Reef Check Australia

Western Moreton Bay
Season Summary Report 2020-2021

REEF CHECK AUSTRALIA

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This project was made possible by a network of dedicated volunteers, generous dive operators, wise advisors, innovative collaborators and the Port of Brisbane.

Thank you to the dedicated citizen scientists who have contributed to survey activities within Moreton Bay and assisted with data entry: Chad Buxton, Paul Colquist, Terry Farr, Chris Klaas, Lisa McComb, Rachel McVeigh, Peter Nicholls, Jodi Salmond and Julie Schubert.

Many of the images used within this document were taken by Reef Check Australia General Manager Jodi Salmond, and SEQ Survey Coordinator Julie Schubert. The image on the front was taken in Moreton Bay at St Helena Island by Julie Schubert.

Project activities were conducted on the traditional lands of the Quandamooka People, Kabi Kabi First Nation and Yugambeh People. We acknowledge the Traditional Custodians of the land, of Elders past, present and emerging.

This project is supported by Reef Check Australia, through funding from the Port of Brisbane.

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Also a big thank you to GO Dive Brisbane for supplying the boat and crew to access the sites.

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1.0 PROJECT INTRODUCTION

This report outlines the survey results documented at six (6) Reef Check Australia Monitoring sites located at Mud Island (2), St Helena Island (2) and Green Island (2) (Figure 1). Reef Check Australia has been monitoring these sites seasonally to detect changes related to seasonal variation and changes to substrate composition.

Figure 1.0 Location of Reef Check Australia monitoring sites. Mud Island (Coral Galore and Rubble Patch), St Helena Island (Palindrome and Ray of Sunshine), Green Island (North and West) – image sourced from Esri.

1.1 KEY FINDINGS FROM 2020-2021 SURVEYS

1.1.1 SURVEY CONDITIONS

Due to unfavourable weather conditions, the summer surveys were postponed three times before we were able to complete them. Water temperatures during the summer surveys were a pleasant 26^{0}C, however this resulted in a dense cover of macroalgae at most sites. Fortunately winter conditions were calmer and no delays were experienced. Water temperature though was a refreshing 16^{0}C, but levels of macroalgae had reduced. Visibility varied between sites but was better during the winter surveys. The lowest visibility was experienced in summer at St Helena Palindrome due to the easily disturbed high silt loading.

1.1.2 SUBSTRATE

Hard coral cover remained fairly consistent at most sites however at Green Island North reached a peak at 11% of substrate in winter 2019, but has declined to 4% in winter 2021. St Helena Island – Ray of Sunshine has also observed a decrease from 12% in winter 2018 to 2% in winter of 2021. Soft coral cover has remained steady and silt levels have decreased across most sites since 2019/2020. Levels of sponge remain low with sand continuing to fluctuate.

Due to the low volume of corals, levels of bleaching are consistently around 1% of the coral population with the exception of Mud Island Rubble Patch in summer 2021 recording an average of 15% of the individual colonies and 18% of the population.

1.1.3 IMPACTS

Levels of impact remain low with the highest recorded impact being 18 incidents of coral damage and 17 of disease at Mud Island Rubble Patch in summer 2021. The highest level of marine debris recorded was 10 counts at St Helena-Palindrome in winter 2021, which is above the range of 1-4 recorded on the other surveys across all sites.

1.1.4 INVERTEBRATE ABUNDANCE

Invertebrate abundance remains low across all sites. *Drupella* snails were the only target invertebrate observed during our surveys, ranging in count from 0 to 28 individuals across all sites.

1.1.5 FISH ABUNDANCE

Numbers of target fish were low, although 19 butterflyfish were recorded at Mud Island Coral Galore in summer 2021, along with one moray eel and one grouper. Other species observed include parrotfish and snapper, although numerous non-target species, such as bream, wrasse, cardinal fish and blennies were also observed on most surveys.

Refer to Table 1 for summary of site data and section 2 for individual site reports.

Table 1: Summary table of RCA monitoring findings for surveys conducted in Inner Moreton Bay in 2020-2021 season. Information includes a basic site summary of average hard and soft coral cover (%), total macroalgae (MA) abundance, nutrient indicator algae (NIA) cover (%), and silt levels (N=none, L=low, M=medium, H=high), as well as a summary of the impacts at each site: average coral bleaching of the population (%) and abundance of reef impacts (coral disease, marine debris, coral damage, and scars). All figures showing a count, rather than a percentage, are a total across all 4 transects at the site (i.e. at total across 80m)

	Basic site summary					Presence of Impacts							
	Hard Coral Coverage (%)	Soft Coral Coverage (%)	Macroalgae (#) per 80m transect	Nutrient Indicator Algae (%)	Silt Loading	Coral Population Bleaching (%)	Coral Disease (#)	Fishing Line (#)	Marine Debris (General) (#)	Anchor Damage (#)	Coral Damage (#) (Unknown Causes)	*Drupella* Scar (#)	Unknown Scar (#)
Green Island, North, Site 1 (Summer)	1.9	10.6	65	59.4	M	3.75	0	0	1	0	0	0	0
Green Island, North, Site 1 (Winter)	3.8	13.1	2	19.4	L	1	0	0	1	0	0	0	0
Green Island, West (Summer)	4.4	18.1	52	50	H	1.25	1	0	2	0	0	0	0
Green Island, West (Winter)	7.5	13.1	13	13.8	M	0.75	0	0	3	0	3	0	1
Mud Island, Coral Galore (Summer)	0.6	12.5	40	25	L	5	12	0	0	0	0	0	0
Mud Island, Coral Galore (Winter)	1.9	9.4	5	24.4	L	0.5	0	2	0	0	0	0	0
Mud Island, Rubble Patch (Summer)	0	0	69	43.1	M	18.8	17	3	1	0	18	0	0
Mud Island, Rubble Patch (Winter)	1.2	5.6	14	35.6	N	0	0	2	2	0	0	0	0
St Helena, Palindrome (Summer)	0.6	3.1	43	26.9	M	2.5	2	0	3	0	0	0	0
St Helena, Palindrome (Winter)	2.5	0	3	12.5	M	0.5	0	1	9	0	0	0	0
St Helena, Ray of Sunshine (Summer)	6.9	11.9	54	53.8	M	0.5	6	0	0	0	0	0	0
St Helena, Ray of Sunshine (Winter)	1.9	9.4	7	23.1	L	0.75	0	0	0	0	0	0	0

2.0 SITE REPORTS

2.1 GREEN ISLAND NORTH, SITE 1

This site is located on the northern side of Green Island. The site was established in 2015 and sits at a depth of 5m. This site hosts patchy hard and soft coral on a soft sediment benthos.

Rubble (25%) was the dominant substrate followed by rock (19%) and nutrient indicator algae (19%). Silt (15%), soft coral (11%), sand (9%) and hard coral (2%) made up the balance of substrate during the March 2021 (summer) survey. During the winter survey in July 2021, silt had reduced to 0%, with sand the dominant substrate at 42%. Rock was recorded at 20%, soft coral had increased slightly to 13%, with rubble down to 2%. Nutrient indicator algae was still at 18% whilst hard coral increased to 4% (Figure 2.1.1).

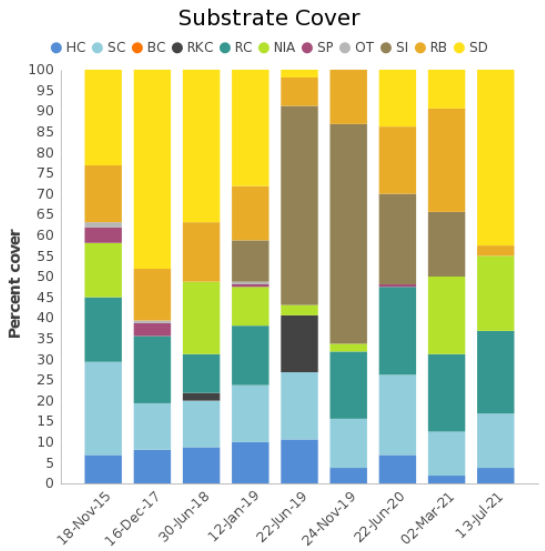

Figure 2.1.1. Benthic type and percent cover: Green Island North, Site 1, 2015 - 2021

In March 2021, 3.75% of the coral population was recorded as bleached, but this decreased to 1% in July 2021.

Coral damage was not recorded on either survey and only one item of marine debris was recorded on each survey. One *Drupella* snail recorded in the March survey and 14 *Drupella* snails recorded in the July survey were the only invertebrates observed.

Fish surveys were conducted with no target fish recorded in March 2021, however in July 2021 one butterflyfish and one parrotfish were recorded. However non-target fish were observed utilising the habitat.

Image 2.1A Site photo

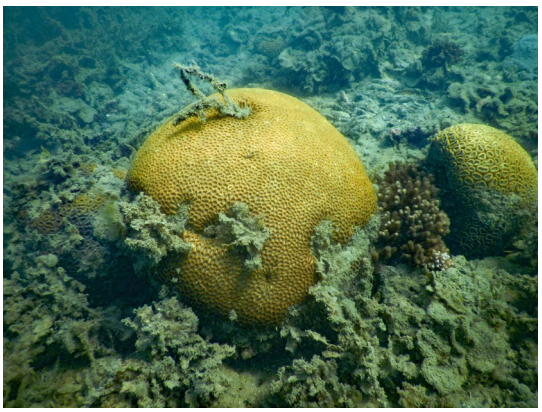

Image 2.1B Massive hard coral

Image 2.1C Surveyor in action

2.2 GREEN ISLAND WEST, SITE 1

This site is located on the western side of green island on the edge of the reef flat. The site was established in 2017 and site at a depth of 5m. This site hosts patchy hard and soft coral on a soft sediment benthos.

Rock (19%) was the dominant substrate followed by soft coral (18%), nutrient indicator algae (18%) and sand (16%). Rubble (13%), hard coral (4%), sponge (4%) and silt at 8% made up the balance of substrate during the March 2021 survey. Sand (51%) dominated the substrate in July 2021. Rock (21%) and soft coral (13%) were the next dominant categories. Hard coral at 8% was an increase from the summer survey and a decrease in rubble to 2% made up the balance (Figure 2.2.1).

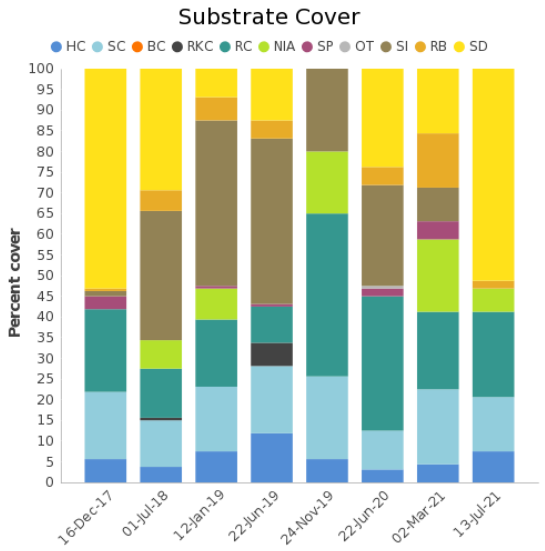

Figure 2.2.1. Benthic type and percent cover: Green Island West, Site 1, 2017 - 2021

Coral bleaching averaged 11% of each colony observed as bleached, with an average of 1% of the coral population bleached in March 2021. This increased to an average of 37% of each colony in July 2021 but remained at 1% of the coral population.

One count of coral disease and two counts of marine debris were recorded during the summer survey, whilst three counts of damage, one unknown scar and three items of general trash were recorded in winter. One butterflyfish and one parrotfish were recorded during the summer survey, and two butterflyfish, one parrotfish and three snapper were observed in winter.

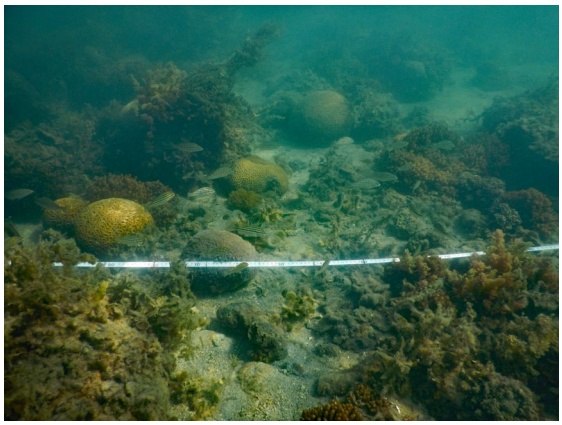

Image 2.2A Site photo

Image 2.2B Massive hard coral

Image 2.2C Soft coral

2.3 MUD ISLAND, CORAL GALORE

Mud Island is situated between the Port of Brisbane and Moreton Island and was historically used as anchorage for ships that were unable to access the shallow Brisbane River. This site is situated on a rocky slope and supports a population of corals, in contrast to the neighbouring survey site called Rubble Patch (See Section 2.4).

Surprisingly rubble made up 48% of the substrate in February 2021 (an increase from previous surveys). Sand attributed 22% of the total substrate followed by rock (16%) and soft coral (13%), with hard coral and silt at <1% each. During the winter survey Rock (40%) was the dominant substrate, followed by nutrient indicator algae (21%), sand (13%), rubble (12%), and soft coral (9%). Hard coral contributed 2% with sponge and other just over 1% each. (Figure 2.3.1).

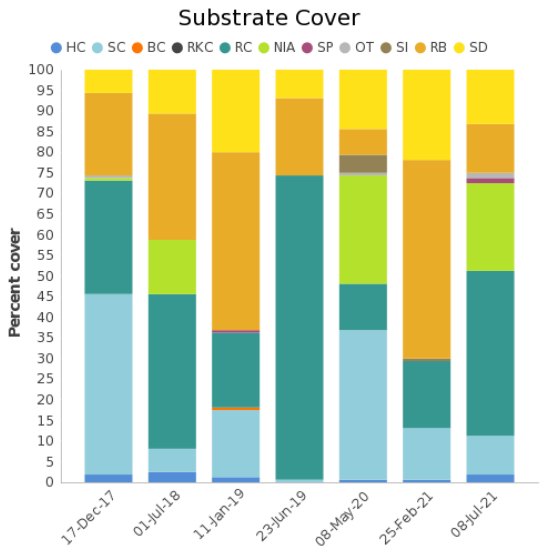

Figure 2.3.1. Benthic type and percent cover: Mud Island, Coral Galore, 2017 - 2021

Bleaching averaged 25% of coral colonies and 5% of the coral population during summer, decreasing to 10% of colonies and 1% of population in winter. Twelve incidences of coral disease were recorded in summer with one item of marine debris recorded in winter.

Twenty-eight *Drupella* snails were recorded in summer, with four recorded in winter.

Fish surveys were conducted and 19 butterfly fish, one grouper, one moral eel and one parrotfish were recorded in summer. Only three butterflyfish were recorded in winter.

Image 2.3A Site photo

Image 2.3B Soft coral and sea slugs

Image 2.3C Dominant algae - *Lobophora*

2.4 MUD ISLAND, RUBBLE PATCH

This site at Mud Island consists primarily of unconsolidated coral rubble, sparse soft coral and algae fields. This site was first surveyed in 2017 after it was identified by Roelfsema et al (2017) as an area of interest.

Hard and soft coral were not detected on substrate transect during the summer survey, but were observed within the impacts transect belt. Rubble made up 85% of the substrate, with sand making up 13%. Rock at 2% made up the balance in summer. During the winter survey, rock dominated at 31%, followed by nutrient indicator algae (27%). Rubble made up 21%, sand 11%, with soft coral at 6%, other at 3% and hard coral just over 1%. (Figure 2.4.1).

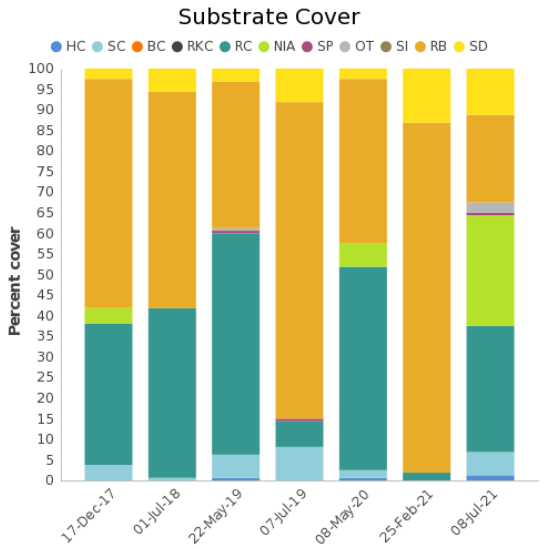

Figure 2.4.1. Benthic type and percent cover: Mud Island, Rubble Patch, 2017 - 2021

Bleaching averaged 15% of each colony and 18% of the population in summer. Eighteen incidences of unknown coral damage and 17 of disease were recorded on the impact survey and four items of marine debris. The only impacts recorded in winter were two items of fishing line and two of general debris. Bleaching was not observed. Two *Drupella* snails were observed in summer and seven in winter during the invertebrate survey.

Fish surveys were conducted and four butterflyfish and two snapper were recorded in summer, with three butterflyfish recorded in winter.

Image 2.4A Dominant algae

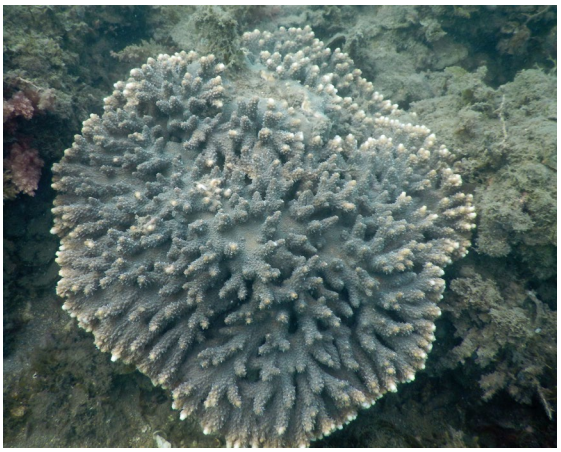

Image 2.4B Hard coral

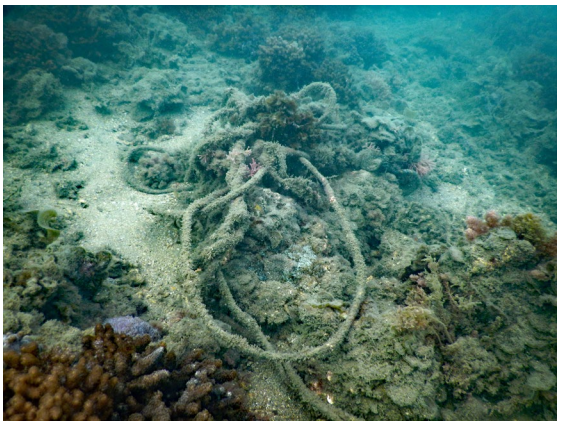

Image 2.4C Marine debris - rope

2.5 ST HELENA, PALINDROME

This site at St Helena Island is located in close proximity to the jetty and runs parallel to the shore. The substrate is generally soft sediment and sand with patchy coral cover.

Rubble dominated (74%) during the summer survey. Sand (11%), silt (9%), soft coral (3%), rock (2%) and hard coral at just under 1% made up the balance of the substrate. Silt dominated in winter (72%), with sand and nutrient indicator algae both contributing 11%. Rubble made up only 2%, bleached coral 2% and hard coral 2%.(Figure 2.5.1).

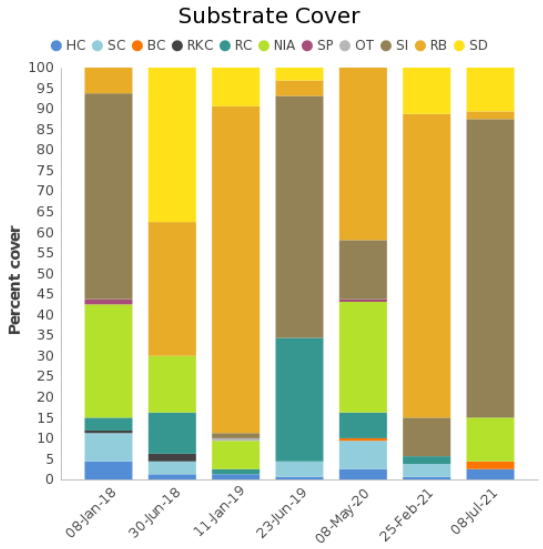

Figure 2.5.1. Benthic type and percent cover: St Helena Island, Palindrome, 2018 - 2021

Coral bleaching averaged 20% of coral colonies and 2% of the population in summer. Two incidences of disease and three items of marine debris were also recorded. Bleaching decreased to 2% of colonies and 1% of the population in winter. Ten items of marine debris were recorded.

Fish surveys were conducted and one parrotfish was recorded during the winter survey but wobbegong sharks and bream were observed during summer.

Image 2.5A Site photo

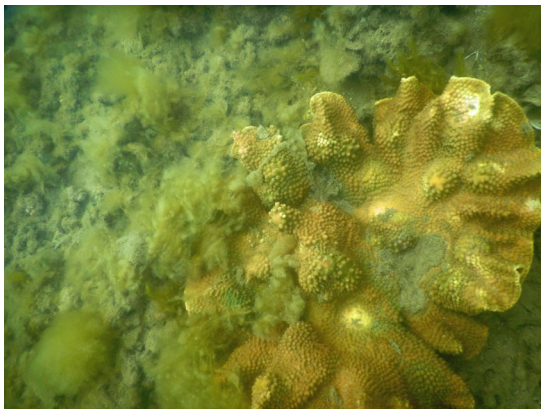

Image 2.5B Foliose hard coral and nutrient indicator algae

Image 2.5C Massive hard coral

2.6 ST HELENA, RAY OF SUNSHINE

This site at St Helena Island is located off the southern end of the island. The substrate is generally soft sediment and sand with patchy coral cover, however it has a greater cover of coral than Palindrome.

During the summer survey rubble made up 26% of the substrate, with nutrient indicator algae making up a further 20%. Sand attributed 19%, silt 13%, soft coral 12%, hard coral 7%, with rock at 2% and sponge at just under 1% making up the balance of the substrate. Sand (49%) dominated the winter survey, with rock and nutrient indicator algae both at 19%, whilst soft coral was lower than summer at 9% as was hard coral at 2%. Rubble and sponge both contributed less than 1% (Figure 2.6.1).

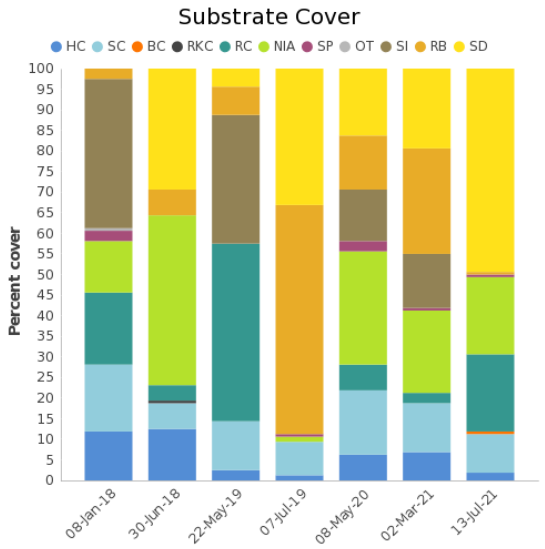

Figure 2.6.1. Benthic type and percent cover: St Helena Island, Ray of Sunshine, 2018 - 2021

Bleaching affected less than 1% of the total coral population with an average of 7% of any individual colony being bleached during summer, with six incidences of coral disease recorded. Bleaching increased to an average of 26% of individual colonies but remained at 1% of the population during winter. No other impacts were recorded during winter. One *Drupella* snail was recorded in summer and five in winter.

Fish surveys were conducted and four butterfly fish and four parrotfish were recorded in summer, with one parrotfish recorded in winter.

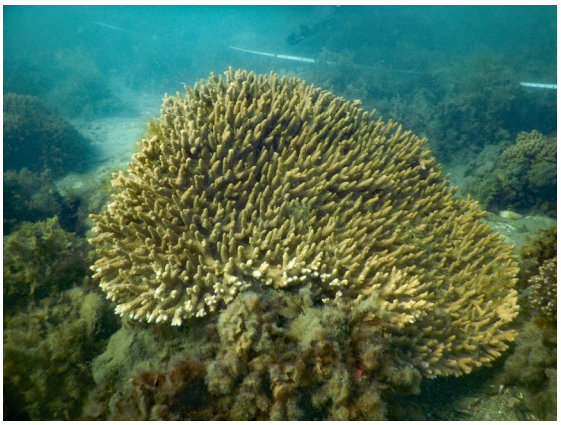

Image 2.6A Site photo

Image 2.6B Bleached hard coral

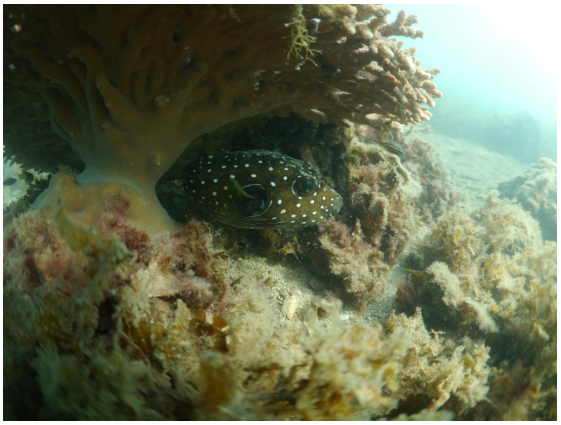

Image 2.6C Non-target pufferfish

3.0 REFERENCES

Roelfsema,C.M., Bayraktarov, E., van den Berg,C.,Breeze, S., Grol, M.G.G., Kenyon,T., de Kleermaeker, S., Loder, J., Mihaljević, M., Passenge,rJ., Rowland, P.,Vercelloni, J.and Wingerd, J.(2017). Ecological Assessment of the Flora and Fauna of Flinders Reef, Moreton Bay Marine Park, Queensland. UniDive, The University of Queensland Underwater Club, Brisbane, Australia.

Image 3.1 Survey team Mud Island

Image 3.2 Nudibranch – *Goniobranchus daphne*

Image 3.3 Green Island West

Image 3.4 Team photo

Image 3.5 Soft corals – Mud Island Rubble Patch