

Reef Check Australia

Townsville Region Season Summary Report 2021-2022



REEF CHECK AUSTRALIA

www.reefcheckaustralia.org

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A special note of acknowledgement to our trainers, professional volunteers and staff: Nathan Cook, Jenni Calcraft and Aimee Brown.

Many of the images used within this document were taken by Reef Check Australia GBR Coordinator Jenni Calcraft.

Project activities were conducted on the traditional lands of the Wulgurukaba and Bindal People. We acknowledge the Traditional Custodians of the land, of Elders past, present and future.

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Magnetic Island
Community Development
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Project Introduction

Reef Check Australia (RCA) is an environmental charity dedicated to protecting Australia's reefs and oceans by engaging the community in hands-on citizen science and education initiatives. Survey teams are part of a worldwide network of trained volunteers that regularly monitor and report on reef health in more than 90 countries using a standardised scientific survey method. The goal of Reef Check monitoring is to determine broad-scale trends of how our reefs are changing over time on both local and global scales. RCA data can be provided to scientists and managers as an early warning system to supplement other monitoring programs that document changes and disturbances on the reef.

Since 2001, Reef Check Australia (RCA) has supported citizen science reef monitoring projects on reefs around Australia. For the past 21 years, our surveys have helped with the collection of long-term data relating to reef health at a local, national and global scale. RCA's survey methods collect quantitative data for substrate cover, key invertebrate species, target fish species, as well as anthropogenic and natural impacts in reef habitats.

Reef Check Surveys

Reef Check surveys are conducted along a transect line that is laid along a constant depth and reef habitat type. The total transect length that is surveyed is 80m, divided into four 20m sections or transect replicates (Figure 1), separated by 5m intervals. A set of biological indicators was chosen for Reef Check, to serve individually as indicators of specific types of human impacts, and collectively as a proxy for ecosystem health. These indicators fall into the following categories:

- Percent cover of reef composition is surveyed using a "point sample" method with a plumbline, or weighted line. Divers record the substrate type that is directly below the tape measure every 0.5m along each of the four 20m sections to estimate the percent cover of 25 substrate categories.
- Invertebrate, reef health impact and fish (when logistically suitable) abundance are documented using a 5m wide u-shaped search pattern across the transect line to search for target indicators.

For additional details on monitoring methodology, please see the [Reef Check Australia Monitoring Methods](#) (Hill & Loder 2013).

This report summarises the findings from surveys conducted in the Townsville region on Magnetic Island and Middle Reef for the 2021-2022 financial year .

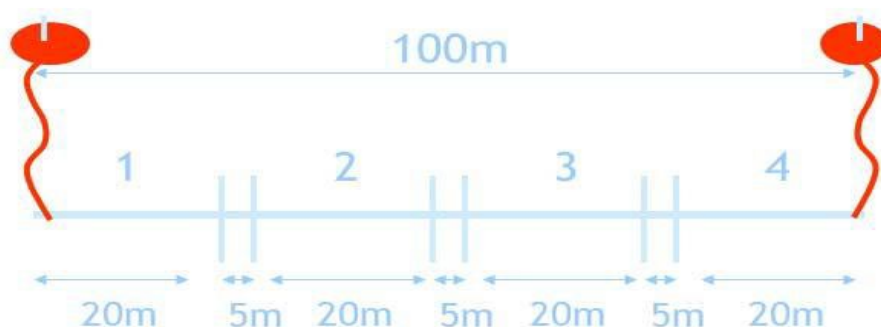


Figure 1: Diagram of a Reef Check transect line showing four replicates of 20m each.

Monitoring Sites

In the 2021-2022 season, Reef Check Australia volunteers visited eight sites across four locations at Magnetic Island. Locations included Geoffrey Bay (Site 4 & 5), Alma Bay (Site 1 & 2), Florence Bay (Site 1 & 2) and Nelly Bay (Site 1 & 2) (Figure 2). Additionally, surveys were conducted at two sites at Middle Reef (Site 1 & 2).

Monitoring sites were established in various years, with the earliest site established in 2003 (Geoffrey Bay and Nelly Bay).



Figure 2. Map of Magnetic Island and Middle Reef Survey Locations – base image sourced from Queensland Globe

Summary data is provided in Table 1 below.

Table 1: Summary table of RCA monitoring findings for surveys conducted on Magnetic Island and Middle Reef for the 2021-2022 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. a total across 80m).

Magnetic Island Reefs	Site Summary					Presence of Impacts						
	Hard Coral Coverage (%)	Soft Coral Coverage (%)	Macroalgae (#) per 80m transect	Nutrient Indicator Algae (%)	Silt (Low, Medium, High)	Coral Population Bleaching (%)	Coral Disease (#)	Marine Debris (General) (#)	Coral Damage (#) (unknown causes)	Drupella Scar (#)	Crown of Thorns Scar (#)	Unknown Scar (#)
Alma Bay, Site 1	47	3	36	25	L	0.5	0	0	4	0	0	1
Alma Bay, Site 2	51	1	33	22	L	4	0	0	1	10	0	8
Florence Bay, Site 1	24	0	77	51	L	4	0	0	7	3	0	5
Florence Bay, Site 2	27	0	58	46	M	5	0	1	0	4	0	0
Geoffrey Bay, Site 4	51	0	66	44	L	3	0	1	27	8	0	32
Geoffrey Bay, Site 5	71	0.6	30	24	L	2	0	0	14	10	0	10
Nelly Bay, Site 1	29	1.2	8	5	H	3	0	0	6	0	0	6
Nelly Bay, Site 2	23	0.6	18	11	H	0.5	9	0	0	0	0	11
Middle Reef, Site 1	31	2.5	12	24	M	5	0	0	2	3	0	1
Middle Reef, Site 2	89	1.2	3	8	L	2	0	0	3	1	0	9

Substrate patterns

- The average hard coral cover across all sites surveyed in 2021-2022 was 44%, with total percentage ranging from 23 to 89%; an increase from last year (15% to 71%).
- Rock (RC) accounted for an average of 28% of cover across all sites.
- Nutrient indicator algae accounted for 5% of cover on average across all sites. There was an average of 34 counts of RCA seasonal macroalgae categories (including *Sargassum*, *Turbinaria*, and *Lobophora*). In previous years the macroalgae, *Asparagopsis*, has been anecdotally noted.
- Soft coral (SC) was present at 7 of the 10 sites, but in low levels of cover (1% of the total substrate composition on average). The highest cover of soft coral was at Alma Bay Site 1 (2.5%) and Middle Reef Site 1; a decrease from last year. Rubble was present at nine of the sites, averaging 10%. Sponge cover was low across the sites, with the highest recorded at Florence Bay Site 2 (3%).

Refer Figure 3.0 for Substrate Cover for 2021-2022 and Figures 4a, 4b and 5 for individual site substrate cover over time.

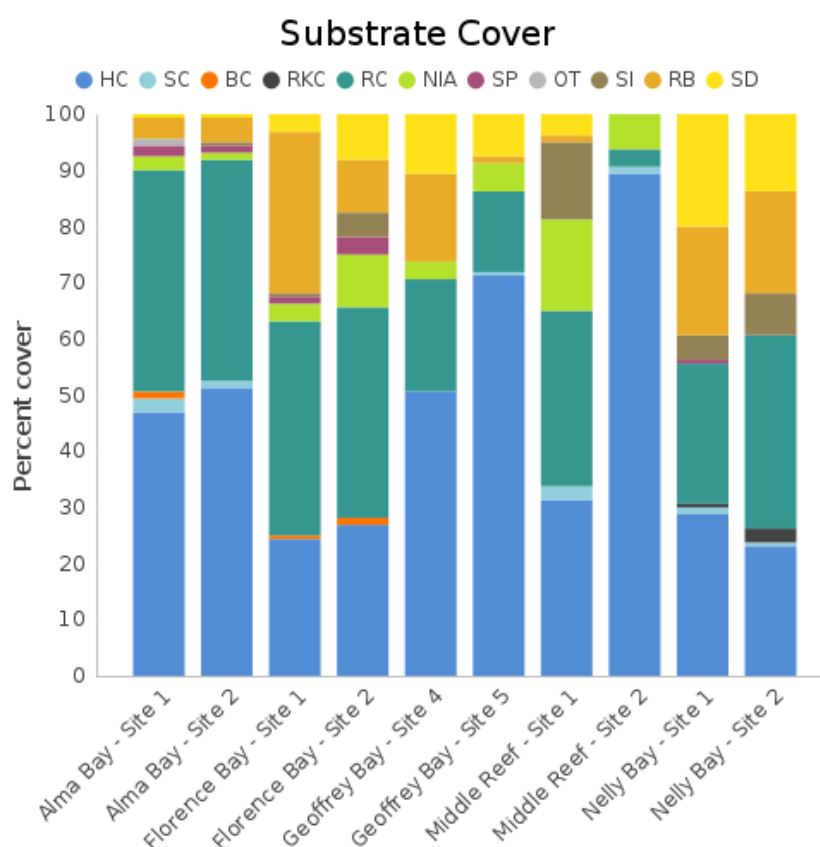


Figure 2: Substrate cover at all Magnetic Island and Middle Reef Sites for the 2021-2022 season. Substrates recorded include hard coral (HC), soft coral (SC), bleached coral (BC), recently killed coral (RKC), rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble (RB).

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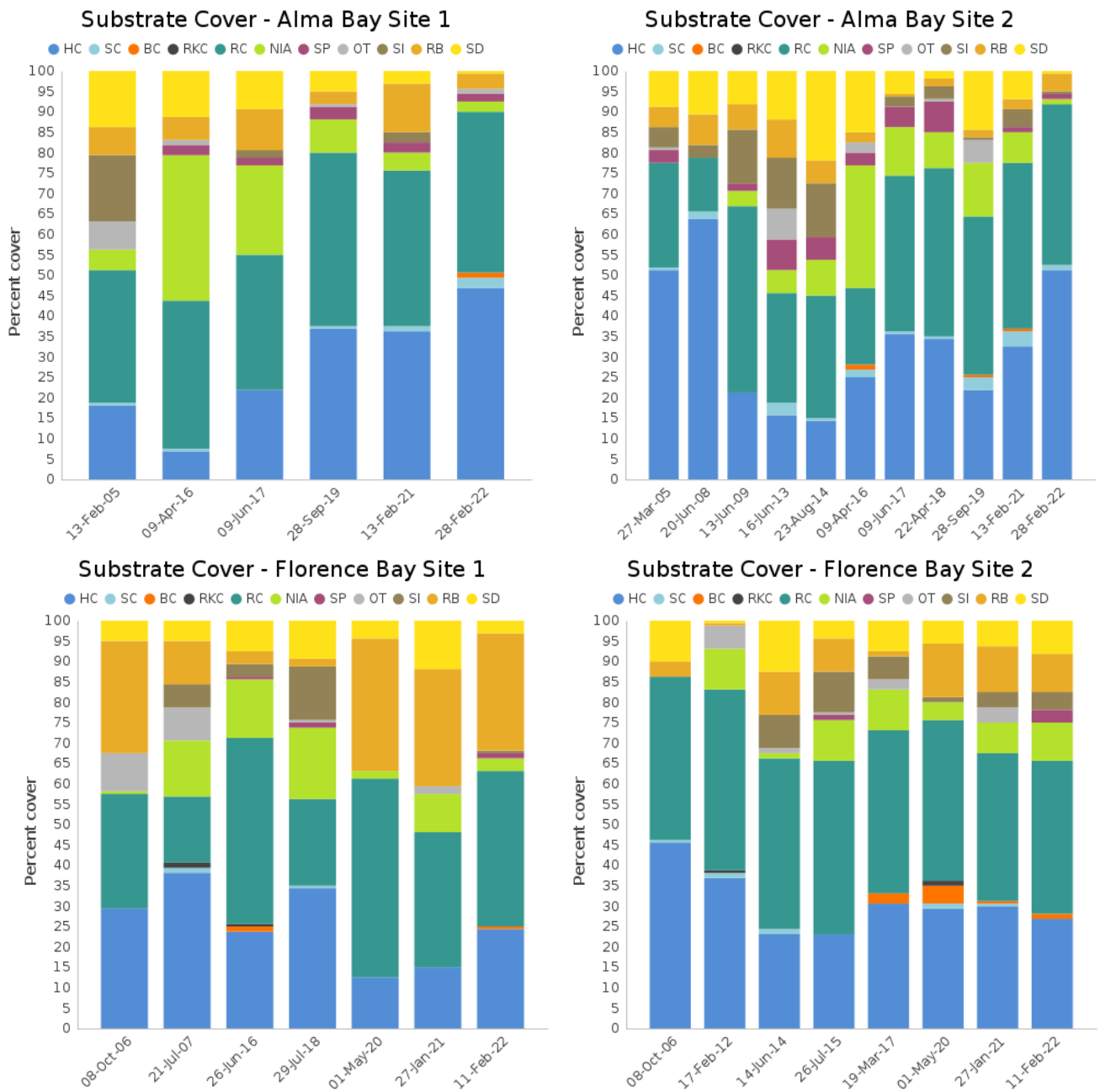


Figure 3a: Percent cover of substrate composition at Magnetic Island Reef Check Australia monitoring sites. Substrates recorded include hard coral (HC), soft coral (SC), bleached coral (BC), recently killed coral (RKC), rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble (RB).

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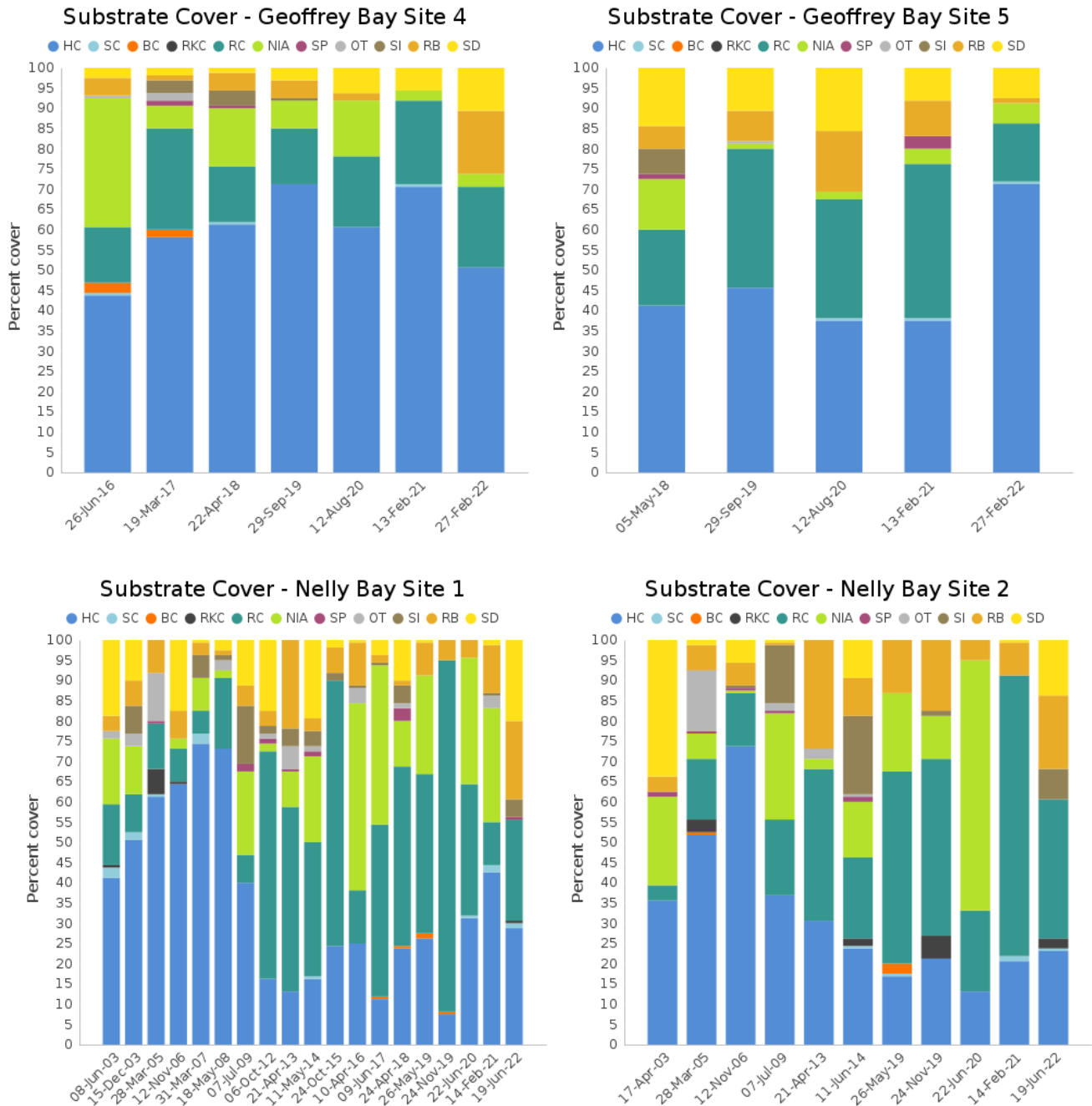


Figure 4b: Percent cover of substrate composition at Magnetic Island Reef Check Australia monitoring sites. Substrates recorded include hard coral (HC), soft coral (SC), bleached coral (BC), recently killed coral (RKC), rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble (RB).

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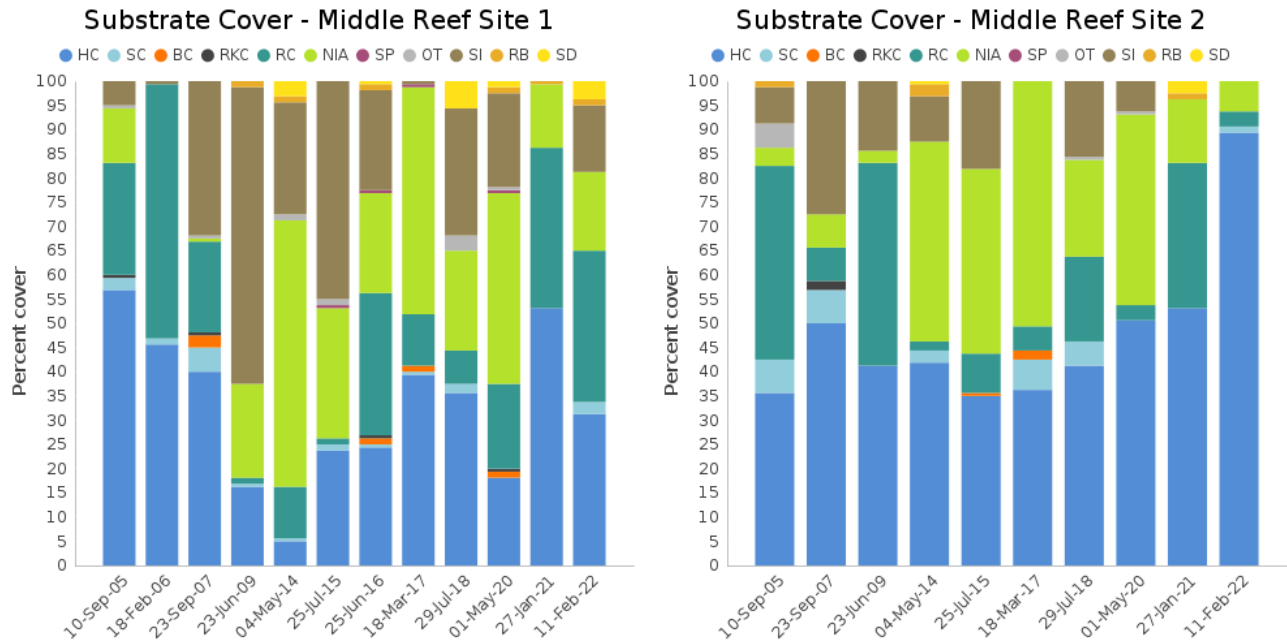


Figure 5: Percent cover of substrate composition at Middle Reef, Reef Check Australia monitoring sites. Substrates recorded include hard coral (HC), soft coral (SC), bleached coral (BC), recently killed coral (RKC), rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble (RB).rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble (RB).

Signs of Reef Stress

- The highest number of *Drupella* spp snail scars was recorded at Alma Bay Site 2 and Geoffrey Bay Site 5 (10 each), two of the four sites with the highest percentage of hard coral cover. This is a decrease from last season.
- Scars from unknown causes were documented at 9 sites, with the highest at Geoffrey Bay Site 4 ($n = 32$), whilst Nelly Bay Site 2 had 11 and Geoffrey Bay Site 10 (Figure 6).
- Marine debris was only recorded at Florence Bay Site 2 and Geoffrey Bay Site 4 (1 each).
- Coral disease was only recorded at Nelly Bay Site 2; a decrease from last season, despite warmer temperatures earlier in the 2022 year.
- Varying levels of coral bleaching was observed across all sites. The population impact ranged from 0.5% (Alma Bay Site 1 and Nelly Bay Site 2), to 5.25% at Florence Bay Site 2. Of note; the majority of surveys were conducted in summer and Nelly Bay surveys conducted in winter.
- Coral damage from unknown causes was recorded at 8 sites, ranging from one incident at Alma Bay Site 2 to 27 incidences at Geoffrey Bay Site 4.

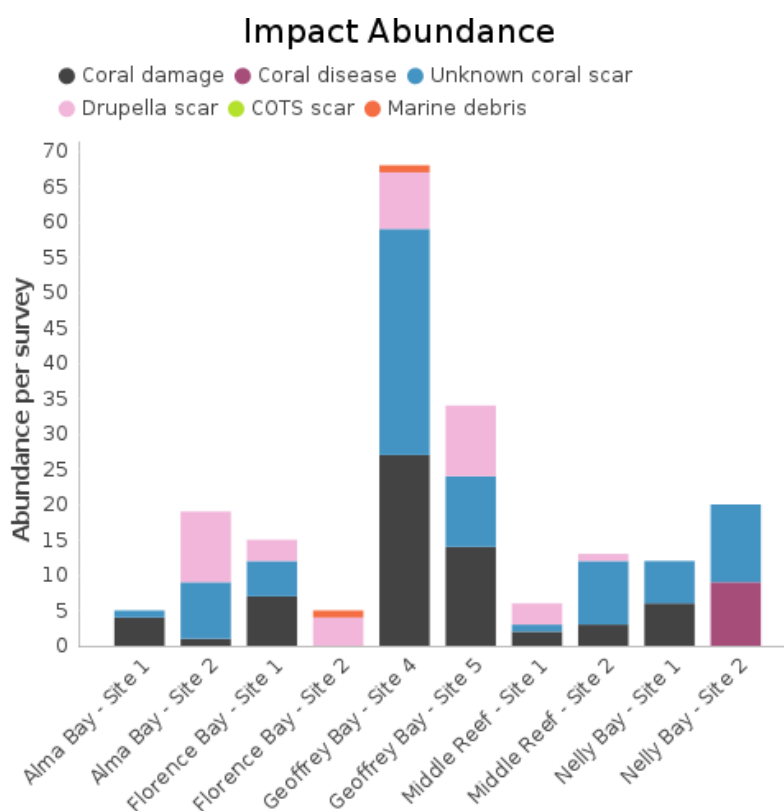


Figure 6: Abundance of recorded reef health impacts at Magnetic Island and Middle Reef 2021-2022.

Indicator Invertebrates

- Target sea cucumber species (*Thelenota ananas*, *Stichopus chloronotus*, *Holothuria edulis*) were not recorded at any sites.
- *Drupella* snails were recorded at all sites this season. The highest number of snails was recorded at Geoffrey Bay Site 4 (n=35) (Figure 7).
- Giant clams were recorded at Florence Bay Site 1 (n=1) and the snorkel trail site at Geoffrey Bay Site 5 (n=2).
- Trochus shells were not observed this season.
- Banded coral shrimp and anemone were not observed at any site which is consistent with last season.

Invertebrate Abundance

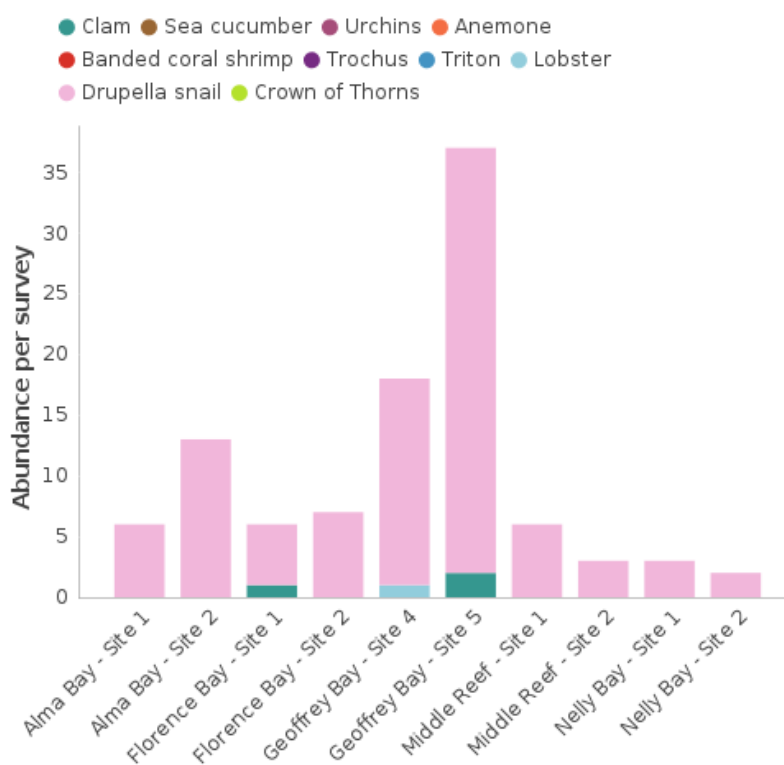


Figure 7: Abundance of recorded reef invertebrates at Magnetic Island and Middle Reef 2021-2022.

Target sea cucumbers include green prickly fish, prickly redfish and pinkfish. These sea cucumbers are recognised internationally as both economically and environmentally important; in many countries they are a food source, as well as sold in the aquarium trade. Sea cucumbers also have a vital role on the reef environmentally; as a major detritivore, they keep reef areas 'clean'. Low numbers of sea cucumbers may mean underlying ecological issues in a particular reef area.

Giant clams are filter feeders that also help to build reefs due to their calcium carbonate shell. They provide space for smaller sessile organisms to grow (on their shell) and are an important food source in many countries. Their shells are valuable in the curio market. They are a protected species in Australia.

Drupella snails are small, coral eating snails. Although small numbers on the reef is common, outbreaks of these snails can result in extensive reef damage.

Observations for the 2021-2022 survey season

This year the Reef Check Australia reef health survey season ran from October to June, encompassing the Australian summer (December-February); a critical time for the health of coral.

Water temperatures on the reef warmed unseasonably early in December, and continued to accumulate heat late into the summer, until the end of March. These above average water temperatures led to a mass coral bleaching event late in the summer of 2021-2022, with varied severity, covering the length of the Great Barrier Reef. Data from the Australian Institute of Marine Science (AIMS) Long Term monitoring program (shared through the Great Barrier Reef Marine Park Authorities Reef Health snapshot for summer 2021-2022) during this bleaching event show major (30-60%) to severe bleaching on reefs from Cooktown to the Whitsundays, with the most severe bleaching occurring on inshore and offshore reefs within the Townsville region.

Reef Check Australia surveys for the 2021-2022 season were completed between February and June around Magnetic Island inshore reefs and middle reef, located between Magnetic Island and Townsville mainland shows minimal coral bleaching (1-5% of the coral population within Reef Check transects) suggesting that Magnetic Island reefs are potentially more tolerant of warmer temperatures, however this must be taken with a word of caution; Reef Check Australia surveys were conducted late in the summer, which may have been after the peak bleaching period.

Difficulty getting into the field due to team availability, illness and unfavourable weather conditions forced some surveys to be conducted in winter instead of summer. Regardless, as reef health monitoring surveys offer a snapshot in time, it is only with continued monitoring of reefs over time and space that long term changes and patterns, or recovery versus mortality may be detected.

The next season of Reef Check Australia reef health monitoring for the Townsville region is due to commence from October.

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Reef Check Community Engagement

Our ambassadors were out and about leading and participating in a number of events to spread awareness of the reefs in the area, to share knowledge on local reef health, inspire positive action and encourage their communities to implement small changes in daily actions, that have large impacts on the world around them. For the second year in a row, the ecological data collected as part of our reef health surveys were included in the Dry Tropics to Healthy Waterways 2021 Report Card to provide information on the health of our local marine ecosystems. Our continued partnerships with Tangaroa Blue, AUSMAP and the Department of Environment and Science saw our team deliver beach and underwater clean-ups at Alma, Nelly and Horseshoe Bays at Magnetic Island. Development and planning sessions lead to community engagement stalls at the local Townsville and Magnetic Island markets and events in collaboration with the Ocean Film Festival, Townsville City Council and Intrepid Domestic Travel.

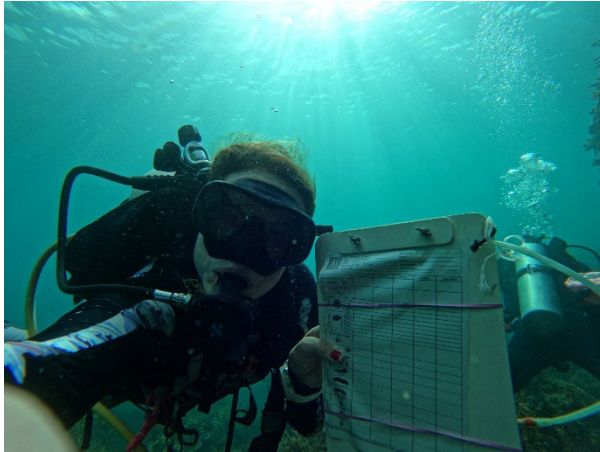


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Team Survey Images



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Further Information

For more information on Reef Check Australia, survey methods, sites and previous reports, please go to www.reefcheckaustralia.org.

Additional resources used in this report;

- Great Barrier Reef Marine Park Authority, Australian Institute of Marine Science, and CSIRO 2022, Reef snapshot: Summer 2021-22, Great Barrier Reef Marine Park Authority, Townsville.
- Long-term Monitoring Program survey reports;
(www.aims.gov.au/docs/research/monitoring/reef/latestsurveys.html);
(<https://apps.aims.gov.au/reef-monitoring/reefs>)

