Coral Sea Marine Park.

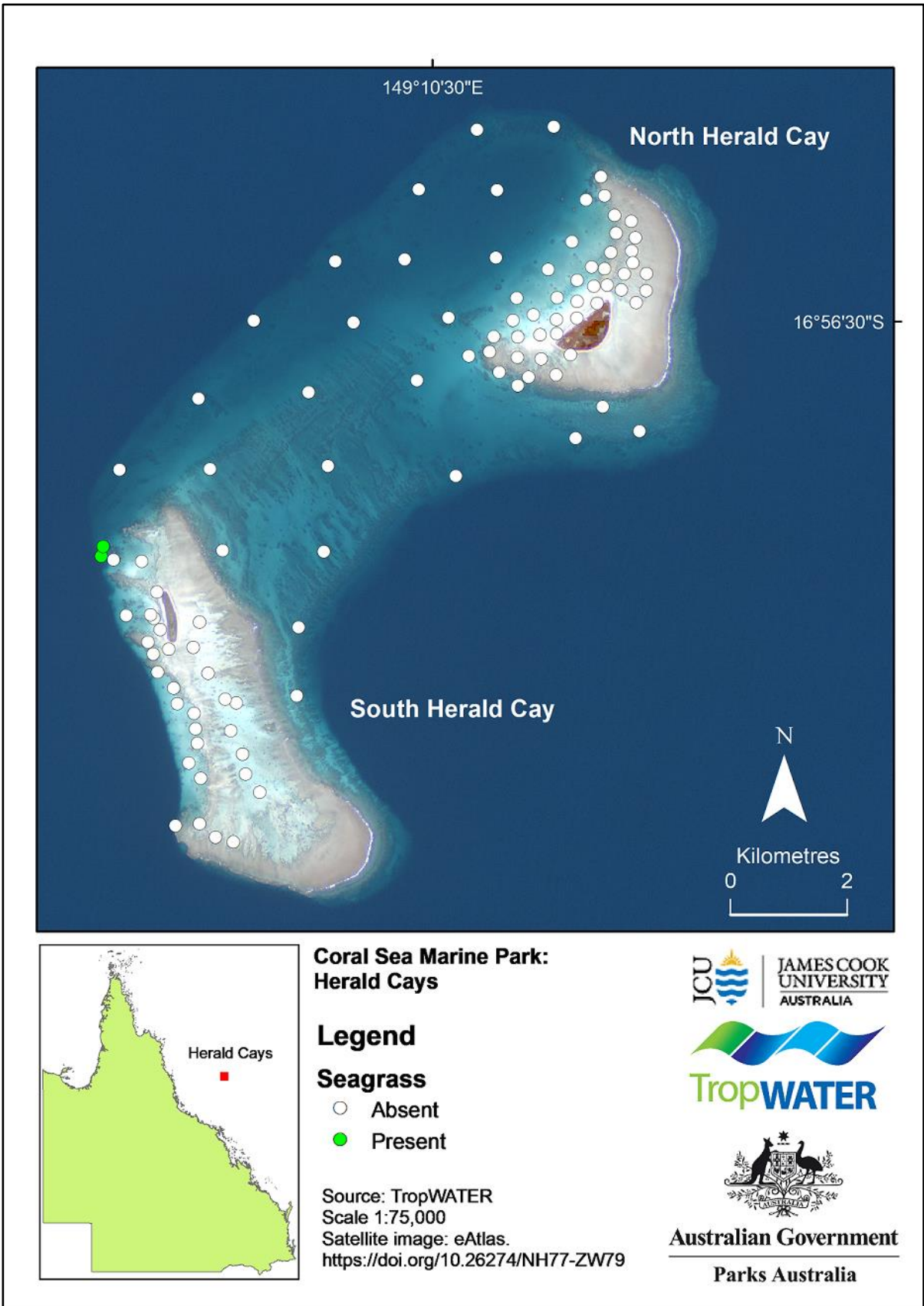


Figure 21: Seagrass presence/absence survey sites at Herald Cays, in the Coral Sea Marine Park.

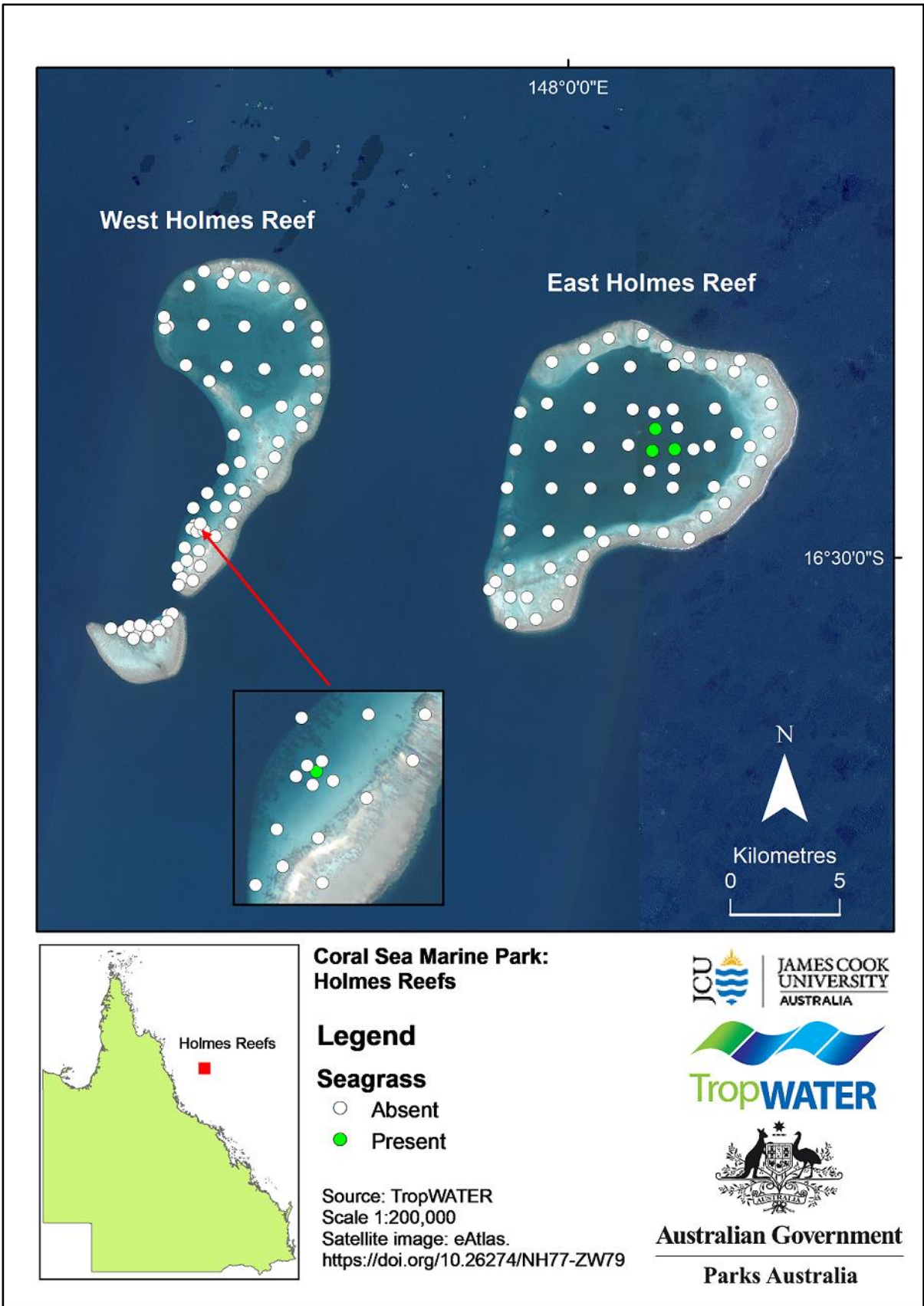


Figure 22: Seagrass presence/absence survey sites at Holmes Reef, in the Coral Sea Marine Park.

Demersal Fish Community Observations

A total of 54 RUVS were deployed during the survey. Each RUVS were placed a minimum of 50 meters apart to ensure we were not surveying the same fish during filming. RUVS were deployed as evenly as possible between shallow and deepwater habitats to assess if fish assemblages vary at different habitat depths. When possible, RUVS were deployed in different benthic habitats (i.e., algae versus seagrass benthic habitats), across both deep and shallow water at each reef site (Figure 23). Analysis of RUVS footage is underway using *EventMeasure* software.

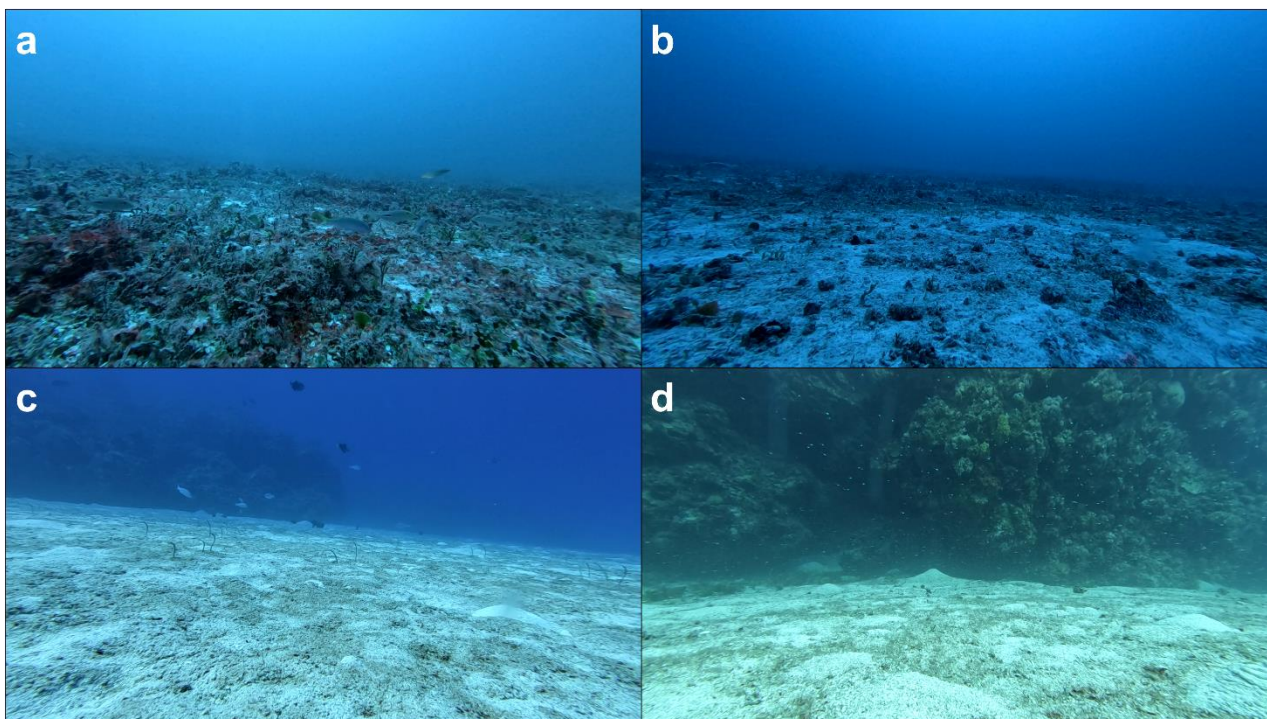


Figure 23: Sample footage from RUVS within (a) deepwater algae dominated benthic habitats at Lihou Reef; (b) deepwater *Halophila decipiens* meadow in Tregrosse Reef; (c) shallow water bare substrate with garden eels at Herald Cays; and (d) shallow coral reef habitat at Flinders Reef.

Disturbance and Other Observations

The shallow coral reefs appeared to be in poor condition at all reef lagoon sites visited, with many bleached coral and coral rubble observed (Figure 24). New coral recruits were observed at some of the reef sites surveyed; Herald Cays, Holmes, and Flinders Reef. Coral at depths in the lagoon (on and at the bottom of bommies), appeared to be in better condition in comparison to shallow water coral reefs inside the lagoon. Our survey did not formally assess coral health.



Figure 24: Bleached hard coral observed in the shallows at East Diamond Islet in Tregrosse Reef lagoon.

Megafauna observed during the survey include large adult male green sea turtles (*Chelonia mydas* – Lihou Reef, Tregrosse Reef and Herald Cays; Figure 24), bottlenose dolphins (*Tursiops aduncus* – edge of the marine park when steaming to Lihou Reef), and a solitary juvenile whale shark (*Rhincodon typus* – when anchored off East Diamond Islet, in Tregrosse Reef). A whale was sighted in the distance outside East Diamond Islet (not within the lagoon) however it was too far away to identify.



Figure 25: Male green sea turtle (*Chelonia mydas*) observed near a shallow water *Halophila decipiens* meadow at East Diamond Islet. This adult male was most likely waiting for females to emerge at night, to initiate mating after the female has finished laying eggs.

A small shoal of unidentified ctenophores was spotted around the Iron Joy when anchored at East Diamond Islet, shortly before the juvenile whale shark was spotted. Shoals of unidentified moon jellies (*Aurelia spp.*) were also observed around the Iron Joy when anchored at East Diamond Islet, and North and South Herald Cays.

Many sharks were spotted in every reef lagoon surveyed, however, the number of sharks were far greater in the lagoon of Lihou Reef. The diversity of shark species observed during our survey was high; sharks observed included grey reef, white tip reef, silver tip reef, grey nurse, oceanic whitetip, and tiger.

FUTURE WORK

Recommendations for Future Surveys

The survey objectives outlined in this grant round were achieved. To improve the quality and outcomes of future survey work, we propose the following recommendations:

- Longer time at each reef site to deploy more RUVS for greater statistical analysis of fish community assemblages between deepwater and shallow water sites, and between different benthic habitats (i.e., algae versus seagrass).
- Deepwater RUVS need to be weighted more to prevent them from tipping over in the strong currents.
- More time at each reef site to allow for the deployment of fish capture devices (such as fish traps and/or nets), to help with species identification, and detecting nursery habitats.
- Deploy baited RUVS (BRUVS) to compare the results between baited and unbaited, and to capture predator fish (such as sharks).
- Deploy light and temperature loggers on the RUVS to gain knowledge of the light limitations and temperature stresses between the shallow and deepwater benthic habitats.
- Return to Tregrosse Reef, Herald Cays and Holmes Reef in the senescent season (March – August) to determine if the seagrass meadows are seasonal, as found in the Great Barrier Reef lagoon.
- Return to Tregrosse Reef, Herald Cays and Holmes Reef at the same time of year (growing season – September to February) to determine if the meadow boundaries change significantly over time; the deepwater meadow at East Diamond Islet found in 2021 was no longer present during our survey.
- Survey the remaining reef lagoons; Cato Reef, Wreck Reef, Saumarez Reefs, Frederick Reef, Kenn Reef, Mellish Reef, Marion Reef, Willis Islets, Coringa Islets and Magdelaine Cays, Moore Reefs, Bougainville Reef, Osprey Reef, and Ashmore and Boot Reef.

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ATTACHMENT 1 – PERSONNEL ON BOARD

Personnel	Organisation	Dates on board	Role
Samantha Tol	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Field trip lead – Benthic mapping
Paul York	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Field participant – Benthic mapping
Rob Coles	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Field participant – Benthic mapping
Abbi Scott	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Field participant – Benthic mapping
Lloyd Shepherd	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Technician, small boat master, field participant – Benthic mapping
Paul Leeson	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Technician, small boat master, field participant – Benthic mapping
Luke Hoffmann	TropWATER, James Cook University	03/12/2021 – 16/12/2021	Field participant – Benthic mapping
Merrick Ekins	Queensland Museum	03/12/2021 – 16/12/2021	Field trip lead – Octocoral identification
Stefano Borghi	ARC Centre of Excellence, James Cook University	03/12/2021 – 16/12/2021	Field participant – Octocoral identification
Ellen Ariel	Turtle Health Research Facility, James Cook University	03/12/2021 – 16/12/2021	Field trip lead – Sea turtle observations
Victoria Stoddard	Volunteer	03/12/2021 – 16/12/2021	Field participant – Sea turtle observations
Mary Clarke	Citizen Scientists	03/12/2021 – 16/12/2021	Field trip lead – Sea bird observations
Mitchell Baskys	Parks Australia - CSMP	03/12/2021 – 16/12/2021	Field trip lead – Parks Australia
Brain Tracey	Parks Australia - CSMP	03/12/2021 – 16/12/2021	Field participant – Parks Australia
Rob Benn	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> Master
Gavin Ray	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> First Mate
Henry Whittaker	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> deckhand
Coby Richardson	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> deckhand
Casey Castro	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> deckhand
Shane Old	<i>Iron Joy</i>	03/12/2021 – 16/12/2021	<i>Iron Joy</i> Cook

ATTACHMENT 2 – SURVEY SITE LOCATIONS, METHOD, AND DATE

Benthic Habitat Mapping

Date	Boat	Site ID	Method	Reef Site	Latitude	Longitude
05/12/2022	Kahn	0	Drop camera	Lihou Reef	-17.32000283	152.0333327
05/12/2022	Kahn	1	Drop camera	Lihou Reef	-17.302107	152.0166998
05/12/2022	Kahn	2	Drop camera	Lihou Reef	-17.302622	151.9922725
05/12/2022	Kahn	3	Drop camera	Lihou Reef	-17.2760925	151.9816752
05/12/2022	Kahn	4	Drop camera	Lihou Reef	-17.2686875	151.9529255
05/12/2022	Kahn	5	Drop camera	Lihou Reef	-17.235135	151.953058
05/12/2022	Kahn	6	Drop camera	Lihou Reef	-17.23857	151.927271
05/12/2022	Kahn	7	Drop camera	Lihou Reef	-17.26870933	151.9230152
05/12/2022	Kahn	8	Drop camera	Lihou Reef	-17.34210917	151.991411
05/12/2022	Kahn	9	Drop camera	Lihou Reef	-17.32921583	152.0110398
05/12/2022	Kahn	10	Drop camera	Lihou Reef	-17.374405	151.8899272
05/12/2022	Pile 1	1	Drop camera	Lihou Reef	-17.33251383	152.048887
05/12/2022	Pile 1	2	Drop camera	Lihou Reef	-17.35061433	152.0237028
05/12/2022	Pile 1	3	Drop camera	Lihou Reef	-17.3644345	151.9898715
05/12/2022	Pile 1	4	Drop camera	Lihou Reef	-17.36161533	151.968926
05/12/2022	Pile 1	5	Drop camera	Lihou Reef	-17.32794683	151.9540567
05/12/2022	Pile 1	6	Drop camera	Lihou Reef	-17.29964233	151.9635933
05/12/2022	Pile 1	7	Drop camera	Lihou Reef	-17.30437417	151.9303538
05/12/2022	Pile 1	8	Drop camera	Lihou Reef	-17.2953635	151.8983368
05/12/2022	Pile 1	9	Drop camera	Lihou Reef	-17.30251567	151.8725808
05/12/2022	Pile 1	10	Drop camera	Lihou Reef	-17.281172	151.8598032
05/12/2022	Pile 1	11	Drop camera	Lihou Reef	-17.26853917	151.8947882
05/12/2022	Pile 1	12	Drop camera	Lihou Reef	-17.26847967	151.8947982
05/12/2022	Pile 1	13	Drop camera	Lihou Reef	-17.325195	151.9210338
05/12/2022	Tender 1	0	Drop camera	Lihou Reef	-17.33019483	152.0556153
05/12/2022	Tender 1	1	Drop camera	Lihou Reef	-17.31976733	152.0482213
05/12/2022	Tender 1	2	Drop camera	Lihou Reef	-17.3194335	152.0516355
05/12/2022	Tender 1	3	Drop camera	Lihou Reef	-17.322493	152.0538072
05/12/2022	Tender 1	4	Drop camera	Lihou Reef	-17.32597533	152.0529848
05/12/2022	Tender 1	5	Drop camera	Lihou Reef	-17.33831033	152.0519877
05/12/2022	Tender 1	6	Drop camera	Lihou Reef	-17.33731783	152.0558732
05/12/2022	Tender 1	7	Drop camera	Lihou Reef	-17.340573	152.05948
05/12/2022	Tender 1	8	Drop camera	Lihou Reef	-17.34541567	152.052061
05/12/2022	Tender 1	9	Drop camera	Lihou Reef	-17.35123067	152.0489002
05/12/2022	Tender 1	10	Drop camera	Lihou Reef	-17.35393083	152.0444972
05/12/2022	Tender 1	11	Drop camera	Lihou Reef	-17.3604445	152.0438638
05/12/2022	Tender 1	12	Drop camera	Lihou Reef	-17.35914517	152.0413123
05/12/2022	Tender 1	13	Drop camera	Lihou Reef	-17.34616833	152.0475563
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05/12/2022	Tender 1	15	Drop camera	Lihou Reef	-17.3237445	152.0476617
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06/12/2022	Kahn	11	Drop camera	Lihou Reef	-17.364929	151.8721578
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06/12/2022	Kahn	13	Drop camera	Lihou Reef	-17.3316075	151.8443353
06/12/2022	Kahn	14	Drop camera	Lihou Reef	-17.32838383	151.8471497
06/12/2022	Kahn	15	Drop camera	Lihou Reef	-17.33038833	151.8164333
06/12/2022	Kahn	16	Drop camera	Lihou Reef	-17.36208533	151.7849002
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06/12/2022	Kahn	20	Drop camera	Lihou Reef	-17.39019117	151.844493
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06/12/2022	Pile 1	14	Drop camera	Lihou Reef	-17.359959	151.9268303
06/12/2022	Pile 1	15	Drop camera	Lihou Reef	-17.35808567	151.9031523
06/12/2022	Pile 1	16	Drop camera	Lihou Reef	-17.3327365	151.8972738
06/12/2022	Pile 1	17	Drop camera	Lihou Reef	-17.33202917	151.8688035
06/12/2022	Pile 1	18	Drop camera	Lihou Reef	-17.3073955	151.8397993
06/12/2022	Pile 1	19	Drop camera	Lihou Reef	-17.29906217	151.8132532
06/12/2022	Pile 1	20	Drop camera	Lihou Reef	-17.3279545	151.7855055
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06/12/2022	Pile 1	44	Drop camera	Lihou Reef	-17.39402625	151.6762104
06/12/2022	Pile 1	45	Drop camera	Lihou Reef	-17.51641933	151.638755
06/12/2022	Pile 1	46	Drop camera	Lihou Reef	-17.52029483	151.6233782
06/12/2022	Pile 1	47	Drop camera	Lihou Reef	-17.49820683	151.6029182
06/12/2022	Pile 1	48	Drop camera	Lihou Reef	-17.4852945	151.588715
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06/12/2022	Tender 1	21	Drop camera	Lihou Reef	-17.37634967	152.0243947
06/12/2022	Tender 1	22	Drop camera	Lihou Reef	-17.37297983	152.0313965

06/12/2022	Tender 1	23	Drop camera	Lihou Reef	-17.3681115	152.0379358
06/12/2022	Tender 1	24	Drop camera	Lihou Reef	-17.36454967	152.0347373
06/12/2022	Tender 1	25	Drop camera	Lihou Reef	-17.36908717	152.0291465
06/12/2022	Tender 1	26	Drop camera	Lihou Reef	-17.3722915	152.023909
06/12/2022	Tender 1	27	Drop camera	Lihou Reef	-17.3758665	152.017463
06/12/2022	Tender 1	28	Drop camera	Lihou Reef	-17.3801995	152.0059383
06/12/2022	Tender 1	29	Drop camera	Lihou Reef	-17.38473783	152.0005007
06/12/2022	Tender 1	30	Drop camera	Lihou Reef	-17.38505617	151.994189
06/12/2022	Tender 1	31	Drop camera	Lihou Reef	-17.38531683	151.9841842
06/12/2022	Tender 1	32	Drop camera	Lihou Reef	-17.38726183	151.9732535
06/12/2022	Tender 1	33	Drop camera	Lihou Reef	-17.38393183	151.9633195
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06/12/2022	Tender 1	35	Drop camera	Lihou Reef	-17.38371267	151.9399468
06/12/2022	Tender 1	36	Drop camera	Lihou Reef	-17.382835	151.9303877
06/12/2022	Tender 1	37	Drop camera	Lihou Reef	-17.3895325	151.9204695
06/12/2022	Tender 1	38	Drop camera	Lihou Reef	-17.41295483	151.8762318
06/12/2022	Tender 1	39	Drop camera	Lihou Reef	-17.40928367	151.8773187
06/12/2022	Tender 1	40	Drop camera	Lihou Reef	-17.41041083	151.8835022
06/12/2022	Tender 1	41	Drop camera	Lihou Reef	-17.411688	151.8735652
06/12/2022	Tender 1	42	Drop camera	Lihou Reef	-17.4105295	151.8692178
06/12/2022	Tender 1	43	Drop camera	Lihou Reef	-17.41219867	151.8663118
06/12/2022	Tender 1	44	Drop camera	Lihou Reef	-17.408594	151.8576725
06/12/2022	Tender 1	45	Drop camera	Lihou Reef	-17.41256317	151.8429695
06/12/2022	Tender 1	46	Drop camera	Lihou Reef	-17.41841967	151.8319487
06/12/2022	Tender 1	47	Drop camera	Lihou Reef	-17.4260565	151.823472
06/12/2022	Tender 1	48	Drop camera	Lihou Reef	-17.43131833	151.8154502
06/12/2022	Tender 1	49	Drop camera	Lihou Reef	-17.436002	151.8043887
06/12/2022	Tender 1	50	Drop camera	Lihou Reef	-17.44019467	151.7949922
07/12/2022	Kahn	22	Drop camera	Lihou Reef	-17.44950183	151.7609037
07/12/2022	Kahn	23	Drop camera	Lihou Reef	-17.435486	151.7398612
07/12/2022	Kahn	24	Drop camera	Lihou Reef	-17.42539233	151.7031575
07/12/2022	Kahn	25	Drop camera	Lihou Reef	-17.42627517	151.672161
07/12/2022	Kahn	26	Drop camera	Lihou Reef	-17.45681317	151.6478528
07/12/2022	Kahn	27	Drop camera	Lihou Reef	-17.46069417	151.6748932
07/12/2022	Kahn	28	Drop camera	Lihou Reef	-17.48606467	151.6810593
07/12/2022	Kahn	29	Drop camera	Lihou Reef	-17.47606417	151.7051942
07/12/2022	Kahn	30	Drop camera	Lihou Reef	-17.45565133	151.7272712
07/12/2022	Kahn	31	Drop camera	Lihou Reef	-17.5332215	151.616952
07/12/2022	Kahn	32	Drop camera	Lihou Reef	-17.529573	151.5933558
07/12/2022	Pile 1	39	Drop camera	Lihou Reef	-17.44028983	151.7842358
07/12/2022	Pile 1	40	Drop camera	Lihou Reef	-17.42668411	151.7635577
07/12/2022	Pile 1	41	Drop camera	Lihou Reef	-17.40865497	151.7293318
07/12/2022	Pile 1	42	Drop camera	Lihou Reef	-17.39300559	151.7268361
07/12/2022	Pile 1	43	Drop camera	Lihou Reef	-17.39742838	151.6997406
07/12/2022	Pile 1	49	Drop camera	Lihou Reef	-17.46454067	151.5881888
07/12/2022	Pile 1	50	Drop camera	Lihou Reef	-17.48747917	151.5624778

07/12/2022	Pile 1	51	Drop camera	Lihou Reef	-17.49335167	151.533928
07/12/2022	Pile 1	52	Drop camera	Lihou Reef	-17.5262225	151.5112898
07/12/2022	Pile 1	53	Drop camera	Lihou Reef	-17.53929633	151.4692987
07/12/2022	Pile 1	54	Drop camera	Lihou Reef	-17.56348783	151.4808152
07/12/2022	Pile 1	55	Drop camera	Lihou Reef	-17.56268183	151.5054537
07/12/2022	Pile 1	56	Drop camera	Lihou Reef	-17.5604465	151.5279855
07/12/2022	Pile 1	57	Drop camera	Lihou Reef	-17.55193017	151.5569485
07/12/2022	Pile 1	58	Drop camera	Lihou Reef	-17.53332483	151.5370675
07/12/2022	Pile 1	59	Drop camera	Lihou Reef	-17.51692417	151.5633565
07/12/2022	Pile 1	60	Drop camera	Lihou Reef	-17.55007917	151.5832693
07/12/2022	Pile 1	61	Drop camera	Lihou Reef	-17.46302278	151.7516371
07/12/2022	Tender 1	51	Drop camera	Lihou Reef	-17.4430605	151.7871275
07/12/2022	Tender 1	52	Drop camera	Lihou Reef	-17.45067967	151.771763
07/12/2022	Tender 1	53	Drop camera	Lihou Reef	-17.45792633	151.7638457
07/12/2022	Tender 1	54	Drop camera	Lihou Reef	-17.46358617	151.7587233
07/12/2022	Tender 1	55	Drop camera	Lihou Reef	-17.46820083	151.755491
07/12/2022	Tender 1	56	Drop camera	Lihou Reef	-17.470948	151.7546595
07/12/2022	Tender 1	57	Drop camera	Lihou Reef	-17.47179667	151.7471652
07/12/2022	Tender 1	58	Drop camera	Lihou Reef	-17.47483017	151.7431938
07/12/2022	Tender 1	59	Drop camera	Lihou Reef	-17.4772145	151.7400088
07/12/2022	Tender 1	60	Drop camera	Lihou Reef	-17.47623167	151.732502
07/12/2022	Tender 1	61	Drop camera	Lihou Reef	-17.48050917	151.732556
07/12/2022	Tender 1	62	Drop camera	Lihou Reef	-17.48510533	151.7272868
07/12/2022	Tender 1	63	Drop camera	Lihou Reef	-17.49031683	151.7217042
07/12/2022	Tender 1	64	Drop camera	Lihou Reef	-17.49036483	151.7155245
07/12/2022	Tender 1	65	Drop camera	Lihou Reef	-17.4962605	151.7155888
07/12/2022	Tender 1	66	Drop camera	Lihou Reef	-17.50137067	151.709868
07/12/2022	Tender 1	67	Drop camera	Lihou Reef	-17.5046795	151.7063732
07/12/2022	Tender 1	68	Drop camera	Lihou Reef	-17.5053585	151.7019435
07/12/2022	Tender 1	69	Drop camera	Lihou Reef	-17.51191067	151.6969375
07/12/2022	Tender 1	70	Drop camera	Lihou Reef	-17.51397117	151.6894655
07/12/2022	Tender 1	71	Drop camera	Lihou Reef	-17.5191905	151.6850118
07/12/2022	Tender 1	72	Drop camera	Lihou Reef	-17.52621783	151.6777087
07/12/2022	Tender 1	73	Drop camera	Lihou Reef	-17.52965417	151.6679462
07/12/2022	Tender 1	74	Drop camera	Lihou Reef	-17.53771417	151.6624943
07/12/2022	Tender 1	75	Drop camera	Lihou Reef	-17.53791633	151.650872
07/12/2022	Tender 1	76	Drop camera	Lihou Reef	-17.5463035	151.6507085
07/12/2022	Tender 1	77	Drop camera	Lihou Reef	-17.5481585	151.637698
07/12/2022	Tender 1	78	Drop camera	Lihou Reef	-17.55571767	151.6346752
07/12/2022	Tender 1	79	Drop camera	Lihou Reef	-17.5554375	151.6256448
07/12/2022	Tender 1	80	Drop camera	Lihou Reef	-17.555531	151.6179127
07/12/2022	Tender 1	81	Drop camera	Lihou Reef	-17.56282367	151.611948
07/12/2022	Tender 1	82	Drop camera	Lihou Reef	-17.56687517	151.6041858
07/12/2022	Tender 1	83	Drop camera	Lihou Reef	-17.56668733	151.5970705
07/12/2022	Tender 1	84	Drop camera	Lihou Reef	-17.57384083	151.5923578
07/12/2022	Tender 1	85	Drop camera	Lihou Reef	-17.57748083	151.580516

07/12/2022	Tender 1	86	Drop camera	Lihou Reef	-17.575725	151.5714703
07/12/2022	Tender 1	87	Drop camera	Lihou Reef	-17.58098667	151.5623008
08/12/2022	Kahn	33	Drop camera	Lihou Reef	-17.5873945	151.4559697
08/12/2022	Kahn	34	Drop camera	Lihou Reef	-17.60118833	151.4257902
08/12/2022	Kahn	35	Drop camera	Lihou Reef	-17.62640233	151.4297895
08/12/2022	Kahn	36	Drop camera	Lihou Reef	-17.61318133	151.4248133
08/12/2022	Kahn	37	Drop camera	Lihou Reef	-17.63740267	151.3985002
08/12/2022	Kahn	38	Drop camera	Lihou Reef	-17.64032317	151.4089543
08/12/2022	Kahn	39	Drop camera	Lihou Reef	-17.64387783	151.4076433
08/12/2022	Kahn	40	Drop camera	Lihou Reef	-17.6408455	151.4143632
08/12/2022	Kahn	41	Drop camera	Lihou Reef	-17.6369515	151.4215107
08/12/2022	Kahn	42	Drop camera	Lihou Reef	-17.62345467	151.4461597
08/12/2022	Pile 1	62	Drop camera	Lihou Reef	-17.568762	151.4294023
08/12/2022	Pile 1	63	Drop camera	Lihou Reef	-17.59727067	151.3887523
08/12/2022	Pile 1	64	Drop camera	Lihou Reef	-17.62210917	151.3418055
08/12/2022	Pile 1	65	Drop camera	Lihou Reef	-17.64658917	151.358742
08/12/2022	Pile 1	66	Drop camera	Lihou Reef	-17.65002467	151.358366
08/12/2022	Pile 1	67	Drop camera	Lihou Reef	-17.645381	151.379538
08/12/2022	Pile 1	68	Drop camera	Lihou Reef	-17.62232883	151.3791717
08/12/2022	Pile 1	69	Drop camera	Lihou Reef	-17.62936983	151.4259022
08/12/2022	Pile 1	70	Drop camera	Lihou Reef	-17.6327285	151.4306273
08/12/2022	Pile 1	71	Drop camera	Lihou Reef	-17.63281367	151.4306437
08/12/2022	Pile 1	72	Drop camera	Lihou Reef	-17.62614533	151.4418982
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08/12/2022	Tender 1	89	Drop camera	Lihou Reef	-17.57852267	151.5386707
08/12/2022	Tender 1	90	Drop camera	Lihou Reef	-17.57858867	151.5263508
08/12/2022	Tender 1	91	Drop camera	Lihou Reef	-17.58592083	151.520421
08/12/2022	Tender 1	92	Drop camera	Lihou Reef	-17.58853733	151.5144787
08/12/2022	Tender 1	93	Drop camera	Lihou Reef	-17.58645283	151.5039093
08/12/2022	Tender 1	94	Drop camera	Lihou Reef	-17.59138917	151.5020523
08/12/2022	Tender 1	95	Drop camera	Lihou Reef	-17.59361467	151.4945647
08/12/2022	Tender 1	96	Drop camera	Lihou Reef	-17.5937785	151.486504
08/12/2022	Tender 1	97	Drop camera	Lihou Reef	-17.61103217	151.4706488
08/12/2022	Tender 1	98	Drop camera	Lihou Reef	-17.610307	151.46163
08/12/2022	Tender 1	99	Drop camera	Lihou Reef	-17.6152275	151.45302
09/12/2022	Kahn	43	Drop camera	Tregrosse Reef	-17.458018	151.022849
09/12/2022	Kahn	44	Drop camera	Tregrosse Reef	-17.46727317	150.999827
09/12/2022	Kahn	45	Drop camera	Tregrosse Reef	-17.48071233	150.9813803
09/12/2022	Kahn	46	Drop camera	Tregrosse Reef	-17.49177783	150.9577283
09/12/2022	Kahn	47	Drop camera	Tregrosse Reef	-17.50859	150.9361727
09/12/2022	Kahn	48	Drop camera	Tregrosse Reef	-17.52284717	150.9192635
09/12/2022	Kahn	49	Drop camera	Tregrosse Reef	-17.52477733	150.9169855
09/12/2022	Kahn	50	Drop camera	Tregrosse Reef	-17.543118	150.887033
09/12/2022	Kahn	51	Drop camera	Tregrosse Reef	-17.55808583	150.8587548
09/12/2022	Kahn	52	Drop camera	Tregrosse Reef	-17.58234117	150.8376145
09/12/2022	Kahn	53	Drop camera	Tregrosse Reef	-17.6022585	150.8092987

09/12/2022	Kahn	54	Drop camera	Tregrosse Reef	-17.63797117	150.7942135
09/12/2022	Kahn	55	Drop camera	Tregrosse Reef	-17.66189683	150.824294
09/12/2022	Pile 1	73	Drop camera	Tregrosse Reef	-17.61896817	151.4428932
09/12/2022	Pile 1	74	Drop camera	Tregrosse Reef	-17.46787517	151.066646
09/12/2022	Pile 1	75	Drop camera	Tregrosse Reef	-17.4896235	151.054342
09/12/2022	Pile 1	76	Drop camera	Tregrosse Reef	-17.50014083	151.0278575
09/12/2022	Pile 1	77	Drop camera	Tregrosse Reef	-17.49357483	151.0418942
09/12/2022	Pile 1	78	Drop camera	Tregrosse Reef	-17.52190767	151.0093947
09/12/2022	Pile 1	79	Drop camera	Tregrosse Reef	-17.53884517	150.9906127
09/12/2022	Pile 1	80	Drop camera	Tregrosse Reef	-17.55794467	150.970256
09/12/2022	Pile 1	81	Drop camera	Tregrosse Reef	-17.57114267	150.9400472
09/12/2022	Pile 1	82	Drop camera	Tregrosse Reef	-17.58337283	150.9180163
09/12/2022	Pile 1	83	Drop camera	Tregrosse Reef	-17.60423933	150.8946777
09/12/2022	Pile 1	84	Drop camera	Tregrosse Reef	-17.60423933	150.8946777
09/12/2022	Pile 1	85	Drop camera	Tregrosse Reef	-17.62116467	150.8729573
09/12/2022	Pile 1	86	Drop camera	Tregrosse Reef	-17.6378725	150.8526897
09/12/2022	Pile 1	87	Drop camera	Tregrosse Reef	-17.65246767	150.8356178
09/12/2022	Pile 1	88	Drop camera	Tregrosse Reef	-17.6490115	150.8177713
09/12/2022	Pile 1	89	Drop camera	Tregrosse Reef	-17.66963667	150.7953803
09/12/2022	Pile 1	90	Drop camera	Tregrosse Reef	-17.66324783	150.815511
09/12/2022	Pile 1	91	Drop camera	Tregrosse Reef	-17.57739867	150.7984875
09/12/2022	Pile 1	92	Drop camera	Tregrosse Reef	-17.5465005	150.7764398
09/12/2022	Pile 1	93	Drop camera	Tregrosse Reef	-17.53237633	150.7969527
09/12/2022	Pile 1	94	Drop camera	Tregrosse Reef	-17.53232883	150.7969927
09/12/2022	Pile 1	95	Drop camera	Tregrosse Reef	-17.51014	150.8219145
09/12/2022	Pile 1	96	Drop camera	Tregrosse Reef	-17.49088067	150.852265
09/12/2022	Pile 1	97	Drop camera	Tregrosse Reef	-17.4720405	150.8799648
09/12/2022	Pile 1	98	Drop camera	Tregrosse Reef	-17.458821	150.9023908
09/12/2022	Pile 1	99	Drop camera	Tregrosse Reef	-17.44327133	150.9252383
09/12/2022	Pile 1	100	Drop camera	Tregrosse Reef	-17.45592283	150.9623627
09/12/2022	Pile 1	101	Drop camera	Tregrosse Reef	-17.467315	150.9427822
09/12/2022	Pile 1	102	Drop camera	Tregrosse Reef	-17.55738333	151.0026763
09/12/2022	Pile 1	103	Drop camera	Tregrosse Reef	-17.54608533	150.999986
09/12/2022	Pile 1	104	Drop camera	Tregrosse Reef	-17.535664	151.0178207
09/12/2022	Pile 1	105	Drop camera	Tregrosse Reef	-17.545339	151.0398053
09/12/2022	Pile 1	106	Drop camera	Tregrosse Reef	-17.51632767	151.0451742
09/12/2022	Pile 1	107	Drop camera	Tregrosse Reef	-17.506835	151.0388562
09/12/2022	Pile 1	108	Drop camera	Tregrosse Reef	-17.5023435	151.0535942
09/12/2022	Pile 1	109	Drop camera	Tregrosse Reef	-17.48224633	151.0373998
09/12/2022	Pile 1	110	Drop camera	Tregrosse Reef	-17.51609583	151.020802
09/12/2022	Pile 1	111	Drop camera	Tregrosse Reef	-17.53227367	151.0597782
09/12/2022	Tender 1	100	Drop camera	Tregrosse Reef	-17.43676733	151.0665473
09/12/2022	Tender 1	101	Drop camera	Tregrosse Reef	-17.45296483	151.0514892
09/12/2022	Tender 1	102	Drop camera	Tregrosse Reef	-17.46944183	151.0327003
09/12/2022	Tender 1	103	Drop camera	Tregrosse Reef	-17.484462	151.0150147
09/12/2022	Tender 1	104	Drop camera	Tregrosse Reef	-17.50073033	150.9938663

09/12/2022	Tender 1	105	Drop camera	Tregrosse Reef	-17.5161065	150.9731995
09/12/2022	Tender 1	106	Drop camera	Tregrosse Reef	-17.5304815	150.9517192
09/12/2022	Tender 1	107	Drop camera	Tregrosse Reef	-17.545938	150.9242615
09/12/2022	Tender 1	108	Drop camera	Tregrosse Reef	-17.56292717	150.9044815
09/12/2022	Tender 1	109	Drop camera	Tregrosse Reef	-17.582501	150.8783847
09/12/2022	Tender 1	110	Drop camera	Tregrosse Reef	-17.60063417	150.8535088
09/12/2022	Tender 1	111	Drop camera	Tregrosse Reef	-17.62008983	150.8352123
09/12/2022	Tender 1	112	Drop camera	Tregrosse Reef	-17.646137	150.8289928
09/12/2022	Tender 1	113	Drop camera	Tregrosse Reef	-17.6514405	150.8283152
09/12/2022	Tender 1	114	Drop camera	Tregrosse Reef	-17.65284083	150.8250872
09/12/2022	Tender 1	115	Drop camera	Tregrosse Reef	-17.5572365	150.816709
09/12/2022	Tender 1	116	Drop camera	Tregrosse Reef	-17.53782283	150.843042
09/12/2022	Tender 1	117	Drop camera	Tregrosse Reef	-17.516368	150.8731687
09/12/2022	Tender 1	118	Drop camera	Tregrosse Reef	-17.49842717	150.901365
09/12/2022	Tender 1	119	Drop camera	Tregrosse Reef	-17.48418633	150.9188873
09/12/2022	Tender 1	120	Drop camera	Tregrosse Reef	-17.49857767	150.9771037
09/12/2022	Tender 1	121	Drop camera	Tregrosse Reef	-17.51092767	150.9892002
09/12/2022	Tender 1	122	Drop camera	Tregrosse Reef	-17.493482	151.0166407
09/12/2022	Tender 1	123	Drop camera	Tregrosse Reef	-17.484539	151.0347223
10/12/2022	Kahn	56	Drop camera	Tregrosse Reef	-17.451492	151.0621063
10/12/2022	Kahn	57	Drop camera	Tregrosse Reef	-17.44280433	151.0597498
10/12/2022	Kahn	58	Drop camera	Tregrosse Reef	-17.43464983	151.0612487
10/12/2022	Kahn	59	Drop camera	Tregrosse Reef	-17.45421317	151.0696385
10/12/2022	Kahn	60	Drop camera	Tregrosse Reef	-17.44763083	151.0692497
10/12/2022	Kahn	61	Drop camera	Tregrosse Reef	-17.4420325	151.068732
10/12/2022	Kahn	62	Drop camera	Tregrosse Reef	-17.43941733	151.0731168
10/12/2022	Kahn	63	Drop camera	Tregrosse Reef	-17.4330285	151.0746097
10/12/2022	Kahn	64	Drop camera	Tregrosse Reef	-17.42716433	151.0727415
10/12/2022	Kahn	65	Drop camera	Tregrosse Reef	-17.421089	151.071092
10/12/2022	Kahn	66	Drop camera	Tregrosse Reef	-17.41301883	151.0732765
10/12/2022	Kahn	67	Drop camera	Tregrosse Reef	-17.416346	151.0698705
10/12/2022	Kahn	68	Drop camera	Tregrosse Reef	-17.424797	151.0682302
10/12/2022	Kahn	69	Drop camera	Tregrosse Reef	-17.44960917	150.8282805
10/12/2022	Kahn	70	Drop camera	Tregrosse Reef	-17.462034	150.8013852
10/12/2022	Kahn	71	Drop camera	Tregrosse Reef	-17.47442433	150.7796897
10/12/2022	Kahn	72	Drop camera	Tregrosse Reef	-17.44873683	150.7774053
10/12/2022	Kahn	73	Drop camera	Tregrosse Reef	-17.423294	150.7710437
10/12/2022	Kahn	144	Diver	Tregrosse Reef	-17.42493756	150.8060496
10/12/2022	Pile 1	112	Drop camera	Tregrosse Reef	-17.51939883	151.0824935
10/12/2022	Pile 1	113	Drop camera	Tregrosse Reef	-17.49748233	151.0965863
10/12/2022	Pile 1	114	Drop camera	Tregrosse Reef	-17.46098417	151.0882748
10/12/2022	Pile 1	115	Drop camera	Tregrosse Reef	-17.48837933	151.0756617
10/12/2022	Pile 1	116	Drop camera	Tregrosse Reef	-17.45352933	150.860149
10/12/2022	Pile 1	117	Drop camera	Tregrosse Reef	-17.47028733	150.832387
10/12/2022	Pile 1	118	Drop camera	Tregrosse Reef	-17.4887115	150.8028245
10/12/2022	Pile 1	119	Drop camera	Tregrosse Reef	-17.50369967	150.7780023

10/12/2022	Pile 1	120	Drop camera	Tregrosse Reef	-17.4349875	150.8132992
10/12/2022	Pile 1	121	Drop camera	Tregrosse Reef	-17.43301917	150.8069955
10/12/2022	Pile 1	122	Drop camera	Tregrosse Reef	-17.42883133	150.8007863
10/12/2022	Pile 1	123	Drop camera	Tregrosse Reef	-17.42474767	150.8011825
10/12/2022	Pile 1	124	Drop camera	Tregrosse Reef	-17.4218555	150.8093338
10/12/2022	Pile 1	125	Drop camera	Tregrosse Reef	-17.42250367	150.8150312
10/12/2022	Pile 1	126	Drop camera	Tregrosse Reef	-17.4297305	150.8210262
10/12/2022	Tender 1	124	Drop camera	Tregrosse Reef	-17.47114333	151.0494227
10/12/2022	Tender 1	125	Drop camera	Tregrosse Reef	-17.4415525	151.0645785
10/12/2022	Tender 1	126	Drop camera	Tregrosse Reef	-17.433019	151.0707025
10/12/2022	Tender 1	127	Drop camera	Tregrosse Reef	-17.42805467	151.0710307
10/12/2022	Tender 1	128	Drop camera	Tregrosse Reef	-17.44379167	150.8862868
10/12/2022	Tender 1	129	Drop camera	Tregrosse Reef	-17.43775683	150.8592517
11/12/2022	Kahn	74	Diver	Herald Cays	-16.93865567	149.197217
11/12/2022	Kahn	75	Diver	Herald Cays	-16.93642517	149.1997475
11/12/2022	Kahn	76	Diver	Herald Cays	-16.9338825	149.201404
11/12/2022	Kahn	77	Diver	Herald Cays	-16.9314575	149.2024002
11/12/2022	Kahn	78	Diver	Herald Cays	-16.928614	149.2031537
11/12/2022	Kahn	79	Diver	Herald Cays	-16.9260315	149.202931
11/12/2022	Kahn	80	Diver	Herald Cays	-16.9231065	149.2014067
11/12/2022	Kahn	81	Diver	Herald Cays	-16.92036133	149.2008158
11/12/2022	Kahn	82	Diver	Herald Cays	-16.92689933	149.2055083
11/12/2022	Kahn	83	Diver	Herald Cays	-16.92930383	149.2061292
11/12/2022	Kahn	84	Diver	Herald Cays	-16.93121733	149.205563
11/12/2022	Kahn	85	Diver	Herald Cays	-16.93296933	149.2057202
11/12/2022	Kahn	86	Diver	Herald Cays	-16.93460767	149.20444
11/12/2022	Kahn	87	Diver	Herald Cays	-16.93695683	149.2039737
11/12/2022	Kahn	88	Diver	Herald Cays	-16.9388055	149.2062297
11/12/2022	Kahn	89	Diver	Herald Cays	-16.93705367	149.2077628
11/12/2022	Kahn	90	Diver	Herald Cays	-16.93454483	149.2078402
11/12/2022	Kahn	91	Diver	Herald Cays	-16.93624117	149.2017993
11/12/2022	Kahn	92	Diver	Herald Cays	-16.9335905	149.1993957
11/12/2022	Kahn	93	Diver	Herald Cays	-16.93556217	149.1971723
11/12/2022	Kahn	94	Diver	Herald Cays	-16.93811317	149.1941102
11/12/2022	Kahn	95	Diver	Herald Cays	-16.94135817	149.1939762
11/12/2022	Kahn	96	Diver	Herald Cays	-16.94064217	149.1904592
11/12/2022	Kahn	97	Diver	Herald Cays	-16.94359167	149.1915048
11/12/2022	Kahn	98	Diver	Herald Cays	-16.94389933	149.1880812
11/12/2022	Kahn	99	Diver	Herald Cays	-16.94386233	149.1843888
11/12/2022	Kahn	100	Diver	Herald Cays	-16.9461495	149.1837613
11/12/2022	Kahn	101	Diver	Herald Cays	-16.94694617	149.187989
11/12/2022	Kahn	102	Diver	Herald Cays	-16.9471765	149.1916667
11/12/2022	Kahn	103	Diver	Herald Cays	-16.946581	149.1961713
11/12/2022	Kahn	104	Diver	Herald Cays	-16.94951983	149.1939595
11/12/2022	Kahn	105	Diver	Herald Cays	-16.94983667	149.189738
11/12/2022	Kahn	106	Diver	Herald Cays	-16.9491265	149.1852208

11/12/2022	Kahn	107	Diver	Herald Cays	-16.94142033	149.1873342
11/12/2022	Kahn	108	Diver	Herald Cays	-16.94338083	149.1940317
11/12/2022	Kahn	109	Diver	Herald Cays	-16.94111217	149.1971132
11/12/2022	Kahn	110	Diver	Herald Cays	-16.93890883	149.2002523
11/12/2022	Pile 1	127	Drop camera	Herald Cays	-16.923723	149.1985825
11/12/2022	Pile 1	128	Drop camera	Herald Cays	-16.91298367	149.1935905
11/12/2022	Pile 1	129	Drop camera	Herald Cays	-16.91339633	149.181823
11/12/2022	Pile 1	130	Drop camera	Herald Cays	-16.92230867	149.184895
11/12/2022	Pile 1	131	Drop camera	Herald Cays	-16.922205	149.172812
11/12/2022	Pile 1	132	Drop camera	Herald Cays	-16.93251933	149.1706435
11/12/2022	Pile 1	133	Drop camera	Herald Cays	-16.93279417	149.1599412
11/12/2022	Pile 1	134	Drop camera	Herald Cays	-16.94174517	149.162783
11/12/2022	Pile 1	135	Drop camera	Herald Cays	-16.94151317	149.1474023
11/12/2022	Pile 1	136	Drop camera	Herald Cays	-16.95208133	149.1558548
11/12/2022	Pile 1	137	Drop camera	Herald Cays	-16.952983	149.1389077
11/12/2022	Pile 1	138	Drop camera	Herald Cays	-16.96335367	149.140723
11/12/2022	Pile 1	139	Drop camera	Herald Cays	-16.96346567	149.1267193
11/12/2022	Pile 1	140	Drop camera	Herald Cays	-16.97669733	149.1258033
11/12/2022	Pile 1	141	Drop camera	Herald Cays	-16.976926	149.1301512
11/12/2022	Pile 1	142	Drop camera	Herald Cays	-16.98534117	149.1320262
11/12/2022	Pile 1	143	Drop camera	Herald Cays	-16.98487467	149.1277767
11/12/2022	Pile 1	144	Drop camera	Herald Cays	-16.99787333	149.1356658
11/12/2022	Pile 1	145	Drop camera	Herald Cays	-16.997781	149.1447672
11/12/2022	Pile 1	146	Drop camera	Herald Cays	-17.006565	149.1374805
11/12/2022	Pile 1	147	Drop camera	Herald Cays	-17.010894	149.1483388
11/12/2022	Pile 1	148	Drop camera	Herald Cays	-16.99671583	149.1540553
11/12/2022	Pile 1	149	Drop camera	Herald Cays	-16.98665767	149.1542992
11/12/2022	Pile 1	150	Drop camera	Herald Cays	-16.98589283	149.1390965
11/12/2022	Pile 1	151	Drop camera	Herald Cays	-16.97535583	149.1426192
11/12/2022	Pile 1	152	Drop camera	Herald Cays	-16.97552483	149.1582197
11/12/2022	Pile 1	153	Drop camera	Herald Cays	-16.96294867	149.1588492
11/12/2022	Pile 1	154	Drop camera	Herald Cays	-16.964411	149.1785132
11/12/2022	Pile 1	155	Drop camera	Herald Cays	-16.958816	149.1969428
11/12/2022	Pile 1	156	Drop camera	Herald Cays	-16.95780533	149.206743
11/12/2022	Pile 1	157	Drop camera	Herald Cays	-16.954177	149.2011303
11/12/2022	Pile 1	158	Drop camera	Herald Cays	-16.9511005	149.188072
11/12/2022	Pile 1	159	Drop camera	Herald Cays	-16.950354	149.1724882
11/12/2022	Pile 1	160	Drop camera	Herald Cays	-16.94672033	149.1804882
11/12/2022	Pile 1	161	Drop camera	Herald Cays	-16.94104817	149.1773578
11/12/2022	Pile 1	162	Drop camera	Herald Cays	-16.93221983	149.1846825
11/12/2022	Pile 1	163	Drop camera	Herald Cays	-16.9381555	149.1878697
11/12/2022	Pile 1	164	Drop camera	Herald Cays	-16.933966	149.192729
11/12/2022	Pile 1	165	Drop camera	Herald Cays	-16.929858	149.1963757
12/12/2022	Pile 1	166	Diver	Herald Cays	-16.98147067	149.1324683
12/12/2022	Pile 1	167	Diver	Herald Cays	-16.98481117	149.1315485
12/12/2022	Pile 1	168	Diver	Herald Cays	-16.98697483	149.1330323

12/12/2022	Pile 1	169	Diver	Herald Cays	-16.9898355	149.134397
12/12/2022	Pile 1	170	Diver	Herald Cays	-16.98958933	149.1381557
12/12/2022	Pile 1	171	Diver	Herald Cays	-16.99339917	149.140423
12/12/2022	Pile 1	172	Diver	Herald Cays	-16.99721917	149.1430422
12/12/2022	Pile 1	173	Diver	Herald Cays	-17.0018355	149.143895
12/12/2022	Pile 1	174	Diver	Herald Cays	-17.005296	149.1457047
12/12/2022	Pile 1	175	Diver	Herald Cays	-17.005296	149.1457047
12/12/2022	Pile 1	176	Diver	Herald Cays	-17.00824867	149.1461622
12/12/2022	Pile 1	177	Diver	Herald Cays	-17.01817417	149.1443117
12/12/2022	Pile 1	178	Diver	Herald Cays	-17.017482	149.1415583
12/12/2022	Pile 1	179	Diver	Herald Cays	-17.015533	149.139087
12/12/2022	Pile 1	180	Diver	Herald Cays	-17.01579883	149.135376
12/12/2022	Pile 1	181	Diver	Herald Cays	-17.00880633	149.1392588
12/12/2022	Pile 1	182	Diver	Herald Cays	-17.00368583	149.138786
12/12/2022	Pile 1	183	Diver	Herald Cays	-17.00156617	149.1384827
12/12/2022	Pile 1	184	Diver	Herald Cays	-16.9992765	149.1382548
12/12/2022	Pile 1	185	Diver	Herald Cays	-16.99555783	149.1351153
12/12/2022	Pile 1	186	Diver	Herald Cays	-16.99323817	149.1326068
12/12/2022	Pile 1	187	Diver	Herald Cays	-16.990556	149.1319468
12/12/2022	Pile 1	188	Diver	Herald Cays	-16.98884167	149.1310998
12/12/2022	RUVS	142	Drop camera	Herald Cays	-16.97614933	149.1239217
12/12/2022	RUVS	143	Drop camera	Herald Cays	-16.97474217	149.1242435
13/12/2022	Kahn	111	Diver	West Holmes Reef	-16.43061783	147.8526095
13/12/2022	Kahn	112	Diver	West Holmes Reef	-16.4097135	147.834288
13/12/2022	Kahn	113	Diver	West Holmes Reef	-16.40514533	147.8339108
13/12/2022	Kahn	114	Diver	West Holmes Reef	-16.387213	147.8505013
13/12/2022	Kahn	115	Diver	West Holmes Reef	-16.38793633	147.8606648
13/12/2022	Kahn	116	Diver	West Holmes Reef	-16.38936583	147.8672807
13/12/2022	Kahn	117	Diver	West Holmes Reef	-16.3936725	147.8833857
13/12/2022	Kahn	118	Diver	West Holmes Reef	-16.4000545	147.8900122
13/12/2022	Kahn	119	Diver	West Holmes Reef	-16.40896667	147.8966987
13/12/2022	Kahn	120	Diver	West Holmes Reef	-16.4149375	147.8969975
13/12/2022	Kahn	121	Diver	West Holmes Reef	-16.42655117	147.8971928
13/12/2022	Kahn	122	Diver	West Holmes Reef	-16.43738683	147.8964152
13/12/2022	Kahn	123	Diver	West Holmes Reef	-16.44247867	147.8898122
13/12/2022	Kahn	124	Diver	West Holmes Reef	-16.44857733	147.8907208
13/12/2022	Kahn	125	Diver	West Holmes Reef	-16.4604045	147.879628
13/12/2022	Kahn	126	Diver	West Holmes Reef	-16.46660833	147.8742032
13/12/2022	Kahn	127	Diver	West Holmes Reef	-16.47421717	147.8673108
13/12/2022	Kahn	128	Diver	West Holmes Reef	-16.4800165	147.8633195
13/12/2022	Kahn	129	Diver	West Holmes Reef	-16.48637167	147.8616192
13/12/2022	Kahn	130	Diver	West Holmes Reef	-16.49164267	147.8551475
13/12/2022	Kahn	131	Diver	West Holmes Reef	-16.4971435	147.8484513
13/12/2022	Kahn	132	Diver	West Holmes Reef	-16.50112783	147.8435217
13/12/2022	Kahn	133	Diver	West Holmes Reef	-16.507934	147.8415957
13/12/2022	Kahn	134	Diver	West Holmes Reef	-16.510744	147.8400345

13/12/2022	Kahn	135	Diver	West Holmes Reef	-16.50898617	147.845923
13/12/2022	Kahn	136	Diver	West Holmes Reef	-16.50337867	147.849049
13/12/2022	Kahn	137	Diver	West Holmes Reef	-16.521905	147.8376358
13/12/2022	Kahn	138	Diver	West Holmes Reef	-16.52510867	147.8355125
13/12/2022	Kahn	139	Diver	West Holmes Reef	-16.528731	147.8319593
13/12/2022	Kahn	140	Diver	West Holmes Reef	-16.53101467	147.8272343
13/12/2022	Kahn	141	Diver	West Holmes Reef	-16.53186	147.8215098
13/12/2022	Pile 1	189	Drop camera	West Holmes Reef	-16.42431417	147.8431147
13/12/2022	Pile 1	190	Drop camera	West Holmes Reef	-16.408867	147.8357173
13/12/2022	Pile 1	191	Drop camera	West Holmes Reef	-16.39288867	147.8444803
13/12/2022	Pile 1	192	Drop camera	West Holmes Reef	-16.39198383	147.8583382
13/12/2022	Pile 1	193	Drop camera	West Holmes Reef	-16.3932905	147.8749523
13/12/2022	Pile 1	194	Drop camera	West Holmes Reef	-16.40880617	147.8851577
13/12/2022	Pile 1	195	Drop camera	West Holmes Reef	-16.40883517	147.8670287
13/12/2022	Pile 1	196	Drop camera	West Holmes Reef	-16.40820583	147.8503728
13/12/2022	Pile 1	197	Drop camera	West Holmes Reef	-16.42489083	147.8598483
13/12/2022	Pile 1	198	Drop camera	West Holmes Reef	-16.425814	147.875377
13/12/2022	Pile 1	199	Drop camera	West Holmes Reef	-16.426385	147.8922338
13/12/2022	Pile 1	200	Drop camera	West Holmes Reef	-16.44055	147.8822468
13/12/2022	Pile 1	201	Drop camera	West Holmes Reef	-16.44250317	147.8678317
13/12/2022	Pile 1	202	Drop camera	West Holmes Reef	-16.45165283	147.8628438
13/12/2022	Pile 1	203	Drop camera	West Holmes Reef	-16.45454317	147.8810967
13/12/2022	Pile 1	204	Drop camera	West Holmes Reef	-16.46243983	147.8652817
13/12/2022	Pile 1	205	Drop camera	West Holmes Reef	-16.46532767	147.8582278
13/12/2022	Pile 1	206	Drop camera	West Holmes Reef	-16.47303933	147.8611913
13/12/2022	Pile 1	207	Drop camera	West Holmes Reef	-16.4745445	147.8519368
13/12/2022	Pile 1	208	Drop camera	West Holmes Reef	-16.47997517	147.8554372
13/12/2022	Pile 1	209	Drop camera	West Holmes Reef	-16.48045633	147.8461655
13/12/2022	Pile 1	210	Drop camera	West Holmes Reef	-16.48791083	147.8482192
13/12/2022	Pile 1	211	Drop camera	West Holmes Reef	-16.48711433	147.8468923
13/12/2022	Pile 1	212	Drop camera	West Holmes Reef	-16.48862633	147.8453715
13/12/2022	Pile 1	213	Drop camera	West Holmes Reef	-16.48981017	147.8476723
13/12/2022	Pile 1	214	Drop camera	West Holmes Reef	-16.48920867	147.8505183
13/12/2022	Pile 1	215	Drop camera	West Holmes Reef	-16.48650733	147.8489905
13/12/2022	Pile 1	216	Drop camera	West Holmes Reef	-16.49598183	147.8426745
13/12/2022	Pile 1	217	Drop camera	West Holmes Reef	-16.5037055	147.8397452
13/12/2022	Pile 1	218	Drop camera	West Holmes Reef	-16.5223645	147.8359668
13/12/2022	Pile 1	219	Drop camera	West Holmes Reef	-16.52678783	147.8309508
13/12/2022	Pile 1	220	Drop camera	West Holmes Reef	-16.52839617	147.8269603
13/12/2022	Pile 1	221	Drop camera	West Holmes Reef	-16.52939283	147.8223207
13/12/2022	Pile 1	222	Drop camera	West Holmes Reef	-16.52876	147.8172748
13/12/2022	Pile 1	223	Drop camera	West Holmes Reef	-16.527728	147.812217
13/12/2022	Pile 1	224	Drop camera	West Holmes Reef	-16.52684917	147.8198823
13/12/2022	Pile 1	225	Drop camera	West Holmes Reef	-16.526471	147.824178
14/12/2022	Kahn	145	Diver	East Holmes Reef	-16.43952683	148.0832608
14/12/2022	Kahn	146	Diver	East Holmes Reef	-16.43046483	148.0793907

14/12/2022	Kahn	147	Diver	East Holmes Reef	-16.42680117	148.0680713
14/12/2022	Kahn	148	Diver	East Holmes Reef	-16.422403	148.0703592
14/12/2022	Kahn	149	Diver	East Holmes Reef	-16.42396117	148.0585457
14/12/2022	Kahn	150	Diver	East Holmes Reef	-16.42100483	148.0494665
14/12/2022	Kahn	151	Diver	East Holmes Reef	-16.41688567	148.0400732
14/12/2022	Kahn	152	Diver	East Holmes Reef	-16.41203583	148.0307237
14/12/2022	Kahn	153	Diver	East Holmes Reef	-16.41358517	148.0165383
14/12/2022	Kahn	154	Diver	East Holmes Reef	-16.41786517	148.0066055
14/12/2022	Kahn	155	Diver	East Holmes Reef	-16.42300817	147.9932562
14/12/2022	Kahn	156	Diver	East Holmes Reef	-16.45101617	148.0689775
14/12/2022	Kahn	157	Diver	East Holmes Reef	-16.45074283	148.0823858
14/12/2022	Kahn	158	Diver	East Holmes Reef	-16.46187317	148.0789675
14/12/2022	Kahn	159	Diver	East Holmes Reef	-16.4700365	148.0721373
14/12/2022	Kahn	160	Diver	East Holmes Reef	-16.478565	148.064136
14/12/2022	Kahn	161	Diver	East Holmes Reef	-16.48395117	148.0563692
14/12/2022	Kahn	162	Diver	East Holmes Reef	-16.492168	148.0494287
14/12/2022	Kahn	163	Diver	East Holmes Reef	-16.49026667	148.038894
14/12/2022	Kahn	164	Diver	East Holmes Reef	-16.48939033	148.0267988
14/12/2022	Kahn	165	Diver	East Holmes Reef	-16.493537	148.0146017
14/12/2022	Kahn	166	Diver	East Holmes Reef	-16.49923733	148.0060933
14/12/2022	Kahn	167	Diver	East Holmes Reef	-16.50897767	148.0010438
14/12/2022	Kahn	168	Diver	East Holmes Reef	-16.51858283	147.9955693
14/12/2022	Kahn	169	Diver	East Holmes Reef	-16.524159	147.9866733
14/12/2022	Kahn	170	Diver	East Holmes Reef	-16.52568767	147.9764817
14/12/2022	Kahn	171	Diver	East Holmes Reef	-16.515578	147.9831405
14/12/2022	Kahn	172	Diver	East Holmes Reef	-16.51534317	147.9762673
14/12/2022	Kahn	173	Diver	East Holmes Reef	-16.51248533	147.9676078
14/12/2022	Kahn	174	Diver	East Holmes Reef	-16.5093685	147.9701002
14/12/2022	Pile 1	0	Drop camera	East Holmes Reef	-16.4242805	148.0434262
14/12/2022	Pile 1	1	Drop camera	East Holmes Reef	-16.424916	148.0253632
14/12/2022	Pile 1	2	Drop camera	East Holmes Reef	-16.42536767	148.0100387
14/12/2022	Pile 1	3	Drop camera	East Holmes Reef	-16.44110983	148.0087342
14/12/2022	Pile 1	4	Drop camera	East Holmes Reef	-16.45673317	148.008313
14/12/2022	Pile 1	5	Drop camera	East Holmes Reef	-16.47263833	148.0091127
14/12/2022	Pile 1	7	Drop camera	East Holmes Reef	-16.4898065	148.0087753
14/12/2022	Pile 1	8	Drop camera	East Holmes Reef	-16.504224	147.9925208
14/12/2022	Pile 1	9	Drop camera	East Holmes Reef	-16.48942883	147.9919027
14/12/2022	Pile 1	10	Drop camera	East Holmes Reef	-16.4727005	147.9931198
14/12/2022	Pile 1	11	Drop camera	East Holmes Reef	-16.45605667	147.9926398
14/12/2022	Pile 1	12	Drop camera	East Holmes Reef	-16.43939233	147.9912305
14/12/2022	Pile 1	13	Drop camera	East Holmes Reef	-16.4428145	147.9803623
14/12/2022	Pile 1	14	Drop camera	East Holmes Reef	-16.4574885	147.9784117
14/12/2022	Pile 1	15	Drop camera	East Holmes Reef	-16.472582	147.9748567
14/12/2022	Pile 1	16	Drop camera	East Holmes Reef	-16.48932717	147.9758608
14/12/2022	Pile 1	17	Drop camera	East Holmes Reef	-16.50463683	147.9756133
14/12/2022	Tender 1	130	Drop camera	East Holmes Reef	-16.45640767	148.074376

14/12/2022	Tender 1	131	Drop camera	East Holmes Reef	-16.44138333	148.0601498
14/12/2022	Tender 1	132	Drop camera	East Holmes Reef	-16.45606267	148.0579033
14/12/2022	Tender 1	133	Drop camera	East Holmes Reef	-16.47218333	148.0596338
14/12/2022	Tender 1	134	Drop camera	East Holmes Reef	-16.47242433	148.0427503
14/12/2022	Tender 1	135	Drop camera	East Holmes Reef	-16.45732783	148.0435555
14/12/2022	Tender 1	136	Drop camera	East Holmes Reef	-16.46504883	148.0432397
14/12/2022	Tender 1	137	Drop camera	East Holmes Reef	-16.44885633	148.044586
14/12/2022	Tender 1	138	Drop camera	East Holmes Reef	-16.4573595	148.051382
14/12/2022	Tender 1	139	Drop camera	East Holmes Reef	-16.441618	148.042804
14/12/2022	Tender 1	140	Drop camera	East Holmes Reef	-16.44172467	148.0264477
14/12/2022	Tender 1	141	Drop camera	East Holmes Reef	-16.45558667	148.0245467
14/12/2022	Tender 1	142	Drop camera	East Holmes Reef	-16.45793417	148.0344118
14/12/2022	Tender 1	143	Drop camera	East Holmes Reef	-16.44941483	148.0356515
14/12/2022	Tender 1	144	Drop camera	East Holmes Reef	-16.44287	148.0352262
14/12/2022	Tender 1	145	Drop camera	East Holmes Reef	-16.46581567	148.0332647
14/12/2022	Tender 1	146	Drop camera	East Holmes Reef	-16.472794	148.025116
15/12/2022	Kahn	175	Drop camera	Flinders Reef	-17.446564	148.3283145
15/12/2022	Kahn	176	Drop camera	Flinders Reef	-17.46499233	148.3263025
15/12/2022	Kahn	177	Drop camera	Flinders Reef	-17.48074017	148.3269317
15/12/2022	Kahn	178	Drop camera	Flinders Reef	-17.49683717	148.3428002
15/12/2022	Kahn	179	Drop camera	Flinders Reef	-17.51279517	148.3439438
15/12/2022	Kahn	180	Drop camera	Flinders Reef	-17.52938383	148.3598945
15/12/2022	Kahn	181	Drop camera	Flinders Reef	-17.5446085	148.3604017
15/12/2022	Kahn	182	Drop camera	Flinders Reef	-17.561165	148.3765823
15/12/2022	Kahn	183	Drop camera	Flinders Reef	-17.57697483	148.3771288
15/12/2022	Kahn	184	Drop camera	Flinders Reef	-17.5932755	148.3933883
15/12/2022	Kahn	185	Drop camera	Flinders Reef	-17.608498	148.3937763
15/12/2022	Kahn	186	Drop camera	Flinders Reef	-17.62500033	148.3939203
15/12/2022	Kahn	187	Drop camera	Flinders Reef	-17.64068083	148.379025
15/12/2022	Kahn	188	Drop camera	Flinders Reef	-17.65530733	148.3766628
15/12/2022	Kahn	189	Drop camera	Flinders Reef	-17.67232717	148.3770417
15/12/2022	Kahn	190	Drop camera	Flinders Reef	-17.68868567	148.3604253
15/12/2022	Kahn	191	Drop camera	Flinders Reef	-17.696186	148.351174
15/12/2022	Kahn	192	Drop camera	Flinders Reef	-17.70516033	148.360108
15/12/2022	Kahn	193	Drop camera	Flinders Reef	-17.70512283	148.3937523
15/12/2022	Kahn	194	Drop camera	Flinders Reef	-17.68859883	148.394341
15/12/2022	Kahn	195	Drop camera	Flinders Reef	-17.6566635	148.4103373
15/12/2022	Kahn	196	Drop camera	Flinders Reef	-17.625272	148.4266252
15/12/2022	Kahn	197	Drop camera	Flinders Reef	-17.68909133	148.426888
15/12/2022	Pile 1	18	Drop camera	Flinders Reef	-17.42902367	148.396451
15/12/2022	Pile 1	19	Drop camera	Flinders Reef	-17.46579917	148.3917372
15/12/2022	Pile 1	20	Drop camera	Flinders Reef	-17.49562	148.4113393
15/12/2022	Pile 1	21	Drop camera	Flinders Reef	-17.5117855	148.4429727
15/12/2022	Pile 1	22	Drop camera	Flinders Reef	-17.52857533	148.4267655
15/12/2022	Pile 1	23	Drop camera	Flinders Reef	-17.5611045	148.4434463
15/12/2022	Pile 1	24	Drop camera	Flinders Reef	-17.55540233	148.4782228

15/12/2022	Pile 1	25	Drop camera	Flinders Reef	-17.59476167	148.460541
15/12/2022	Pile 1	26	Drop camera	Flinders Reef	-17.59163533	148.4896115
15/12/2022	Pile 1	27	Drop camera	Flinders Reef	-17.59439317	148.5254612
15/12/2022	Pile 1	28	Drop camera	Flinders Reef	-17.59433017	148.5598203
15/12/2022	Pile 1	29	Drop camera	Flinders Reef	-17.6238035	148.5634653
15/12/2022	Pile 1	30	Drop camera	Flinders Reef	-17.62413317	148.5277875
15/12/2022	Pile 1	31	Drop camera	Flinders Reef	-17.62598633	148.4941945
15/12/2022	Pile 1	32	Drop camera	Flinders Reef	-17.62462317	148.464084
15/12/2022	Pile 1	33	Drop camera	Flinders Reef	-17.649962	148.5128822
15/12/2022	Pile 1	34	Drop camera	Flinders Reef	-17.66026983	148.560294
15/12/2022	Pile 1	35	Drop camera	Flinders Reef	-17.680687	148.531413
15/12/2022	Tender 1	0	Drop camera	Flinders Reef	-17.43475833	148.328949
15/12/2022	Tender 1	1	Drop camera	Flinders Reef	-17.43328267	148.3605707
15/12/2022	Tender 1	2	Drop camera	Flinders Reef	-17.46521883	148.359842
15/12/2022	Tender 1	3	Drop camera	Flinders Reef	-17.49686667	148.3752633
15/12/2022	Tender 1	4	Drop camera	Flinders Reef	-17.52877667	148.3925093
15/12/2022	Tender 1	5	Drop camera	Flinders Reef	-17.55941733	148.4092833
15/12/2022	Tender 1	6	Drop camera	Flinders Reef	-17.59204083	148.4256303
15/12/2022	Tender 1	7	Drop camera	Flinders Reef	-17.623268	148.460241
15/12/2022	Tender 1	8	Drop camera	Flinders Reef	-17.65552283	148.4765147
15/12/2022	Tender 1	9	Drop camera	Flinders Reef	-17.690706	148.4931797
15/12/2022	Tender 1	10	Drop camera	Flinders Reef	-17.65692617	148.4439023
15/12/2022	Tender 1	11	Drop camera	Flinders Reef	-17.68878133	148.4611513
15/12/2022	Tender 1	12	Drop camera	Flinders Reef	-17.702748	148.460975
15/12/2022	Tender 1	13	Drop camera	Flinders Reef	-17.70517683	148.4507963
15/12/2022	Tender 1	14	Drop camera	Flinders Reef	-17.7120545	148.4436833
15/12/2022	Tender 1	15	Drop camera	Flinders Reef	-17.713602	148.4520692

RUVS deployment

Date	Site ID	Reef Site	Depth	Latitude	Longitude
06/12/2022	0	Lihou Reef	31	-17.38298767	151.8305392
06/12/2022	1	Lihou Reef	14	-17.38352433	151.8322195
06/12/2022	2	Lihou Reef	54	-17.381905	151.8297045
06/12/2022	3	Lihou Reef	50	-17.38515183	151.8328175
06/12/2022	4	Lihou Reef	16	-17.42636133	151.8193397
06/12/2022	5	Lihou Reef	23	-17.42548267	151.8180953
06/12/2022	0	Lihou Reef	51.0	-17.40163883	151.7975763
06/12/2022	1	Lihou Reef	54.1	-17.399991	151.7981733
06/12/2022	2	Lihou Reef	58.4	-17.39486717	151.8002987
06/12/2022	3	Lihou Reef	58.3	-17.39440817	151.7975433
06/12/2022	4	Lihou Reef	15.0	-17.42997367	151.8173485
06/12/2022	5	Lihou Reef	11.9	-17.43002217	151.8182922
10/12/2022	6	Tregrosse Reef	58	-17.5023075	151.028157
10/12/2022	7	Tregrosse Reef	57	-17.50485133	151.0278457
10/12/2022	8	Tregrosse Reef	16	-17.44037517	151.0633397
10/12/2022	9	Tregrosse Reef	16	-17.44159267	151.0644888
10/12/2022	10	Tregrosse Reef	10	-17.4409535	151.0657428
10/12/2022	11	Tregrosse Reef	10	-17.440393	151.0672118
11/12/2022	6	Herald Cays	34.6	-16.930296	149.18898
11/12/2022	7	Herald Cays	37.7	-16.929528	149.187019
11/12/2022	8	Herald Cays	39.0	-16.928732	149.189812
11/12/2022	9	Herald Cays	41.9	-16.927596	149.18797
11/12/2022	10	Herald Cays	16.2	-16.930154	149.195457
11/12/2022	11	Herald Cays	20.2	-16.930495	149.193377
11/12/2022	12	Herald Cays	8.1	-16.930949	149.201458
11/12/2022	13	Herald Cays	8.0	-16.929813	149.202468
12/12/2022	14	Herald Cays	41.7	-16.98460933	149.1256045
12/12/2022	15	Herald Cays	42.9	-16.986832	149.1264798
12/12/2022	16	Herald Cays	39.9	-16.97614933	149.1239217
12/12/2022	17	Herald Cays	40.0	-16.97474217	149.1242435
12/12/2022	18	Herald Cays	13.8	-16.97787683	149.127001
12/12/2022	19	Herald Cays	12.1	-16.97646567	149.1277665
12/12/2022	20	Herald Cays	14.7	-16.98584233	149.1286333
12/12/2022	21	Herald Cays	13.4	-16.98388083	149.1289703
13/12/2022	0	East Holmes Reef	30.3	-16.41212483	147.8576118
13/12/2022	1	East Holmes Reef	28.2	-16.41259583	147.8601447
13/12/2022	2	East Holmes Reef	33.0	-16.41486417	147.8584053
13/12/2022	3	East Holmes Reef	32.2	-16.41502667	147.861306
13/12/2022	4	East Holmes Reef	17.8	-16.4362895	147.886967
13/12/2022	5	East Holmes Reef	16.5	-16.438332	147.8838402
13/12/2022	6	East Holmes Reef	14.3	-16.4408225	147.880899
13/12/2022	7	East Holmes Reef	15.0	-16.441662	147.8775248
13/12/2022	8	East Holmes Reef	8.4	-16.45101583	147.8757763
13/12/2022	9	East Holmes Reef	10.5	-16.45106333	147.8784578

13/12/2022	10	East Holmes Reef	5.5	-16.4516085	147.8812657
13/12/2022	11	East Holmes Reef	9.7	-16.4513745	147.884309
15/12/2022	13	Flinders	39	-17.7007365	148.3926715
15/12/2022	14	Flinders	39	-17.70131317	148.3905332
15/12/2022	15	Flinders	39	-17.700285	148.394472
15/12/2022	16	Flinders	39	-17.70047983	148.3969567
15/12/2022	12	Flinders	11.4	-17.70410283	148.3964365
15/12/2022	13	Flinders	15.7	-17.70402017	148.3944703
15/12/2022	14	Flinders	17.5	-17.70197517	148.3986177
15/12/2022	15	Flinders	16.0	-17.70222633	148.4019402

Octocoral Diversity

Date	Method	Reef Site	Location	Latitude	Longitude	Max Depth	Genus
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	12	Rhytisma
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	11	Rhytisma
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	10	Sinularia
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	9	Efflatounaria
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	9	Sarcophyton
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Sarcophyton
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Sarcophyton/Sinularia
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Nephthya
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Sarcophyton
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Sinularia
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Briareum
05/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.328783	152.0577167	8	Briareum
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Isis
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Capnella
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Plumigorgia
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Lobophytum
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Tubipora
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Sinularia
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Lobophytum
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	10	Sinularia
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	6	Sinularia
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	6	Sinularia
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	6	Cladiella
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	6	Sarcophyton
06/12/2022	SCUBA	Lihou Reef	East of Herald Passage	-17.385	151.997667	6	Cladiella
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Capnella
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia

07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia
07/12/2022	SCUBA	Lihou Reef	Phoenix Cay	-17.476333	151.73666	12	Sinularia
07/12/2022	Snorkel	Lihou Reef	Phoenix Cay	-17.4718333	151.754666	6	Plumigorgia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	15	Rumphella
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	9	Lobophytum
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	7	Paralemnalia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	6	Sinularia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	6	Rhytisma
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	6	Sinularia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	6	Sinularia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	15	Melithaeidae
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	15	Astrogorgia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	7	Sinularia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	8	Sinularia
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	8	Lobophytum
08/12/2022	SCUBA	Lihou Reef	Magdeline Cay	-17.575666	151.547333	7	Capnella
08/12/2022	Snorkel	Tregrosse Reef	East Diamond Islet	-17.4333	151.0721667	1.5	Heteroxenia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Heteroxenia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Sinularia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Nephthya
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Efflatounaria
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Plumigorgia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Sarcophyton
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Sinularia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Sinularia
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Sarcophyton
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Efflatounaria
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Nephthya

09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Lobophytum
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Lobophytum
09/12/2022	SCUBA	Tregrosse Reef	South Diamond Islet	-17.661667	150.821667	14	Astrospicularia
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Viminella
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Acanthogorgia
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Annella
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Paracis
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Ctenocella
10/12/2022	SCUBA	Tregrosse Reef	East Diamond Islet	-17.43316667	151.0661917	15	Sinularia
10/12/2022	Snorkel	Tregrosse Reef	East Diamond Islet	-17.4403333	151.0721667	1	Cladiella
10/12/2022	Snorkel	Tregrosse Reef	East Diamond Islet	-17.4403333	151.0721667	4	Xenia
10/12/2022	Snorkel	Tregrosse Reef	East Diamond Islet	-17.4403333	151.0721667	1	Cladiella
10/12/2022	Snorkel	Tregrosse Reef	West Diamond Islet	-17.4255	150.8065	3	Xenia
10/12/2022	Snorkel	Tregrosse Reef	West Diamond Islet	-17.4255	150.8065	3	Tubipora
10/12/2022	Snorkel	Tregrosse Reef	West Diamond Islet	-17.4255	150.8065	3	Cladiella
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	15	Plumigorgia
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	15	Acanthogorgia
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	12	Lobophytum
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	12	Astrogorgia
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	12	Rhytisma
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	8	Efflatounaria
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	8	Paralemnalia
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	8	Lobophytum
11/12/2022	SCUBA	Herald Cays	North Herald Island	-16.92816667	149.19	8	Sinularia
11/12/2022	Snorkel	Herald Cays	North Herald Island	-16.9387	149.19065	8	Caementabunda nov gen
11/12/2022	Snorkel	Herald Cays	North Herald Island	-16.9387	149.19065	8	Efflatounaria
11/12/2022	Snorkel	Herald Cays	North Herald Island	-16.9387	149.19065	8	Efflatounaria
11/12/2022	Snorkel	Herald Cays	North Herald Island	-16.9387	149.19065	8	Efflatounaria
11/12/2022	Snorkel	Herald Cays	North Herald Island	-16.9387	149.19065	8	Efflatounaria
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Paralemnalia

12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Efflatounaria
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Rhytisma
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Rhytisma
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Efflatounaria
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	Unknown	Astrogorgia
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Caementabunda nov gen
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Melithaeidae
12/12/2022	SCUBA	Herald Cays	South Herald Island	-17.01935	149.1396667	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Annella
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Nephthya
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Astrogorgia
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Umbellifera
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Dendronephthya
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Dichotella
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Acabaria
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Paralemnalia
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Menella
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Rumphella
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Isis
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Sarcophyton
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Rhytisma
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Sinularia
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Lobophytum
13/12/2022	SCUBA	Holmes Reef	West Holmes Reef	-16.433	147.85233	14	Sarcophyton
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Efflatounaria
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Rhytisma

14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Sinularia
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Efflatounaria
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Lobophytum
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Sarcophyton
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Caementabunda nov gen
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Melithaeidae
14/12/2022	SCUBA	Holmes Reef	East Holmes Reef	-16.50766667	147.9646667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Annella
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Paraminabea
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Siphonogorgia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Echinogorgia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Nephthya
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Sarcophyton
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Rhytisma
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Acanthogorgia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Caementabunda nov gen
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Sinularia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Rhytisma
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Xenia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Astrospicularia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Sinularia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Sinularia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Acanthogorgia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.43616667	148.3316667	12	Cladiella
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Elutherobia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Acanthogorgia

15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Sinularia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Unknown
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Scleronephthya
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Scleronephthya
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Lobophytum
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Cladiella
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	number lost
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Paraminabea
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Nephtya
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Heteroxenia
15/12/2022	SCUBA	Flinders Reef	Flinders Reef	-17.71138333	148.3898667	12	Heteroxenia

ATTACHMENT 3 – LICENCES AND PERMITS

Animal Ethics – Fish Observations



James Cook University
 Townsville Qld. 4811 Australia
 Animal Ethics Committee
 JCU Connect Ph: 471844484; Fax:
 email: ethics@jcu.edu.au

Animal Ethics Committee ANIMAL RESEARCH AUTHORITY		Application ID A2858
PRINCIPAL INVESTIGATOR	Samantha Tol Staff	
COLLEGE	TropWATER	
CO-INVESTIGATOR(S)	Paul York, Michael Rasheed, Robert Coles, Lloyd Shepherd and Tim Smith	
SUPERVISOR(S)		
PROJECT TITLE	Reef lagoon benthic habitat mapping in the Coral Sea Marine Park	
APPROVAL DATE:	04-Oct-22	EXPIRY DATE: 04-Oct-24
<p>This project has been allocated Ethics Approval Number A2858, with the following conditions:</p> <ol style="list-style-type: none"> All subsequent records and correspondence relating to this project must refer to this number. All work will be carried out in compliance with the approved protocol and the Application Summary and according to the directions of the James Cook University Animal Ethics Committee. That there is NO departure from the approved protocols unless prior approval has been sought from the Animal Ethics Committee. Approval is conditional on the submission of a satisfactory Annual Progress Report. Non-compliance with mandatory reporting requirements will lead to revocation of approvals granted by the AEC. This report must also detail animal usage, and any unexpected events that may have occurred during the study. For fieldwork activities, video or photographic evidence must be provided to the Animal Ethics Committee with the Annual Progress Report in order to meet the requirements of Sections 2.3.17-23 of the Australian code for the care and use of animals for scientific purposes. A Final Report must be submitted upon the completion of the project. The Principal Investigator must advise the Animal Ethics Committee within 48 hours after the occurrence of an Unexpected Adverse Event, and submit an Unexpected Adverse Event Report as soon as possible after the event. Research activities involving wildlife studies must provide a copy of the JCU animal ethics approval and application to the Queensland Department of Environment and Heritage Protection (EHP). Once the EHP permit is received, it must be provided to the Animal Ethics Committee. 		
Responsible Monitor :	Godfrey, Craig	
Email :	craig.godfrey@jcu.edu.au	
This project was approved on 4/10/2022		
Professor Lin Schwarzkopf Chair, Animal Ethics Committee		

Approval_Form_A

Printed on 18 Oct 2022

Benthic Habitat Mapping

Australian Marine Park Activity Permit



Australian Government
Director of National Parks

Australian Marine Park Activity Permit

Issued under r.12.06(2), 12.09(1) and Part 17 of the
Environment Protection and Biodiversity Conservation Regulations 2000.

Permit Number	PA2022-00105-1
Permitted Activity	Scientific Research – Coral Sea Benthic Habitat Mapping for sections 354-354A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and regulation 12.10 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000.</i>
Marine Park/s	Coral Sea Marine Park
Permit Area	National Park Zone – Zone 11 Habitat Protection Zone (Reefs) – Zone 10 and 8 as specified in the Coral Sea Marine Park Management Plan 2018 for the Coral Sea Marine Park available at the Federal Register of Legislation.
Commencement Date	4 December 2022
Expiry Date	31 December 2024
Permittee	Name: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 07 4232 2013 Email: Samantha.tol@jcu.edu.au
Permittee Representative	Name: Dr Samantha Tol Position: Marine Ecologist Organisation: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 07 4232 2013 Email: Samantha.tol@jcu.edu.au
Nominated Vessel/s	Name: Iron Joy / Registration number: 23154QA Type: Monohull Trawler / Capacity: 22 Length: 24 / Tonnage: 240 Tenders: 5 x 16ft centre console dinghy's

PA2022-00105-1

<p>Activity Conditions This permit is subject to the following activity specific conditions to reduce impacts on marine park values.</p>	<ol style="list-style-type: none"> 1. The Permitted Activity must be undertaken in accordance with Schedule 1 (PA2022-00105 submitted application and additional information), except where inconsistent with this permit. <ol style="list-style-type: none"> (a) No more than 60 tows using a sled net with dimensions approximately 800 mm wide, 800mm long, 80mm tall with catch net opening of approximately 800mm wide 200mm high and 1m long. Tows should be spaced out to avoid several tows in one area. If abundant fauna is located in any area change location to area of less abundance or use less invasive methods such as towed video. 2. The Permittee must ensure that appropriate risk management systems, strategies and procedures are in place to minimise the foreseeable risks to the environment and heritage values of the Marine Parks and must produce evidence of such systems, strategies and procedures on request of the Director. 3. At least two weeks before entering a Park, the Permittee must notify the Director of the dates of the proposed visit, the Nominated Vessel and whether there is a berth availability for a Parks Australia officer. <i>Use of remotely piloted aircraft (drones) and remotely operated vehicles</i> 4. When using remotely piloted aircraft (drones) in the Park, the Permittee must ensure that an observer is present at all times to monitor for the presence and disturbance of, and collision with, wildlife. 6. When using remotely piloted aircraft (drones) in the Park, the Permittee must ensure that the drone: <ol style="list-style-type: none"> (a) does not approach within 100 metres of the shore of, or over any island; (b) does not chase or harass wildlife, alter their course of direction, or restrict their movement or landing; (c) does not approach birds from higher than a 60 degree angle or at speeds exceeding 3 metres per second; (d) is launched and operated as far as practicable from seabird aggregations and nesting seabirds; and (e) is immediately withdrawn from an area if wildlife exhibit signs of disturbance, for example, fleeing, sudden alteration of a course or direction, attacking the remote piloted aircraft or being put to flight. 8. The Permittee must ensure that Part 6 of the EPBC Regulations for aircraft and Remotely Operated Vehicles (ROV) interactions with cetaceans (whales and dolphins) are adhered to in the Park. The Permittee must ensure that any person operating any airborne craft (remotely piloted aircraft (drone)) or ROVs including it as part of the Permitted Activities, must not, in the vicinity of cetaceans cause the vehicle or aircraft to: <ol style="list-style-type: none"> (a) fly lower than 300 metres altitude and or come within a 300 metre radius of a whale or dolphin; (b) approach a whale or dolphin from head on; or (c) land on the water within a 300 metre radius of a whale or dolphin.
<p>Site Conditions This permit is subject to the following location specific conditions to reduce impacts on marine park values.</p>	<p style="text-align: center;"><i>Reef and seagrass areas</i></p> <ol style="list-style-type: none"> 7. The Permittee must ensure that any anchoring of the Nominated Vessels occurs only on sand and that the anchor equipment does not come into contact with any non-sand seafloor habitat. 8. The Permittee must ensure that no person stands or walks on coral, seagrass or other marine organisms as part of the Permitted Activity. <i>Biologically Important Areas for marine turtles</i> 8. During any overnight stay or overnight passage within the Park the Permittee must ensure that lighting on the Nominated Vessels is kept to the minimum necessary for safety and navigation (to minimise behavioural impacts to turtles).

	<p style="text-align: center;"><i>Islands, islets and cays</i></p> <p style="text-align: center;">Visiting islands, islets and cays – zone 8, 10 and 11 <i>Note: Island includes islands, cays and islets.</i></p> <p>10. Island access – for the purposes of bird counting only</p> <p>(a) The Permittee must ensure that the group size on islands does not exceed 15 persons (including the Permittee, Permittee's Personnel and Permit's Clients) at any one time, up to a maximum of 30 persons per day on any island.</p> <p>(b) The Permittee's Clients must always be supervised by the Permittee or Permittee's Personnel during any access to islands.</p> <p>(c) The Permittee, Permittee's Personnel and Permittee's Clients must not leave any industrial or domestic waste on islands.</p> <p>(d) The Permittee, Permittee's Personnel and Permittee's Clients must not feed, touch, chase, harass or disturb wildlife or impede their movements.</p> <p>(e) The Permittee, Permittee's Personnel and Permittee's Clients must not light fires on any land areas.</p> <p>(f) The Permittee must ensure that when the Nominated Vessel is within 500 metres of an island between sunset and sunrise, that:</p> <p style="padding-left: 20px;">(i) any lighting, including outdoor or deck lights, on the Nominated Vessel are extinguished when not necessary for human safety or navigation;</p> <p style="padding-left: 20px;">(ii) block-out blinds are utilized on all portholes and windows.</p> <p>(g) The Permittee, Permittee's Personnel and Permittee's Clients must not access South Villa Islet In Habitat Protection Zone (Rearis) – Zone 7 (location of an occupied Bureau of Meteorology weather station).</p> <p>(h) The Permittee, Permittee's Personnel and Permittee's Clients must not access land above the high-water mark at any time. <i>Note: high-water mark is defined as the mark on the shore left by the tide at high water; also, the line or level reached, usually the highest, and/or a permanent mark which indicates the maximum observed level of tide.</i></p> <p>(i) The Permittee, Permittee's Personnel and Permittee's Clients must not access areas of vegetation on islands.</p> <p>(j) The Permittee, Permittee's Personnel and Permittee's Clients must not access islands between sunset and sunrise.</p> <p>(k) The Permittee, Permittee's Personnel and Permittee's Clients must not erect any structure on islands and must not camp.</p> <p>11. Biosecurity requirements (to prevent the introduction of pest species)</p> <p>(a) The Permittee must ensure that a licensed pest controller conducts a pest treatment of all Nominated Vessels prior to accessing an island and then annually, and must include:</p> <p style="padding-left: 20px;">(i) a broad-spectrum insecticide treatment to control ants, spiders, cockroaches, bird mites, etc; and</p> <p style="padding-left: 20px;">(ii) long-term cockroach, ant and rodent treatment (e.g. cockroach gels, ant gels, lethal bait traps).</p> <p>(b) The Permittee must provide the pest treatment certificates under clause (a) to the Director on an annual basis and the current annual certificates must have been provided to the Director at least two weeks prior to accessing any island (via email marineparkauthorisations@parks.gov.au).</p> <p>(c) The Permittee must ensure that all Permittee's Clients and Personnel are briefed on biosecurity requirements as outlined in the Be Pest Free in the Coral Sea Biosecurity Information Sheet (a copy of which is available at (https://parksaustralia.gov.au/marine/public-pest-free-in-the-coral-sea.pdf)).</p>
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<p>General Conditions The following conditions apply to all permits.</p>	<p style="text-align: center;">General conditions</p> <p>12. The Permittee must not conduct the Permitted Activity before the commencement date or after the expiry date shown on the permit.</p> <p>13. An electronic or hard copy of this permit and attached application (Schedule 1) must be kept on board each Nominated Vessel and must be produced for inspection on request by a Warden.</p> <p>14. The Permittee must inform the Director of proposed changes to the Nominated Vessels at least 14 days before the proposed trip.</p> <p>15. If a Permittee is a company or other incorporated body the Permittee must not, without the approval of the Director, have as a director or officer holder a person who has been convicted of an offence against the EPBC Act or the EPBC Regulations within the previous 10 years.</p> <p>16. The Permittee must not, without the approval of the Director, use directly in the conduct of the Permitted Activity the services of any person who has been convicted of an offence against the EPBC Act or the EPBC Regulations within the previous 10 years.</p> <p style="text-align: center;">Compliance and auditing</p> <p>17. The Permittee must comply with the EPBC Act, the EPBC Regulations, the Management Plan, all permit conditions and any other notices or directions issued by the Director relating to the Permitted Activity or Marine Parks specified on this permit.</p> <p>18. Unless specifically authorized by this or another permit, the Permittee must comply with all prohibitions and determinations made by the Director under the EPBC Regulations.</p> <p>19. The Permittee must comply with all Commonwealth and State or Territory law relating to the Permitted Activity and hold all permits, licences and other relevant authorisations required by law for the conduct of the Permitted Activity.</p> <p>20. The Permittee must ensure that all Participants are fully informed of and understand these permit conditions before they take part in the Permitted Activity.</p> <p>21. The Permittee must take all reasonable steps to ensure all Participants comply with all permit conditions.</p> <p>22. The Permittee must allow a Warden access to Nominated Vessels at any time for the purpose of performing the functions and powers of Wardens under the EPBC Act.</p> <p>23. The Permittee must, and must take reasonable steps to ensure all Participants in the Permitted Activity, comply with all lawful directions issued by a Warden.</p> <p>24. The Permittee must, at no cost to the Director but subject to availability and the provision of reasonable notice, allow a member of the Director's staff to accompany a trip conducting the Permitted Activity for the purpose of evaluating compliance with these Permit conditions.</p> <p style="text-align: center;">Training and qualifications</p> <p>25. The Permittee must maintain relevant training, qualifications and experience to competently conduct the Permitted Activity.</p> <p>26. The Permittee must ensure that all Participants are appropriately trained and/or accredited to competently conduct the Permitted Activity.</p> <p style="text-align: center;">Safety</p> <p>27. The Permittee must ensure that appropriate risk management systems, strategies and procedures are in place to minimise foreseeable risks to the Participants in the Permitted Activity and members of the public and must produce evidence of such systems, strategies and procedures on request of the Director.</p> <p>28. The Permittee must ensure that they fully inform themselves of, and equip themselves for, all potential hazards and conditions they may encounter while conducting the Permitted Activity.</p>
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	<p>29. The Permittee acknowledges that the Director has no ability to monitor or warn the Permittee of changing environmental hazards or developing hazards within a Marine Park.</p> <p>30. The Permittee must inform the Director of any potential safety hazard or risk encountered or discovered while in a Marine Park as soon as practicable.</p> <p>31. If anyone taking part in the Permitted Activity is seriously injured, becomes seriously ill or goes missing while in a Marine Park, the Permittee must ensure:</p> <ul style="list-style-type: none"> (a) notification to the relevant emergency response authority as soon as possible; (b) compliance with any requests or directions from those authorities in relation to the safety of that person or any other person; and (c) notification to the Director's Marine Compliance Duty Officer as soon as practicable. <p><i>Note: The Director is not an emergency response agency and all relevant emergency response agencies should be contacted prior to informing the Director of any incident or safety hazard/risk.</i></p> <p style="text-align: center;"><i>Vessel operations</i></p> <p>32. The Permittee must ensure, or satisfy themselves, that all Nominated Vessels are registered, are suitable for the conduct of the Permitted Activity, have appropriate safety equipment on board at all times, and are operated and maintained in accordance with all relevant and applicable Commonwealth, State and Territory laws. The Permittee must, if requested by the Director, provide copies of all relevant certificates and other documents demonstrating compliance with this condition.</p> <p>33. The Permittee must ensure that a person qualified to operate each Nominated Vessel remains on board at all times to monitor and assure secure anchorage.</p> <p>34. The Permittee must:</p> <ul style="list-style-type: none"> (a) Use appropriate moorings if available; or (b) (if moorings are not available) ensure that minimal damage is caused to the marine environment as a result of anchoring. Anchoring cannot occur on coral. <p>35. When using an existing Paris Australia mooring, the Permittee must:</p> <ul style="list-style-type: none"> (a) not exceed the weight capacity of the mooring. (b) not tie to a vessel already using a mooring. <p>36. The Permittee must ensure that Nominated Vessels do not discharge any fuels or chemical wastes into a Marine Park.</p> <p>37. The Permittee must not, and must take reasonable steps to ensure all Participants in the Permitted Activity do not, litter in a Marine Park. All refuse must be placed in containers on board Nominated Vessels which are designed to fully contain refuse material.</p> <p>38. The Permittee must ensure that Nominated Vessels have been antifouled within the last two years and are generally free from fouling. Vessels cannot be cleaned of fouling inside a Marine Park.</p> <p style="text-align: center;"><i>Environment and heritage protection</i></p> <p>39. Unless specifically authorized by this permit, the Permittee must not, and must take reasonable steps to ensure that all Participants in the Permitted Activity do not:</p> <ul style="list-style-type: none"> (a) behave contrary to any warning or regulatory signs displayed at boat ramps used by the Permittee to access a Marine Park or displayed on marker buoys within a Marine Park; (b) collect, pick, interfere with, feed, handle or disturb any native flora or fauna, or handle or disturb the dwelling place of any native fauna; (c) remove shells, coral, plants or animals from a Marine Park. (d) touch, interfere with, or capture images or sound of, Indigenous Cultural and Intellectual Property without the consent of the owner; or
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	<p>(e) Impede public access to any part of a Marine Park.</p> <p>40. The Permittee must take all reasonable steps to prevent the introduction of pests into a Marine Park or the transfer of pests between locations within a Marine Park. Reasonable steps can include, but are not limited to, scheduled inspection and cleaning of the vessel and any in-water equipment, and/or passenger briefings.</p> <p>41. The Permittee must ensure that all gear, equipment, and other articles lost in a Marine Park that are likely to cause environmental harm, are reported to the Director's Marine Compliance Duty Officer as soon as practicable, and within 10 days in any event, after the loss occurs. The report must include a description of what was lost, the location of loss/suspected loss and the date and time of loss.</p>
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Failure to adhere to this permit and the conditions above may result in a variation to or cancellation of this permit or the imposition of criminal penalties under the EPBC Regulations. A person convicted under the EPBC Regulations may be ineligible for future permits in Australian Marine Parks.

Reporting of potential noncompliance and notifications in accordance with General Conditions 30, 31 and 41 should be made to the 24-hour Marine Compliance Duty Officer on 0419 293 465. For all other enquiries relating to this permit, please contact: marincompliance@sewa.gov.au.



Glen Salmon
 Director
 Authorisations and Compliance
 Marine and Island Parks Branch
 Delegate of the Director of National Parks
 28 November 2022

<p>Interpretation</p> <p>In the permit and permit conditions:</p> <p>Agreement means the agreement executed by the Permittee when applying for this permit.</p> <p>Director means the Director of National Parks and the Director's delegate, and includes any statutory successor to the Director.</p> <p>EPBC Act means the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth).</p> <p>EPBC Regulations means the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> (Cth).</p> <p>Indigenous Cultural and Intellectual Property means all aspects of Aboriginal or Torres Strait Islander people's cultural products, expressions knowledge and heritage, whether (a) intangible, such as songs, dances, stories, and ecological and cultural knowledge; or (b) tangible, such as human remains, artefacts and artefacts.</p> <p>Marine Park means the Australian Marine Parks under the EPBC Act for which this permit is issued.</p> <p>Management Plan means the management plan or management plans made under the EPBC Act in operation from time to time for the Marine Parks specified by this permit.</p> <p>Participants means the Permittee's employees, contractors, other agents and other individuals who take part in the Permitted Activity.</p> <p>Permittee means each person (individual, company or other legal entity) to whom this permit is issued.</p>
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Permitted Activity means the specified activity or activities for which this permit is issued.
Warden means a person appointed as a warden under s.292 of the EPBC Act.
Zone means the relevant zone as specified by the Management Plan

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Australian Government
Director of National Parks

Permit Condition Variation for Australian Marine Park Activity Permit

This decision is made in accordance with subregulation 17.09 of the *Environment Protection and Biodiversity Conservation Regulations 2000*.

Permit Number	PA2022-00105-1 (variation PA2022-00105-2)
Permitted Activity	Scientific Research for sections 354-354A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and regulation 12.10 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> .
Marine Park	Coral Sea Marine Park
Commencement Date	Date of execution of this variation
Expiry Date	31 December 2024
Permittee	Name: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 07 4232 2013 Email: Samantha.tol@jcu.edu.au
Variation to Condition	Australian Marine Park Activity Permit PA2022-00105-1 Permit Area is replaced in its entirety with the below, in accordance with the additional information provided to the Director of National Parks on 11 December 2022: Permit Area: National Park Zone – Zone 11 Habitat Protection Zone (Reefs) – Zone 10, 8 and 9 as specified in the Coral Sea Marine Park Management Plan 2018 for the Coral Sea Marine Park available at the Federal Register of Legislation.

Failure to adhere to this permit and the conditions above is an offence which may result in a variation to or cancellation of this permit or the imposition of criminal penalties under the EPBC Regulations. A person convicted under the EPBC Regulations may be ineligible for future permits in Australian Marine Parks.

PA2022-00105-1 (variation PA2022-00105-2)



Glen Salmon
Director
Authorisations and Compliance
Marine and Island Parks Branch
Delegate of the Director of National Parks
12 December 2022

Interpretation

In the permit and permit conditions:

Agreement means the agreement executed by the Permittee when applying for this permit.

Director means the Director of National Parks and the Director's delegates, and includes any statutory successor to the Director.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Regulations means the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

Marine Park means the Australian Marine Parks under the EPBC Act for which this permit is issued.

Management Plan means the management plan or management plans made under the EPBC Act in operation from time to time for the Marine Parks specified by this permit.

Participants means the Permittee's employees, contractors, other agents and other individuals who take part in the Permitted Activity.

Permittee means each person (individual, company or other legal entity) to whom this permit is issued.

Permitted Activity means the specified activity or activities for which this permit is issued.



Australian Government

Environment Protection and Biodiversity Conservation Regulations 2000

Access to Biological Resources in a Commonwealth Area for Non-Commercial Purposes

Permit number	AU-COM2022-569
Date of issue	03/12/2022
Date of expiry	17/12/2022

Name and organisation of person to whom the permit is issued:	Dr Samantha Tol James Cook University 14-88 McGregor Road SMITHFIELD QLD 4878
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Provision of Regulations for which permit issued	8A.06
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CORAL SEA MARINE PARK – JAMES COOK UNIVERSITY

Access is permitted from 3 December 2022 to 17 December 2023 to the following location:

- Lihou Reef, Tregrosse Reef (Diamond Islets), Herald Cays and Holmes Reef.

to collect the following biological resources for non-commercial purposes:

Common name	Taxon (to the most specific taxonomic level known)	Amount/number/volume
Seagrass	Cymodoceaceae family	Up to 96 specimens
Seagrass	Hydrocharitaceae family	Up to 160 specimens
Seagrass	Zosteraceae family	Up to 32 specimens
Reef fish	Acanthuridae	Up to 80 specimens
Reef fish	Blenniidae	Up to 80 specimens
Game fish	Carangidae	Up to 40 specimens
Game fish	Coryphaenidae	Up to 40 specimens
Game fish	Istiophoridae	Up to 40 specimens
Reef fish	Labridae	Up to 80 specimens
Reef fish	Pomacanthidae	Up to 80 specimens
Reef fish	Scombridae	Up to 80 specimens
Reef fish	Serranidae	Up to 80 specimens
Game fish	Xiphiidae	Up to 40 specimens
Soft corals	Alcyonacea	Up to 160 specimens



Environment Protection and Biodiversity Conservation Regulations 2000

Conditions:

1. The permit holder may authorise in writing another person to perform actions specified in this permit.
2. The permit holder must obtain all other required permit(s) to conduct the specified project.
3. Collection methods shall not attract undue attention or cause unapproved damage, depletion, or disturbance to the environment and other resources such as historic sites.
4. The permit holder will maintain records for each biological sample taken in accordance with subregulation 6A.19 of the *Environment Protection and Biodiversity Conservation Regulations 2000* and provide a copy of these records to the Commonwealth within a reasonable period after the sample is taken.
5. No specimens (including materials) may be collected unless authorised by this permit.
6. The permit holder who undertakes an activity that results in the unintentional death, injury, trading, taking, keeping or moving of a member of a listed threatened species (except a conservation dependent species), a member of a listed threatened ecological community, a member of a listed migratory species, or a member of a listed marine species in or on a Commonwealth area that was not authorised by the permit must notify the Department of Climate Change, Energy, the Environment and Water (The Secretary, Department of Climate Change, Energy, the Environment and Water, GPO Box 3080, Canberra ACT 2601; email: EPBC.Permits@environment.gov.au) within 7 days of becoming aware of the results of the activity.
7. The permit holder shall not use the biological resources to which this permit relates for commercial purposes and will provide a written report on the results of any research on the biological resources to the Commonwealth of Australia.
8. The permit holder will not give the sample to any person without permission of the Commonwealth of Australia.
9. The permit holder will not carry out, or allow others to carry out, research or development for commercial purposes on any genetic resources, or biochemical compounds, comprising or contained in the biological resources unless a benefit sharing agreement has been entered into with the access provider.
10. Access is permitted for Non-Commercial purposes. Failure to adhere to these conditions is an offence and may also result in suspension or cancellation of this permit.

Tristan Lee

Perks Australia Division

Permit Issued by Delegate of the Minister for the Environment and Water

01/12/2022

Permit Number: AU-COM2022-569

Page 2 of 2

Sea Turtle Observations

Australian Marine Park Activity Permit



Australian Government
Director of National Parks

Permit Condition Variation for Australian Marine Park Activity Permit

This decision is made in accordance with subregulation 17.09 of the *Environment Protection and Biodiversity Conservation Regulations 2000*.

Permit Number	PA2022-00151-1 (variation PA2022-00151-2)
Permitted Activity	Scientific Research – collection of Octocorals for sections 354-354A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and regulation 12.10 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> .
Marine Park	Coral Sea Marine Park
Commencement Date	Date of execution of this variation
Expiry Date	3 December 2023
Permittee	Name: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 07 4232 2013 Email: stefano.borghi@my.jcu.edu.au
Variation to Condition	Australian Marine Park Activity Permit PA2022-00151-1 Permit Area is replaced in its entirety with the below, in accordance with the additional information provided to the Director of National Parks on 12 December 2022: Permit Area: National Park Zone – Zone 11 Habitat Protection Zone (Reefs) – Zone 10, 8 and 9 as specified in the Coral Sea Marine Park Management Plan 2018 for the Coral Sea Marine Park available at the Federal Register of Legislation.

Failure to adhere to this permit and the conditions above is an offence which may result in a variation to or cancellation of this permit or the imposition of criminal penalties under the EPBC Regulations. A person convicted under the EPBC Regulations may be ineligible for future permits in Australian Marine Parks.

Glen Salmon
 Director
 Authorisations and Compliance

PA2022-00151-1 (variation PA2022-00151-2)



Glen Salmon
Director
Authorisations and Compliance
Marine and Island Parks Branch
Delegate of the Director of National Parks
12 December 2022

Interpretation

In the permit and permit conditions:

Agreement means the agreement executed by the Permittee when applying for this permit.

Director means the Director of National Parks and the Director's delegates, and includes any statutory successor to the Director.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Regulations means the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

Marine Park means the Australian Marine Parks under the EPBC Act for which this permit is issued.

Management Plan means the management plan or management plans made under the EPBC Act in operation from time to time for the Marine Parks specified by this permit.

Participants means the Permittee's employees, contractors, other agents and other individuals who take part in the Permitted Activity.

Permittee means each person (individual, company or other legal entity) to whom this permit is issued.

Permitted Activity means the specified activity or activities for which this permit is issued.

PA2022-00106-1 (variation PA2022-00106-2)



Australian Government
Director of National Parks

Australian Marine Park Activity Permit

Issued under r.12.06(2), 12.09(1) and Part 17 of the
Environment Protection and Biodiversity Conservation Regulations 2000.

Permit Number	PA2022-00151-1
Permitted Activity	Scientific Research – collection of Octocorals for sections 354-354A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and regulation 12.10 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> .
Marine Park/s	Coral Sea Marine Park
Permit Area	National Park Zone – Zone 11 Habitat Protection Zone (Reefs) – Zone 10 and 8 as specified in the Coral Sea Marine Park Management Plan 2018 for the Coral Sea Marine Park available at the Federal Register of Legislation.
Commencement Date	4 December 2022
Expiry Date	3 December 2023
Permittee	Name: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 0401 804 136 Email: Stefano.borghi@my.jcu.edu.au
Permittee Representative	Name: Stefano Borghi Position: PhD Student Organisation: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 0401 804 136 Email: Stefano.borghi@my.jcu.edu.au
Nominated Vessel/s	Name: Iron Joy / Registration number: 23154QA Type: Monohull Trawler / Capacity: 22 Length: 24 / Tonnage: 240 Tenders: 5 x 16ft centre console dinghy's

PA2022-00151-1

<p>Activity Conditions This permit is subject to the following activity specific conditions to reduce impacts on marine park values.</p>	<ol style="list-style-type: none"> 1. The Permitted Activity must be undertaken in accordance with Schedule 1 (PA2022-00151 submitted application), except where inconsistent with this permit. 2. The Permittee must ensure that appropriate risk management systems, strategies and procedures are in place to minimise the foreseeable risks to the environment and heritage values of the Marine Parks and must produce evidence of such systems, strategies and procedures on request of the Director. 3. At least two weeks before entering a Park, the Permittee must notify the Director of the dates of the proposed visit, the Nominated Vessel and whether there is a berth availability for a Parks Australia officer. 4. The Permittee must ensure only the following equipment and methodology is used: <ol style="list-style-type: none"> a) Collection of coral fragments using a hammer and chisel from the order Octocorallia in the sites listed in the survey plan b) No more than 2 samples of each species per site c) No more than 40 samples per site d) No samples greater than 250g in weight
<p>Site Conditions This permit is subject to the following location specific conditions to reduce impacts on marine park values.</p>	<p style="text-align: center;"><i>Reef and seagrass areas</i></p> <ol style="list-style-type: none"> 5. The Permittee must ensure that any anchoring of the Nominated Vessels occurs only on sand and that the anchor equipment does not come into contact with any non-sand seafloor habitat. 6. The Permittee must ensure that no person stands or walks on coral, seagrass or other marine organisms as part of the Permitted Activity. <p style="text-align: center;"><i>Biologically Important Areas for marine turtles</i></p> <ol style="list-style-type: none"> 7. During any overnight stay or overnight passage within the Park the Permittee must ensure that lighting on the Nominated Vessels is kept to the minimum necessary for safety and navigation (to minimise behavioural impacts to turtles). <p style="text-align: center;"><i>Islands, islets and cays</i></p> <p style="text-align: center;">Note: Island includes islands, cays and islets.</p> <ol style="list-style-type: none"> 8. The permittee must not, and must take reasonable steps to ensure the Permittee Clients and Personnel do not access any islands within the Park. 9. The Permittee must ensure that when the Nominated Vessel is within 500 metres of an island between sunset and sunrise, that: <ol style="list-style-type: none"> i. Any lighting, including outdoor or deck lights, on the Nominated Vessel are extinguished when not necessary for human safety or navigation; ii. block-out blinds are utilised on all portholes and windows.
<p>General Conditions The following conditions apply to all permits.</p>	<p style="text-align: center;"><i>General conditions</i></p> <ol style="list-style-type: none"> 10. The Permittee must not conduct the Permitted Activity before the commencement date or after the expiry date shown on the permit. 11. An electronic or hard copy of this permit and attached application (Schedule 1) must be kept on board each Nominated Vessel and must be produced for inspection on request by a Warden. 12. The Permittee must inform the Director of proposed changes to the Nominated Vessels at least 14 days before the proposed trip. 13. If a Permittee is a company or other incorporated body the Permittee must not, without the approval of the Director, have as a director or officer holder a person who has been convicted of an offence against the EPBC Act or the EPBC Regulations within the previous 10 years. 14. The Permittee must not, without the approval of the Director, use directly in the conduct of the Permitted Activity the services of any person who has been convicted of an offence against the EPBC Act or the EPBC Regulations within the previous 10 years.

PA2022-00151-1

	<p style="text-align: center;"><i>Compliance and auditing</i></p> <p>15. The Permittee must comply with the EPBC Act, the EPBC Regulations, the Management Plan, all permit conditions and any other notices or directions issued by the Director relating to the Permitted Activity or Marine Parks specified on this permit.</p> <p>16. Unless specifically authorised by this or another permit, the Permittee must comply with all prohibitions and determinations made by the Director under the EPBC Regulations.</p> <p>17. The Permittee must comply with all Commonwealth and State or Territory law relating to the Permitted Activity and hold all permits, licences and other relevant authorisations required by law for the conduct of the Permitted Activity.</p> <p>18. The Permittee must ensure that all Participants are fully informed of and understand these permit conditions before they take part in the Permitted Activity.</p> <p>19. The Permittee must take all reasonable steps to ensure all Participants comply with all permit conditions.</p> <p>20. The Permittee must allow a Warden access to Nominated Vessels at any time for the purpose of performing the functions and powers of Wardens under the EPBC Act.</p> <p>21. The Permittee must, and must take reasonable steps to ensure all Participants in the Permitted Activity, comply with all lawful directions issued by a Warden.</p> <p>22. The Permittee must, at no cost to the Director but subject to availability and the provision of reasonable notice, allow a member of the Director's staff to accompany a trip conducting the Permitted Activity for the purpose of evaluating compliance with these Permit conditions.</p> <p style="text-align: center;"><i>Training and qualifications</i></p> <p>23. The Permittee must maintain relevant training, qualifications and experience to competently conduct the Permitted Activity.</p> <p>24. The Permittee must ensure that all Participants are appropriately trained and/or accredited to competently conduct the Permitted Activity.</p> <p style="text-align: center;"><i>Safety</i></p> <p>25. The Permittee must ensure that appropriate risk management systems, strategies and procedures are in place to minimise foreseeable risks to the Participants in the Permitted Activity and members of the public and must produce evidence of such systems, strategies and procedures on request of the Director.</p> <p>26. The Permittee must ensure that they fully inform themselves of, and equip themselves for, all potential hazards and conditions they may encounter while conducting the Permitted Activity.</p> <p>27. The Permittee acknowledges that the Director has no ability to monitor or warn the Permittee of changing environmental hazards or developing hazards within a Marine Park.</p> <p>28. The Permittee must inform the Director of any potential safety hazard or risk encountered or discovered while in a Marine Park as soon as practicable.</p> <p>29. If anyone taking part in the Permitted Activity is seriously injured, becomes seriously ill or goes missing while in a Marine Park, the Permittee must ensure:</p> <ul style="list-style-type: none"> (a) notification to the relevant emergency response authority as soon as possible; (b) compliance with any requests or directions from those authorities in relation to the safety of that person or any other person; and (c) notification to the Director's Marine Compliance Duty Officer as soon as practicable. <p>Note: The Director is not an emergency response agency and all relevant emergency response agencies should be contacted prior to informing the Director of any incident or safety hazard/risk.</p>
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PA2022-00151-1

	<p style="text-align: center;"><i>Vessel operations</i></p> <p>30. The Permittee must ensure, or satisfy themselves, that all Nominated Vessels are registered, are suitable for the conduct of the Permitted Activity, have appropriate safety equipment on board at all times, and are operated and maintained in accordance with all relevant and applicable Commonwealth, State and Territory laws. The Permittee must, if requested by the Director, provide copies of all relevant certificates and other documents demonstrating compliance with this condition.</p> <p>31. The Permittee must ensure that a person qualified to operate each Nominated Vessel remains on board at all times to monitor and assure secure anchorage.</p> <p>32. The Permittee must:</p> <ul style="list-style-type: none"> (a) Use appropriate moorings if available; or (b) (if moorings are not available) ensure that minimal damage is caused to the marine environment as a result of anchoring. Anchoring cannot occur on coral. <p>33. When using an existing Parks Australia mooring, the Permittee must:</p> <ul style="list-style-type: none"> (a) not exceed the weight capacity of the mooring. (b) not tie to a vessel already using a mooring. <p>34. The Permittee must ensure that Nominated Vessels do not discharge any fuels or chemical wastes into a Marine Park.</p> <p>35. The Permittee must not, and must take reasonable steps to ensure all Participants in the Permitted Activity do not, litter in a Marine Park. All refuse must be placed in containers on board Nominated Vessels which are designed to fully contain refuse material.</p> <p>36. The Permittee must ensure that Nominated Vessels have been antifouled within the last two years and are generally free from fouling. Vessels cannot be cleaned of fouling inside a Marine Park.</p> <p style="text-align: center;"><i>Environment and heritage protection</i></p> <p>37. Unless specifically authorised by this permit, the Permittee must not, and must take reasonable steps to ensure that all Participants in the Permitted Activity do not:</p> <ul style="list-style-type: none"> (a) behave contrary to any warning or regulatory signs displayed at boat ramps used by the Permittee to access a Marine Park or displayed on marker buoys within a Marine Park; (b) collect, pick, interfere with, feed, handle or disturb any native flora or fauna, or handle or disturb the dwelling place of any native fauna; (c) remove shells, coral, plants or animals from a Marine Park. (d) touch, interfere with, or capture images or sound of, Indigenous Cultural and Intellectual Property without the consent of the owner; or (e) impede public access to any part of a Marine Park. <p>38. The Permittee must take all reasonable steps to prevent the introduction of pests into a Marine Park or the transfer of pests between locations within a Marine Park. Reasonable steps can include, but are not limited to, scheduled inspection and cleaning of the vessel and any in-water equipment, and/or passenger briefings.</p> <p>39. The Permittee must ensure that all gear, equipment, and other articles lost in a Marine Park that are likely to cause environmental harm, are reported to the Director's Marine Compliance Duty Officer as soon as practicable, and within 10 days in any event, after the loss occurs. The report must include a description of what was lost, the location of loss/suspected loss and the date and time of loss.</p>
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Failure to adhere to this permit and the conditions above may result in a variation to or cancellation of this permit or the imposition of criminal penalties under the EPBC Regulations. A person convicted under the EPBC Regulations may be ineligible for future permits in Australian Marine Parks.

PA2022-00151-1

Reporting of potential noncompliance and notifications in accordance with General Conditions 28, 29 and 39 should be made to the 24-hour Marine Compliance Duty Officer on 0419 293 465. For all other enquiries relating to this permit, please contact: marineparksauthorisations@environment.gov.au.



Glen Salmon
Director
Authorisations and Compliance
Marine and Island Parks Branch
Delegate of the Director of National Parks
28 November 2022

Interpretation

In the permit and permit conditions:

Agreement means the agreement executed by the Permittee when applying for this permit.

Director means the Director of National Parks and the Director's delegates, and includes any statutory successor to the Director.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Regulations means the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

Indigenous Cultural and Intellectual Property means all aspects of Aboriginal or Torres Strait Islander people's cultural products, expressions knowledge and heritage, whether (a) intangible, such as songs, dances, stories, and ecological and cultural knowledge; or (b) tangible, such as human remains, artworks and artefacts.

Marine Park means the Australian Marine Parks under the EPBC Act for which this permit is issued.

Management Plan means the management plan or management plans made under the EPBC Act in operation from time to time for the Marine Parks specified by this permit.

Participants means the Permittee's employees, contractors, other agents and other individuals who take part in the Permitted Activity.

Permittee means each person (individual, company or other legal entity) to whom this permit is issued.

Permitted Activity means the specified activity or activities for which this permit is issued.

Warden means a person appointed as a warden under s.392 of the EPBC Act.

Zone means the relevant zone as specified by the Management Plan

PA2022-00151-1



Australian Government
Director of National Parks

Permit Condition Variation for Australian Marine Park Activity Permit

This decision is made in accordance with subregulation 17.09 of the *Environment Protection and Biodiversity Conservation Regulations 2000*.

Permit Number	PA2022-00147-1 (variation PA2022-00147-2)
Permitted Activity	Scientific Research for sections 354-354A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and regulation 12.10 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> .
Marine Park	Coral Sea Marine Park
Commencement Date	Date of execution of this variation
Expiry Date	31 December 2022
Permittee	Name: James Cook University Address: Building E1 14-88 McGregor Road Smithfield QLD 4878 Phone: 07 4232 2013 Email: ellen.ariel@jcu.edu.au
Variation to Condition	Australian Marine Park Activity Permit PA2022-00147-1 Permit Area is replaced in its entirety with the below, in accordance with the additional information provided to the Director of National Parks on 12 December 2022: Permit Area: National Park Zone – Zone 11 Habitat Protection Zone (Reefs) – Zone 10, 8 and 9 as specified in the Coral Sea Marine Park Management Plan 2018 for the Coral Sea Marine Park available at the Federal Register of Legislation.

Failure to adhere to this permit and the conditions above is an offence which may result in a variation to or cancellation of this permit or the imposition of criminal penalties under the EPBC Regulations. A person convicted under the EPBC Regulations may be ineligible for future permits in Australian Marine Parks.

Glen Salmon
 Director
 Authorisations and Compliance

PA2022-00147-1 (variation PA2022-00147-2)

Interpretation

In the permit and permit conditions:

Agreement means the agreement executed by the Permittee when applying for this permit.

Director means the Director of National Parks and the Director's delegates, and includes any statutory successor to the Director.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Regulations means the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

Marine Park means the Australian Marine Parks under the EPBC Act for which this permit is issued.

Management Plan means the management plan or management plans made under the EPBC Act in operation from time to time for the Marine Parks specified by this permit.

Participants means the Permittee's employees, contractors, other agents and other individuals who take part in the Permitted Activity.

Permittee means each person (individual, company or other legal entity) to whom this permit is issued.

Permitted Activity means the specified activity or activities for which this permit is issued.

