

Controlling the spread of the
CROWN OF THORNS STARFISH
(Acanthaster planci)
for Nu'utele and Nu'ulua Islands, Aleipata
Report

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1. Introduction

An outbreak of the crown of thorn starfish (*Acanthaster planci*) was observed in a number of villages after the 2009 tsunami. The Division of Environment and Conservation (DEC) of Ministry of Natural Resources and Environment (MNRE) and the Fisheries Division of the Ministry of Agriculture and Fisheries worked with the communities to collect the starfish mainly from the areas along the south and southeast coast of Upolu Island. This activity was undertaken to remove the majority of the COTs to reduce the impacts on the reef. Although the collection activity was carried out for these areas, there have been a number of reports from various communities around Upolu, Savaii and Manono Islands. The large numbers of COTs observed in their marine environment have raised concerns on the health of the corals as well as the safety of the communities swimming and fishing in the reef flats and lagoon areas.

A survey carried out by the Marine Conservation Section of DEC have documented the distribution and density of the COTs across selected villages on the islands of Upolu, Savaii and Manono (**Map 1**). Findings from the survey observed certain areas as having severe and dense COTs feeding on the corals. The sites which showed dense numbers of COTs have been given priority for the control program with the overall goal of reducing or stopping the spread of the COTs to areas with healthy coral populations.

Nuulua Island was recently surveyed and showed a diversity of corals and fish species which were in healthy and good condition with very minimal coral bleaching (**Annex 1**). This particular reef also showed high coral recruitment and with the strong current passing through would serve as a source of coral recruitment for areas that are highly degraded and impacted by the COTs and bleaching. Nuutele Island which is only approximately 800 meters away from Nuulua is heavily impacted by the COTs. The control efforts will focus on the reef flat and lagoon area (shallow waters) as well as the reef slopes (deeper water) around the eastern part of Nuutele Island to control the spread of the COTs before it impacts the reefs of Nuulua.

This report presents the control efforts over a 5 day period targeting the reefs of Nuutele and Nuulua islands.



Map 1: Distribution and density of the crown of thorn starfish (COTs)

2. Objectives

The main objective of this activity is to control the spread of the COTs along the eastern reef of Nuutele Island.

3. Methodology

3.1 Sites

The eastern reef of Nuutele Island was mainly targeted for this work (**Map 2**). However, the COTs control program was also carried out for Amaile, Samusu, Satitua and Nuulua Island. The additional sites were undertaken as the inshore reef flat on Nuutele beach (Nuutele Island) did not have COTs. The difficulty of accessing the inshore due to high swells also limit the work on the reef flats.

This control program confirmed the presence of large numbers of COTs on the eastern part of Nuutele mainly along the deeper reef slopes.

3.2 Survey team

There are two main teams which are divided to cover the reef flat/lagoon and reef slopes and deeper water. A team of 4 – 5 divers carried out the work along the slopes and the team of 4 snorkelers including the community representatives focused on the reef flats.



Map 2: Targeted areas for the COTs control program. The white circles indicate areas where the COTs were not found.

3.3 Use of Oxbile (Bile salt)

Two teams will be equipped each with the COTs gun containing approximately 1 – 2 liters of bile salt. Bile salts are derivatives of bile collected from bovines (ie. Oxbile) after they have been slaughtered (Pratchett et al., 2012). The use of bile salts have been proven to be more effective and efficient than the sodium bisulphate which requires multiple injections of the solution into the COTs before it dies. Bile salts only require one injection of the solution into the COTs before it dies.

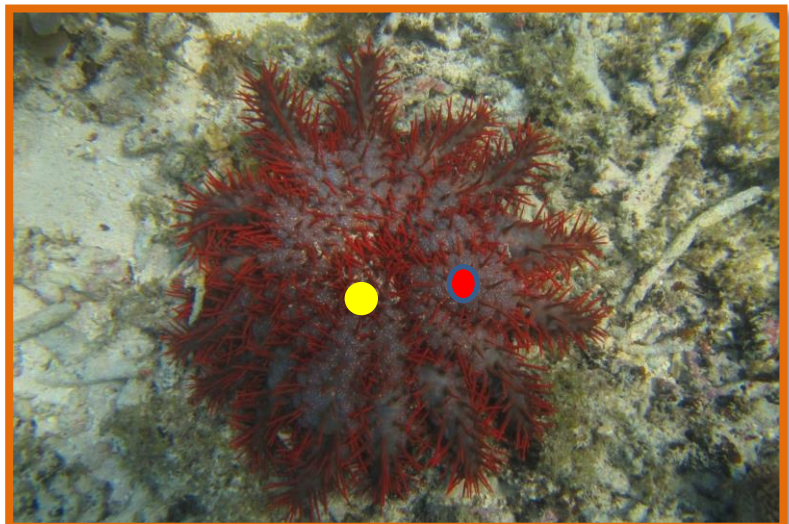


Figure 1: Red circle shows the base of the COT arm where it is injected with bile salt. Juvenile COTs are injected at the center of the body as shown in

For the adult COTs, the base of the arm is injected whereas the juveniles the center of body is injected with bile salt (**Figure 1**).

4 Results

A total of 13 hours of effort was spent controlling the COTs on Nuutele island, Satitooa, Samusu and Amaile over a 4 day period.

A total of 1,530 COTs were injected with bile salt for the 4 sites with the majority of the COTs found mainly along the reef slopes on Nuutele (**Table 1**). The reef flat and channel were done and no COTs were observed. Due to no observation of COTs on the reef flat and channel the snorkel team focused on the reef flats and lagoon areas for Amaile, Samusu and Satitooa.

4.3 Nuutele Island

The eastern side of Nuutele Island had the highest numbers of COTs and the control efforts were focused mainly along this area. Control efforts for Nuutele island were only possible over 4 days, this was mainly due to the high swells and rough sea conditions which make it difficult to carry out any work for that particular side of the island.

A total of 1,174 COTs were injected with bile salt for the eastern reef, averaging a total of 294 COTs per day. The majority of the COTs were concentrated at depths between 5 – 10 meters. Very few COTs were found at depths below 15 meters. The COTs found were mainly adults with very minimal juveniles.

The reef crest and slopes on the northern side of the island (Vini beach) were checked and no COTs were found.

4.4 Satitooa

A total of 288 COTs were injected with bile salt, averaging a total of 72 COTs per day. The reef flat and lagoon area showed minimal COTs where only 6 adults were observed. The reef crest showed a higher number of COTs with a total of 282 COTs injected with bile salt over 2 hours. The high number of COTs observed on the reef crest can be explained by the *Acropora* branching corals which were dominantly found. The *Acropora* species are highly favoured corals that COTs prefer to feed on (Wilmes, 2014; Keesing, 1990; Pratchett, 2007).

No COTs were found on the reef slopes.

4.5 Amaile

An average of 14 COTs per day was documented at Amaile. The COTs were mainly juvenile although adult COTs were also found. The COTs were mainly found on the reef flat and lagoon area.

4.6 Samusu

This site had the smallest number of COTs observed, average of 4 COTs per day. Similar to Amaile, the COTs observed at Samusu were mainly juvenile with very few adults.

Table 1: Summary of the COTs Control Effort carried out over a 5 day period

Date	Site	Latitude	Longitude	Habitat type	Zonation	Depth (m)	COTs collected
21 Apr	Nuutele	14.06155	171.41783	Coral reef	Reef slope	10 -12	90 (adults)
21 Apr	Nuutele	14.06006	171.41626	Coral reef	Reef slope	10 – 15	37 (adults)
21 Apr	Nuulua	14.07035	171.41197	Coral reef	Reef slope	18	0
22 Apr	Nuutele	14.06223	171.41954	Coral reef	Reef flat/crest	1 – 4	0
22 Apr	Nuutele	14.06223	171.41951	Coral reef	Reef slope	12	137 (adults)
22 Apr	Nuutele	14.06324	171.41617	Coral reef	Reef slope	9	44 (adults)
23 Apr	Amaile	13.99547	171.42486	Coral reef	Reef flat	1.5	54 (adults & juveniles)
23 Apr	Samusu	14.00042	171.42028	Coral reef	Reef flat	1.5	14 (adults & juveniles)
23 Apr	Satitua	14.03403	171.42302	Coral reef	Reef flat/lagoon	2	6 (adults)
23 Apr	Nuutele	14.06213	171.41763	Coral reef	Reef slope	12.5	202 (adults)
23 Apr	Nuutele	14.06218	171.41763	Coral reef	Reef slope	8	239 (adults)
24 Apr	Nuutele	14.06137	171.41783	Coral reef	Reef slope	10	207 (adults)
24 Apr	Nuutele	14.06282	171.4176	Coral reef	Reef slope	8	218 (adults)
24 Apr	Satitua	14.02892	171.42542	Coral reef	Reef crest	2	282 (adults & juveniles)
24 Apr	Satitua	14.0366	171.42311	Coral reef	Reef slope	?	0
Grand Total							1,530

5 Conclusion

The crown of thorn starfish are naturally found on our reefs and are part of our marine ecosystem. The high density of COTs observed in our marine environment has devastated the coral reefs. The use of bile salt to kill COTs especially along the reef slope and deeper waters where the adults are found will hopefully reduce and/or control the spread of COTs to healthier and intact coral reefs.

Nuulua island is an example of a health reef where there are no signs of the COTs. The control efforts on Nuutele island over the 4 days is to minimize the spread of the COTs to Nuulua.

6 Recommendation

- To continue to carry out the control program for priority sites that have been identified as highly dense COT areas
- To continue to monitor and document the COT populations
- To investigate linkages between terrestrial run-off and the COT outbreaks
- To conduct long term monitoring programs for priority reef sites to monitor and document the recovery of the reefs from the COTs outbreak

7 Acknowledgement

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8 References

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ANNEX 1: Photos of the healthy coral reefs at Nuulua Island.

