

Whitsundays Public Art and Reef Restoration Project

Reef Restoration Monitoring and maintenance

Field Trip Report

Prepared by: Nathan Cook, Reef Ecologic

On 17 January 2019 Reef Ecologic undertook a maintenance and monitoring visit to the coral nurseries at Blue Pearl and Manta Ray Bay in the Whitsundays. The purpose was to check on the condition and health of both the coral nursery frames and the corals themselves.

Participants included

- Adam Smith and Nathan Cook, Reef Ecologic Staff.
- James Unsworth (Ocean Rafting) and Kailash Cook (Reef Ecologic) as volunteers.

Tasks completed include

- Quantifying survival of all coral colonies
- Assessing the condition of the coral nursery frames
- Cleaning of coral nurseries (ropes, tables, frames, attachments, floats and signs)
- Installing or repairing research signs
- Establishing repeat photopoint monitoring stations for each nursery



Figure 1: Adam monitoring the coral nursery trays at Manta Ray Bay

Replacing dead or missing coral fragments on the table nurseries.

1. Coral survival

a. Blue Pearl Bay

The coral nursery tray had 11 dead or missing coral fragments from original total of 93 representing a reduction of 11.8%. 5 colonies were identified as dead and 6 were missing. Missing fragments suggest ineffective attachment upon propagation. of the missing fragments 4 were attached using silicone and 2 waterproof putty.

The rope nursery had 11 missing fragments from a total of 132 originally propagated representing decline of 8.3%. Many of the fragments on the rope nursery were branching *porities spp* with smooth sides that may be more susceptible to ‘slipping out’ of the rope strands. This observation contrasts with Manta Ray Bay’s rope nursery where all 100 fragments remained attached and alive. (See comments below)



Figure 2: Rope nurseries (Left and centre) and coral on the coral nursery tray (right) at Blue Pearl Bay.

b. Manta Ray Bay

The coral nursery tray had 22 dead (0 missing) coral fragments from original total of 100 representing a reduction of 22%. Explanations for mortality unknown. The coral nursery frames were slightly deeper (7m). The absence of missing fragments suggests more effective techniques due to the use of only experienced staff and volunteers. Of the dead colonies 11 were from corals of opportunity and 11 were from door colonies suggested the method of collection was not a factor. All corals were sourced the Stonehaven Bay. Of the dead colonies there was no difference between those that were propagated using silicone or underwater putty.

The rope nursery had 0 missing or dead fragments from a total of 100 originally propagated. The corals were looking healthy and vibrant.



Figure 3: Rope nursery (left) and coral nursery trays (centre and right) at Manta Ray Bay

2. Coral health

Overall health of the surviving corals on the nursery tray was good. A few (approx. $n < 5$) exhibited signs of bleaching however most were showing good colouration and health. Broken branches from the propagation process had for the most part healed and new branches were evident. Coral growth edges were common on bottom of many colonies where the colony was attached to the fragments plug.

Corals on the rope nursery exhibited a variable signs of health with many *porities spp* colonies showing partial mortality from algal overgrowth. Whether this is as a result of the propagation process and their slower growth limiting their ability to heal quickly remains to be seen. Bleaching was minimal on the rope nursery.



Corals on the rope nursery in Manta Ray Bay appeared in good condition and surviving colonies on the nursery tray were also exhibiting signs of good health and recovery from the propagation process.

Figure 4: Bleaching *acropora sp* colony.

3. Interactions and observations

2 large coral trout, tuskfish, surgeonfish and parrotfish were noted around both nursery types in Blue Pearl Bay. The frames themselves exhibited signs of herbivorous grazing with teeth marks present. The slightly deeper nursery tray was home to schools of fusiliers, batfish and 'stripey' snappers.

Manta Ray Bay had fewer fish interactions overall. Inquisitive Maori wrasse visited while we were working but overall interactions were minimal



Figure 5: Inquisitive Maori wrasse at Manta Ray Bay and grazing surgeonfish at Blue Pearl Bay

4. Sediment and algae

A thick layer of sediment and algae was present on both nursery types however not significantly so. We expected algae and potentially strands of filamentous 'slime' to be growing on the frames however this was not the case. Algae was present but other than where it was compromising some individual colony growth, it did not, on the whole, appear to be compromising the health of the corals.

Algal growth was more obvious in Manta Ray Bay over Blue Pearl Bay. While Manta Ray Bay has an abundance of fish life, primarily it would seem due to the (up to) 10 tourism vessels per day feeding fish near the moorings. We made fewer observations of interactions with marine life at the nurseries in Manta Ray Bay. There were fewer feeding scars or evidence of herbivory.

Whether prevailing windy and wavy conditions (as a result of TC Owen and Penny passing nearby the region) over the summer have assisted with reducing the amount of algae remains to be seen. Overall the amount of algae (or lack thereof) was promising.



Figure 6: Sediment coats the rope at the Manta Ray Bay rope nursery (left) while algae is present on the coral fragment discs (right). Both images taken before any cleaning was completed.

5. Nursery frames condition

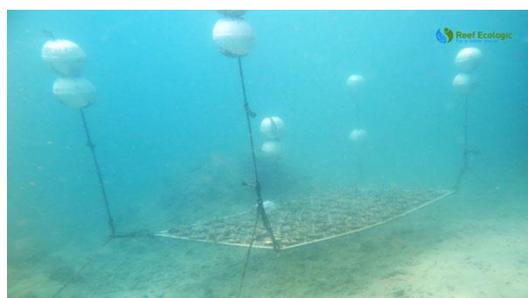


Figure 7: Coral nursery frame at Manta Ray Bay.

The overall condition of the nursery frames was good. All floats were buoyant, all ropes and anchors remained intact and sturdy. Research signage had been overgrown by algae and partially detached. These were cleaned and reattached. We are very pleased with the method.

6. Nursery maintenance

Staff and volunteers used hands, scrubbing brushes and toothbrushes to clean the coral nursery frames of sediment and algae. Ropes were shaken vigorously before volunteers would run their fingers along the rope to free attached algae. Scrubbing brushes were used to clean buoys, ropes and the aluminium frames and the research signage. Toothbrushes were used to clean around the base of colonies on coral nursery discs and where algae was growing close to the colonies on the rope nurseries.

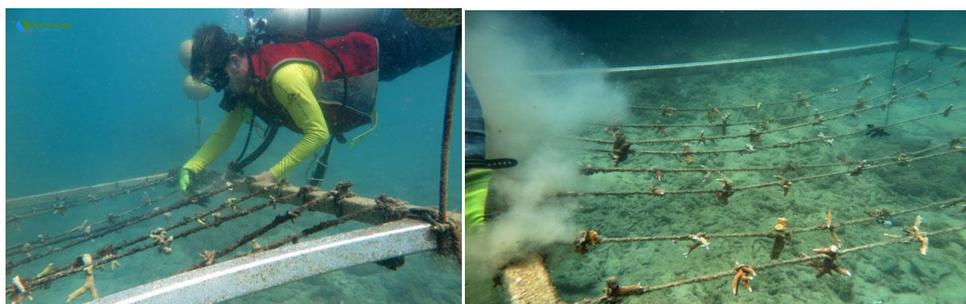


Figure 8: Volunteer cleaning algae off the rope nursery frame.

7. Re-propagation

Coral fragment discs with dead or missing coral fragments were re-propagated recycling the discs and using corals of opportunity remaining from nursery establishment (excess fragments were left on rocks nearby the nursery frames) or from branches of colonies growing on the nursery. We re-propagated a total of 9 new coral colonies at Blue Pearl Bay and 19 news colonies at Manta Ray Bay. All colonies were of the *Acropora spp* family.

8. Photo points for repeat photo monitoring.

Repeat photo points have been established for monitoring purposes. These are

The photo monitoring point is the same on **all** nursery frames in **both Blue Pearl and Manta Ray Bay**. **For the coral nursery trays** 2 photos should be taken from approximately 10cm above the frame surface (underneath the float).

For the rope nurseries photos should be taken from approximately above the float.

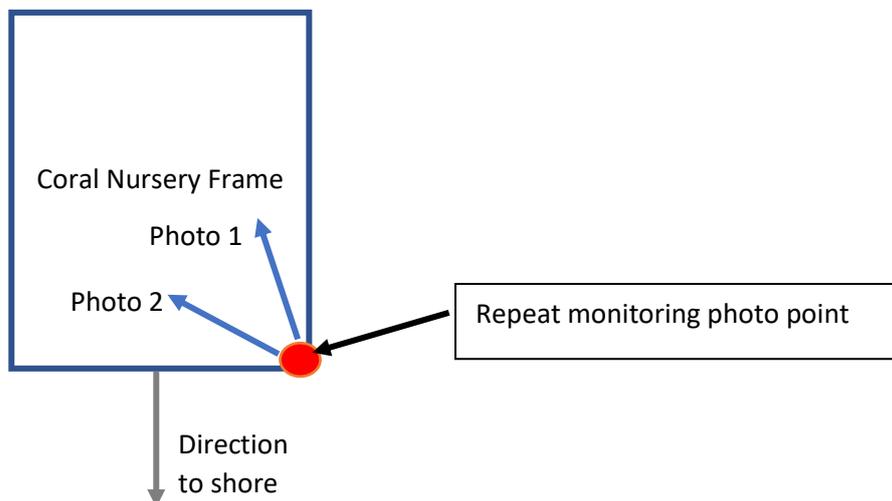


Figure 9: Photo monitoring images rope nurseries, Blue Pearl Bay, 17 Jan 2019.



Figure 11: Photo monitoring images from coral nursery trays in Blue Pearl Bay, 17 Jan 2019.



Figure 10: Photo monitoring images rope nurseries, Manta Ray Bay 17 Jan 2019.



Figure 12: Photo monitoring images coral nursery trays, Manta Ray Bay 17 Jan 2019.

9. Further information and contacts

Reef restoration has been included as a key element of Reef Ecologic’s proposal to support the tourism industry as part of the Jointly Funded Tourism Recovery Fund for the Whitsundays. For further information please contact Reef Restoration Project Lead, Marine Scientist, Nathan Cook on nathan.cook@reefecologic.org or phone. 0437 318 802