Reef Check Australia

Magnetic Island
Season Summary Report 2019

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 supportive funding agencies.

Thank you to the dedicated citizen scientists who have contributed to survey activities: Aimee Brown, Jenni Calcraft, Gemma Molinaro, Susanna Primavesi and Maren Toor

A special note of acknowledgement to our trainers, professional volunteers and staff: Peter Faulkner, Gemma Molinaro, Nathan Cook and Jenni Calcraft

Many of the images used within this document were taken by Reef Check Australia Community Engagement and GBR Coordinator Nathan Cook and Assistant 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 and present.

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Thank you to industry supporters who provided in-kind support during this survey season for surveys, and volunteer training events including: Pleasure Divers Magnetic Island, Bungalow Bay YHA, Conservation Volunteers Australia, Reef Ecologic and GBR Legacy.

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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 standardized 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 18 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). 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 interval 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 on Magnetic Island in the calendar year 2019.

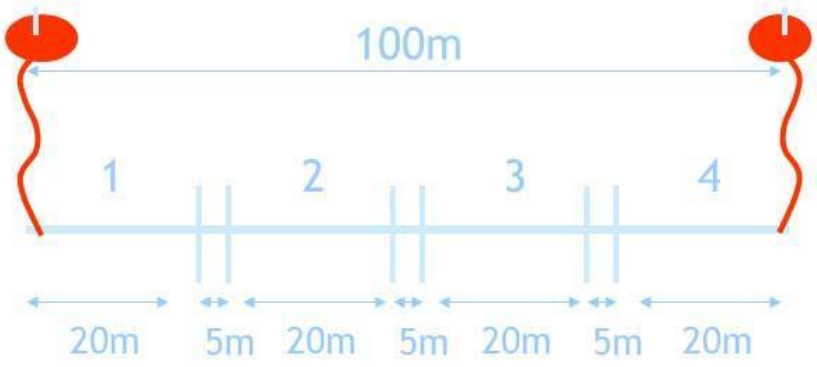


Figure 1: Diagram of a Reef Check transect line showing four replicates of 20m each.

Monitoring Sites

In 2019, Reef Check Australia volunteers visited six sites across three locations at Magnetic Island. Locations included Geoffrey Bay (Site 4 & 5), Alma Bay (Site 1 & 2) and Nelly Bay (Site 1 & 2) (Figure 2). Additional Magnetic Island Sites (Florence Bay and Middle Reef) were not surveyed in 2019. We aim to survey these in early 2020.

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

Figure 2: Location of Reef Check Australia monitoring areas around Magnetic Island surveyed in 2019.

Table 1: Summary table of RCA monitoring results for surveys conducted at Magnetic Island for the 2019 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).

Magnetic Island Reefs	Site Summary					Presence of Impacts						
	Hard Coral Coverage (%)	Soft Coral Coverage (%)	Macroalgae (#) per 80m transect	Nutrient Indicator Algae (%)	Silt (%)	Coral Population Bleaching (%)	Coral Disease (#)	Marine Debris (General) (#)	Coral Damage (#) (unknown causes)	*Drupella* Scar (#)	Crown of Thorns Scar (#)	Unknown Scar (#)
Alma Bay, Site 1	37	1	39	13	0	0	1	0	6	0	0	0
Alma Bay, Site 2	22	3	38	8	1	1	0	0	0	0	0	13
Geoffrey Bay, Site 4	71	0	42	1	1	1	4	0	16	0	0	0
Geoffrey Bay, Site 5	46	0	75	7	0	1	2	0	10	0	0	0
Nelly Bay, Site 1	8	0	138	0	0	1	2	0	2	4	0	0
Nelly Bay, Site 2	21	0	98	11	1	1	0	0	4	32	0	8
Mean (%)	34	1	72	7	0	1	2	0	6	6	0	4

Substrate patterns

- The average hard coral cover for sites surveyed in 2019 was 34%, ranging from 8-71% (Table 1, Figure 3 & 4).
- Rock (RC) accounted for 43% of cover across all sites.
- Nutrient indicator algae accounted for 7% of cover on average across all sites. There was an average of 72 counts of RCA seasonal macroalgae categories (including *Sargassum, Padina* and *Turbinaria)* Figure 3 & 4)..
- Soft coral (SC) was present at 2 of the 6 sites (Table 1), 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 2 (3%). In 2019, Sponge was also present in low quantities (0.5%) and was recorded at 1 of the 6 sites. The highest sponge cover was at Alma Bay Site 1 (3%).

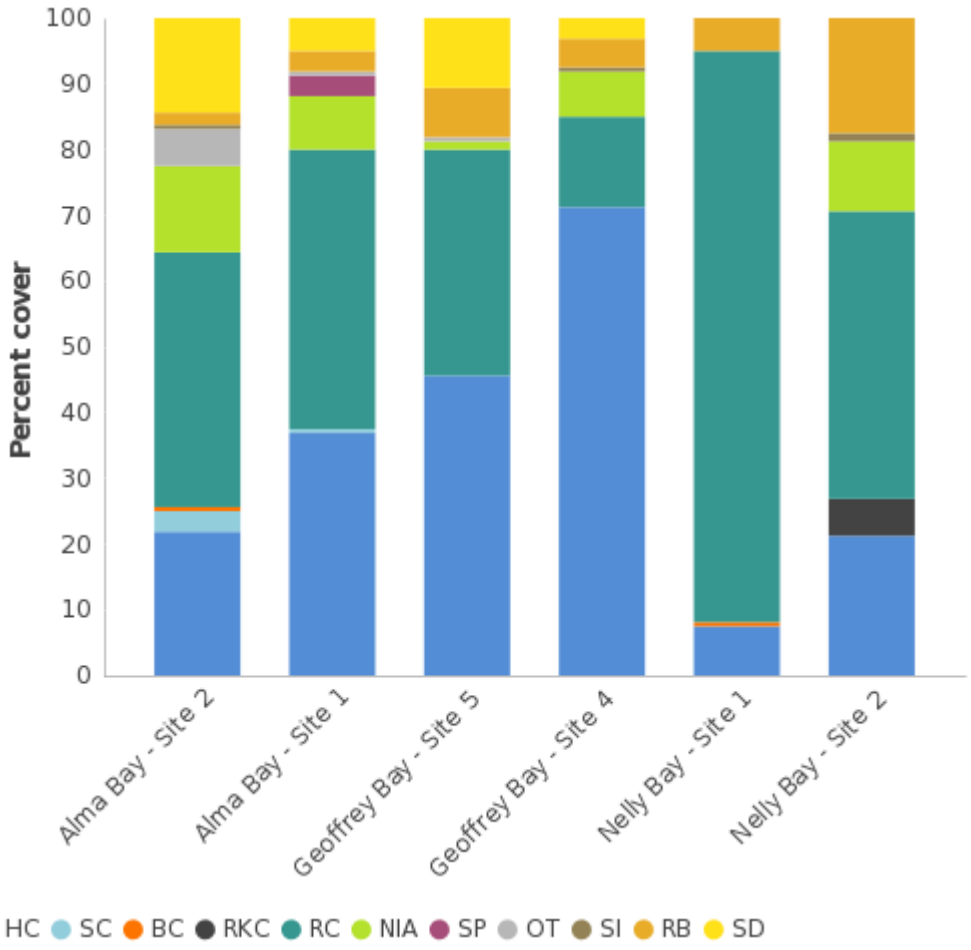
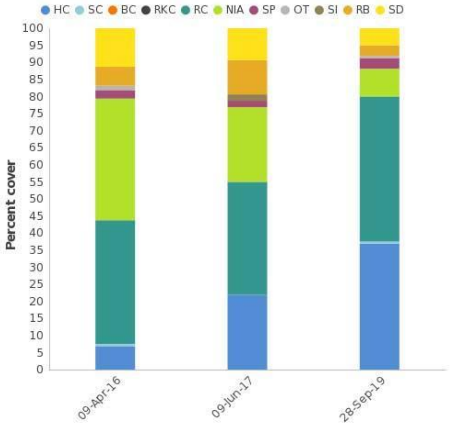
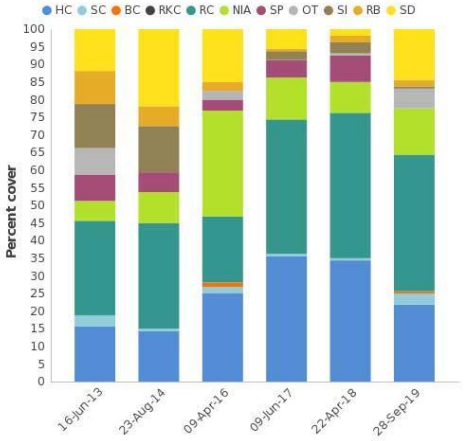


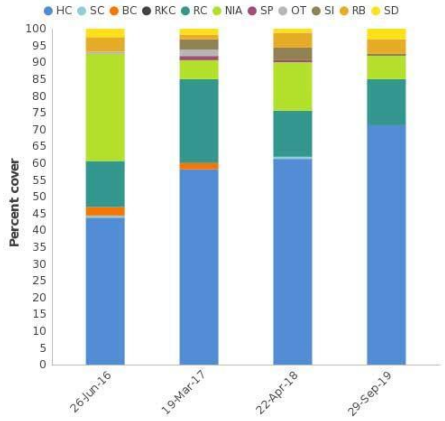
Figure 3: Substrate cover at all Magnetic Island Sites for the 2019 season. Substrates recorded include hard coral (HC), soft coral (SC), bleached coral (BC), recently killed coral (RKC), rock (RC), nutrient indicator algae (NIA), sponge (SP), other (OT), rubble



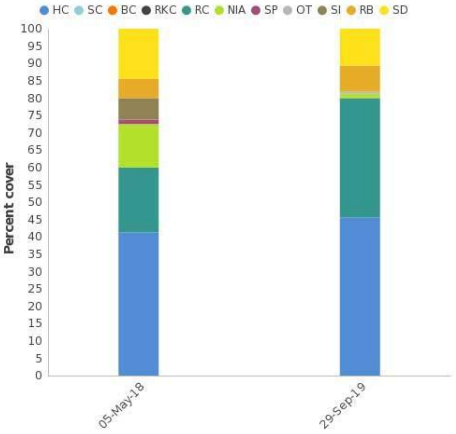
Alma Bay Site 1



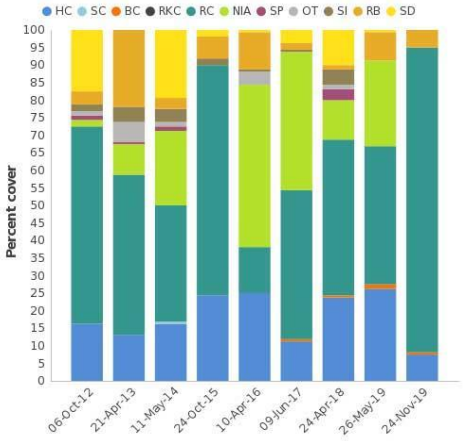
Alma Bay Site 2



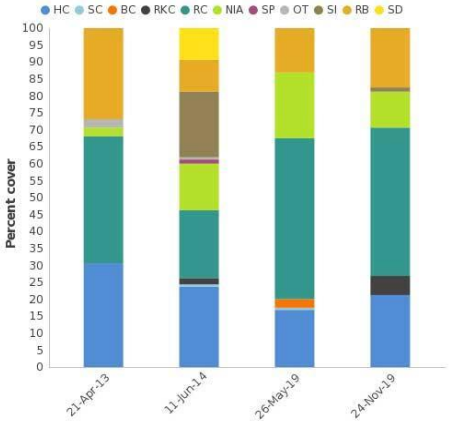
Geoffrey Bay Site 4



Geoffrey Bay Site 5



Nelly Bay Site 1



Nelly Bay Site 2

Figure 4: Percent cover of substrate composition at Magnetic Island Reef Check Australia monitoring sites between 2012 and 2019. See figure 3 for key of codes

Signs of Reef Stress

- The highest number of *Drupella* snail scars (n=32) was recorded at Nelly Bay Site 2 (with the highest number of Drupella snails recorded at Nelly Bay at Site 1 and 2 combined). Scars from unknown causes were documented at 2 sites, with the highest at Alma Bay Site 2 (n=13) and Nelly Bay Site 2 (n=8) (Figure 5).
- No marine debris was recorded at any site.
- Coral disease was recorded at 4 sites. Incidences of coral disease were recorded at Alma Bay Site 1 (n=1), Nelly Bay Site 1 (n=2) and Geoffrey Bay Site 4 & 5 (n=4 & n=2 respectively) (Figure 5).
- Coral bleaching was recorded in low levels on all sites in 2019. The lowest population impact recorded was 0.5% (Nelly Bay Site 1 and the same at Nelly Bay Site 2), and highest at Alma Bay Site 2 and Geoffrey Bay Site 5 (both 1%).
- While Geoffrey Bay Site 4 had the highest live coral cover (71%), it also had the highest incidence of impact abundance (n=16). This may be a result of the locations' popularity due to the proximity to the snorkel trail.
- 'Other coral damage' was recorded on 5 out of 6 sites. Geoffrey Bay Site 4 had the highest incidents of damage recorded (n=16).

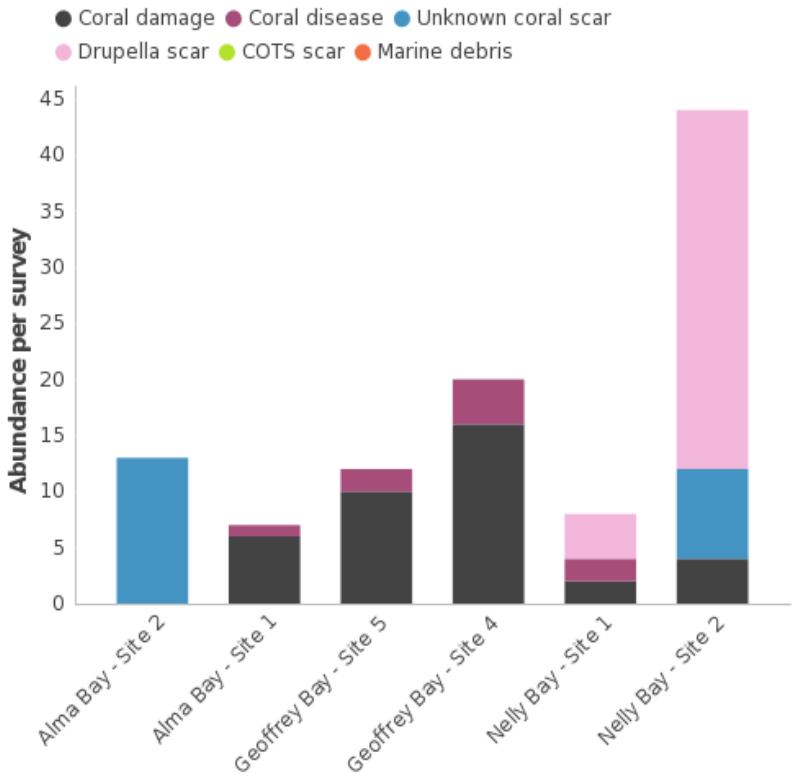


Figure 5: Abundance of recorded reef health impacts around Magnetic Island in 2019.

Indicator Invertebrates

- *Drupella* snails were recorded at 2 of the 6 sites. The highest number of snails was recorded at Geoffrey Bay Site 2 (n=32) (Figure 6).
- Giant clams were recorded at the snorkel trail site at Geoffrey Bay Site 5 (n=2) (Figure 6).
- Trochus were only recorded at Nelly Bay Site 1 (n=1).
- No Banded coral shrimp or anemone were recorded at any site.

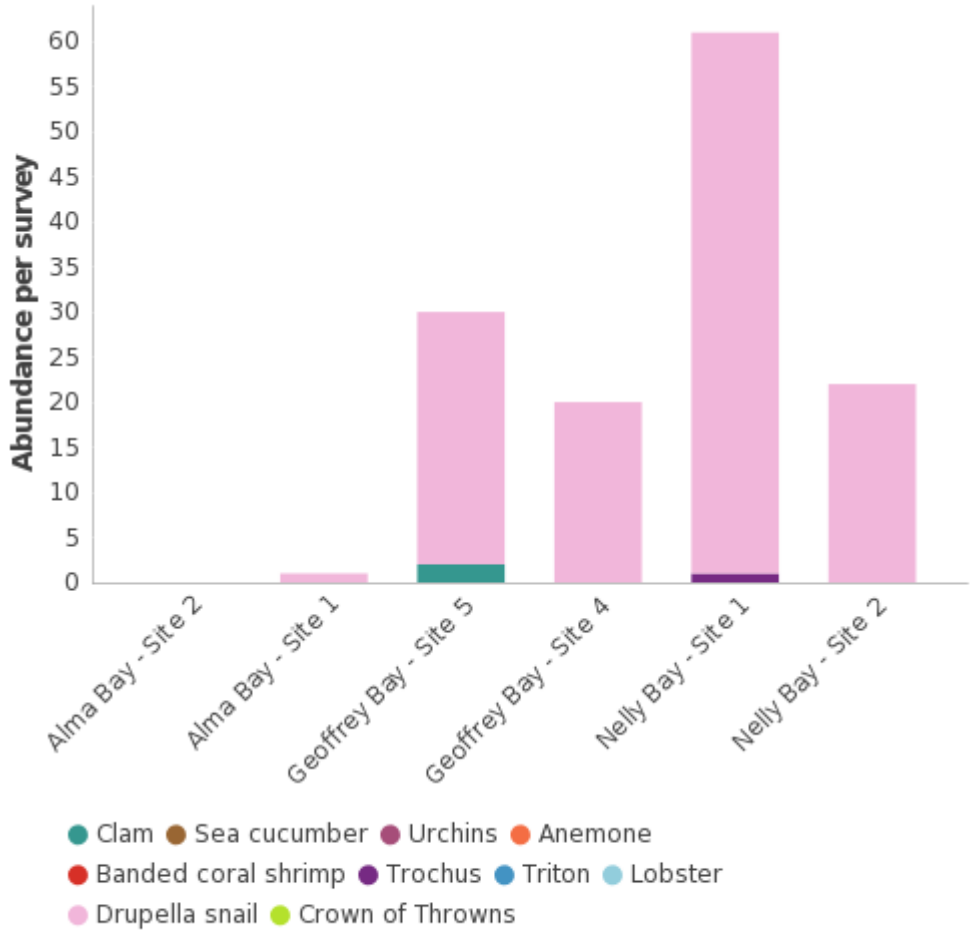
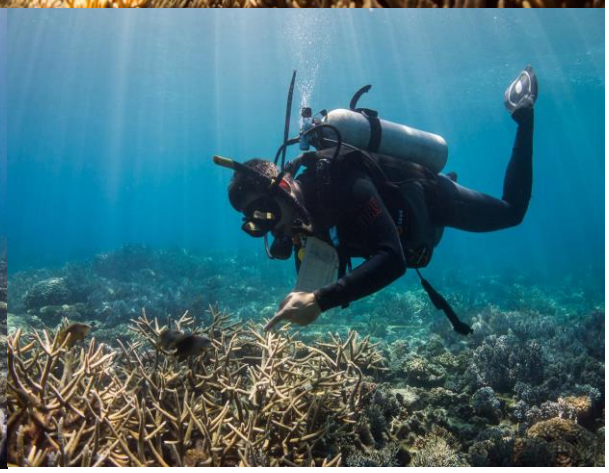


Figure 6: Abundance of recorded reef invertebrates around Magnetic Island in 2019.

Reef Check Surveyor Training

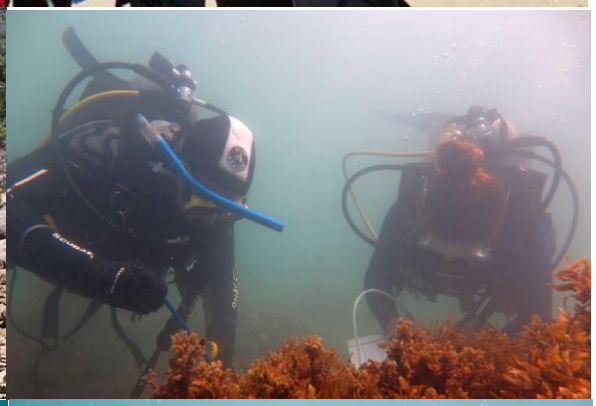
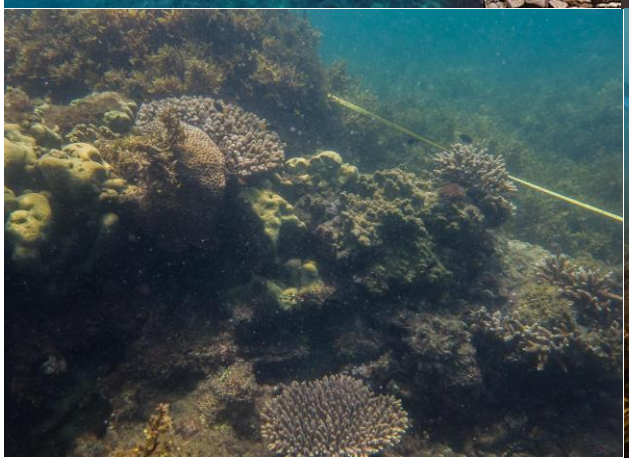
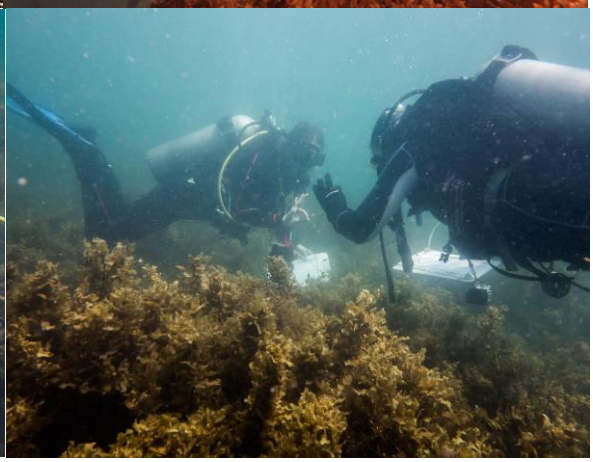
A Reef Check Australia survey training program was conducted in September 2019 in the Great Barrier Reef region. In 2019 a total of 10 new Reef Check Australia surveyors were trained to help survey the health of local reefs. Reef Check Australia surveyors are citizen scientists who have undergone extensive training on globally-standardised Reef Check monitoring, collecting valuable data about what's making up the reef (substrate), what's living on the reef (abundance of key invertebrates) and reef health (abundance of visual reef impacts).



Reef Check Ambassador Training

In September 2019 we conducted our annual Reef Check Ambassador training workshop at the Conservation Volunteers Australia boardroom at the Pallarenda Quarantine Station, Townsville. Reef Ambassadors are reef role models who actively empower their communities to better understand and help protect marine environments at a local level. The program mentors volunteers to develop their knowledge and skills in reef ecology, communications, behaviour change principles, and project planning to support positive locally relevant action for the reef. Eight new RCA ambassadors joined the ranks and participated in a number of events in Townsville throughout the second half of 2019 including Townsville City Council's National Water Week.

Reef Check Community Engagement

As part of Reef Check activities staff and trained ambassadors participated in a number of community events to raise the profile of Reef Check, share knowledge on local reef health and encourage the community to implement behavioural change activities as part of their everyday lives. 2019 saw the beginning of a partnership between Reef Check Australia and Tangaroa Blue Foundation to deliver beach and underwater clean-ups at Alma Bay and Nelly Bay locations as part of the ReefClean project. A total of 4 clean-ups at Magnetic Island have been conducted in 2019, collecting a total of 29.1kg of marine debris from local reef ecosystems. Additionally RCA partnered with AUSMAP to complete one microplastics survey at Alma Bay. AUSMAP is a nation-wide citizen science initiative, surveying Australian beaches for microplastic pollution.

Team Survey Images