

Report on the distribution of the introduced seaweeds (*Codium arenicola* and *Spatoglossum macrodontum*) and the distribution and density of the crown of thorns starfish (*Acanthaster planci*)



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1. Introduction

An initial survey of the marine environment carried out in 2008 by Dr. Posa Skelton and the Marine Conservation Section of the Division of Environment and Conservation, assessed selected sites for the presence of introduced species and the potential impacts on the marine environment. Surveys were conducted around the Apia harbour, Mulinu'u and the Palolo Deep Marine Reserve- a total of eleven (11) sites. Findings from this initial assessment confirmed the presence of introduced species that were potentially invasive. This included two introduced seaweeds, *Codium arenicola* and *Spatoglossum macroduntum* that were observed distributed and well established across these sites.

An outbreak of the crown of thorns starfish (*Acanthaster planci*) was observed in a number of villages after the 2009 tsunami. The Fisheries Division of the Ministry of Agriculture and Fisheries and the MNRE worked with the communities to collect the starfish mainly from the areas along the southern and south-eastern coast of Upolu Island. This activity was an effort to help with the recovery of coral reefs from the impacts of the tsunami. However, there were a number of reports from various villages on both Upolu, Savai'i and Manono Islands reporting large numbers of crown of thorns starfish (COT) in their marine environment and concerns that the increase in the number of COTs were impacting the health of the corals. The Marine Conservation Section continued to work with communities to remove COTs from the eleven (11) villages in 2013. However, these efforts focused mainly in the shallow and lagoon areas where the team snorkelled and manually collected both adult and juvenile COTs. Collection efforts should also be focused along the slopes of the deeper areas. In order to prioritize efforts of controlling the COTs, an understanding of their distribution and densities needs to be conducted for the islands. Although, previous work focused around the south and south-eastern coast of Upolu, there needs to be further information or baseline data on the distribution across the islands.

2. Objectives

The main objectives of this survey are to:

- Identify the distribution and impacts of the introduced seaweeds
- Determine the distribution and density of COTs
- Map the distribution of the two seaweeds

3. Methodology

There will be two teams conducting the activities as proposed in the plan. Each team consists of 2 individuals. Both teams conducted the COT count while simultaneously monitoring the presence of the two introduced seaweeds.

3.1 Belt Line Transect Method (BLT method)

The BLT method was used by both teams. Firstly one member of each team measures a 50 meter line parallel to the shore/coast with a measuring tape. Then starting from the same side of the line, both members in each team snorkels towards the 50 meter mark while counting the COT and observing for the two introduced seaweed species. The two swimmers kept a constant two meter distance on either side of the line (indicated by the measuring tape) until they reached the end of the 50 meters (**refer to figure 1.**)

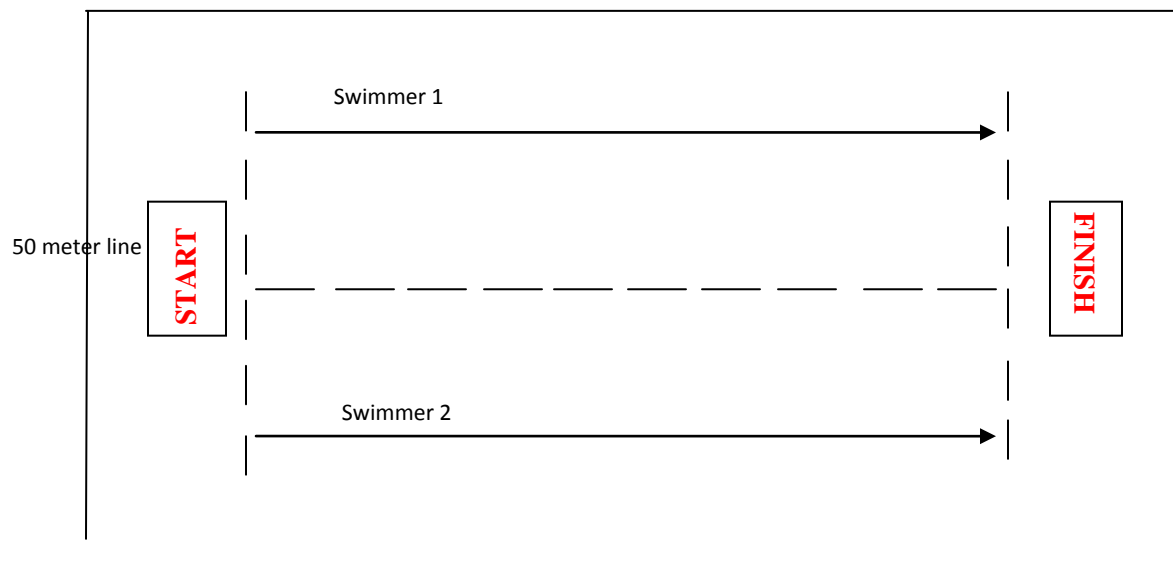


Figure 1: Example of the Belt Line Transect (BLT) model used by both teams

4. Results

4.1 Day 1:

Poutasi

A total area of 2,000m² was surveyed for Poutasi village. There was no presence of the introduced seaweed species and only 1 crown of thorns starfish was observed. Furthermore slow coral recruitment was observed.

Vaovai

A total area of 2,800m² was surveyed for Vaovai village. There was no presence of the introduced seaweed species and a total count of 11 crown of thorns starfish was observed. In addition good coral coverage and a high number of indicator fish species such as parrot fish and mullet was observed.

Matautu

A total area of 2,000m² was surveyed for Matautu village. There was no presence of the introduced seaweed species and a total count of 2 crown of thorns starfish was observed in the area surveyed. Fair live coral coverage was also observed in the area.

Tafatafa

A total area of 2,000m² was surveyed for Tafatafa village. There was no presence of the introduced seaweed species and a total count of 10 crown of thorns starfish was observed. Good live coral coverage was also observed in the area.

4.2 Day 2:

Matavai

A total area of 2400m² was surveyed for Matavai village. There was no evidence of the introduced seaweed species and a total count of 30 crown of thorns starfish was observed. Good live coral coverage was also observed within the marine area.

Utulaelae

A total area of 1,200m² was surveyed for Utulaelae village. Samples of the introduced seaweed species (*Spatoglossum macrodontum*) were collected and a total count of 9 crown of thorns starfish was observed. Other observations identified good coral coverage and an abundance of marine invertebrates such as green fish.

Lotofaga

A total area of 2,000m² was surveyed for Lotofaga village. Samples of the introduced seaweed species (*Spatoglossum macrodontum*) were collected and total count of 42 crown of thorns starfish was observed. There was good live coral coverage but also large areas with coral rubble and dead coral.

Vavau

A total area of 1,200m² was surveyed for Vavau village. Samples of the introduced seaweed species (*Spatoglossum macrodontum*) were collected and there was no presence of the crown of thorns starfish in the survey area. Other observation identified portions of the marine area were mainly coral rubble.

Lalomanu

A total area of 2,000m² was surveyed for Lalomanu village. There was no presence of the introduced seaweed species and also no presence of the crown of thorns starfish in the survey area. Other observations show the slow coral recovery and recruitment with an estimated 95% of the area of coral rubble. A high population of sea urchins was also observed.

4.3 Day 3:

Samusu

A total area of 1,200m² was surveyed for Samusu village. There was no presence of the introduced seaweed species and a total count of 1 crown of thorns starfish was observed in the surveyed area. Abundance in marine invertebrates such as the lolli fish was observed.

Amaile

A total area of 1,200m² was surveyed for Amaile village. There was no presence of the introduced seaweed species and a total count of 5 crown of thorns starfish was observed. An improvement of coral recruitment and an increase in live coral coverage as compared to data/surveys collect from the previous year (2013) was observed.

Musumusu

A total area of 1,600m² was surveyed for Musumusu village. No presence of the introduced seaweed species and the crown of thorns starfish was observed in the surveyed area. Other observations include fair cover of seagrass bed

Samamea

A total area of 2,000m² was surveyed for Samamea village. No presence of the introduced seaweed species was observed and there was also no presence of the crown of thorns starfish in the marine area. Other observations include the area dominated by the seaweed species *Sargasm* and coral rubble. Two reef sharks were also observed within the area which is a good indicator for the health of the reefs.

Saoluafata

A total area of 2,000m² was surveyed for Saoluafata village. No presence of the introduced seaweed species was observed with a total count of 1 juvenile crown of thorns starfish. Additional observations include an estimated 80% coverage of coral rubble and dead coral and an excellent sea-grass bed .

4.4 Day 4:

Falefa

A total area of 2,000m² was surveyed for Falefa village. No presence of the introduced seaweed species or crown of thorns starfish was observed. Other observations include an estimated 90% of the area to be coral rubble and dead coral with excellent sea-grass bed.

Table 1: Total count of COT and the presence of the introduced seaweed

<u>Village</u>	<u>Crown of thorns count (COT)</u>	<u>Presence of introduced seaweed</u>
1. Poutasi	1	No
2. Vaovai	11	No
3. Matautu	2	No
4. Tafatafa	10	No
5. Matavai	30	No
6. Utulaelae	9	Yes
7. Lotofaga	42	Yes
8. Vavau	0	Yes
9. Lalomanu	0	No
10.Samusu	1	No
11.Amaile	5	No
12.Musumusu	0	No
13.Samamea	0	No

14.Saoluafata	1	No
15.Falefa	0	No

5. Conclusion

This survey shows the presence of higher numbers of COTs mainly in areas with good live coral coverage. All of the sites surveyed were within the reef and most of them did not have good coverage of live corals for COTs to feed on.

Of the three of the 15 surveyed villages only 3 were confirmed to have one of the introduced seaweeds, the *Spatoglossum macrodontum* sp. These villages are all adjacent to each other which indicate the seaweed may be spreading in the southern eastern coast.

6. Recommendation

- To continue monitoring sites with the high presence of COTs
- To continue to assess other sites for the presence of the two seaweeds
- To continue surveys to determine the density of the COTS in other areas around the islands
- To include survey areas outside of the reef
- To initiate a coral rehabilitation programme for areas with low\slow live coral recovery\coverage