



# CORAL TRIANGLE INITIATIVE

ON CORAL REEFS, FISHERIES AND FOOD SECURITY



## WIYALOKI, NATAULE & PANABALA CMMA MARINE RESOURCE MONITORING PROGRAM SURVEY REPORT #: 2

MONITORING PERIOD: FEBRUARY 2013



**June 2013**

This publication was prepared for Papua New Guinea's National Coordinating Committee and the Wiyaloki, Nataule & Panabala Community Managed Marine Area with funding from the United States Agency for International Development's Coral Triangle Support Partnership (CTSP).



**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE



# **Wiyaloki, Nataule & Panabala CMMA Marine Resource Monitoring Program Survey Report #: 2 Monitoring Period: February 2013**

**AUTHOR:** Noel Wangunu

**USAID PROJECT NUMBER:** GCP LWA Award # LAG-A-00-99-00048-00

**CITATION:** Wangunu, N., ed. *Wiyaloki, Nataule & Panabala CMMA Marine Resource Monitoring Program, Survey Report #: 2, Monitoring Period: February 2013*. Honolulu, HI: The USAID Coral Triangle Support Partnership, 2013. Print.

**PRINTED IN:** Honolulu, Hawaii, USA, July 2013

This is a publication of the Coral Triangle Initiative on Corals, Fisheries and Food Security (CTI-CFF). Funding for the preparation of this document was provided by the USAID-funded Coral Triangle Support Partnership (CTSP). CTSP is a consortium led by the World Wildlife Fund, The Nature Conservancy, and Conservation International with funding support from the United States Agency for International Development's Regional Asia Program.

For more information on the Coral Triangle Initiative, please contact:

Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security Interim-Regional Secretariat  
Ministry of Marine Affairs and Fisheries of the Republic of Indonesia  
Mina Bahari Building II, 17th Floor  
Jalan Medan Merdeka Timur No. 16  
Jakarta Pusat 10110, Indonesia  
[www.coraltriangleinitiative.org](http://www.coraltriangleinitiative.org)

CTI-CFF National Coordinating Committee

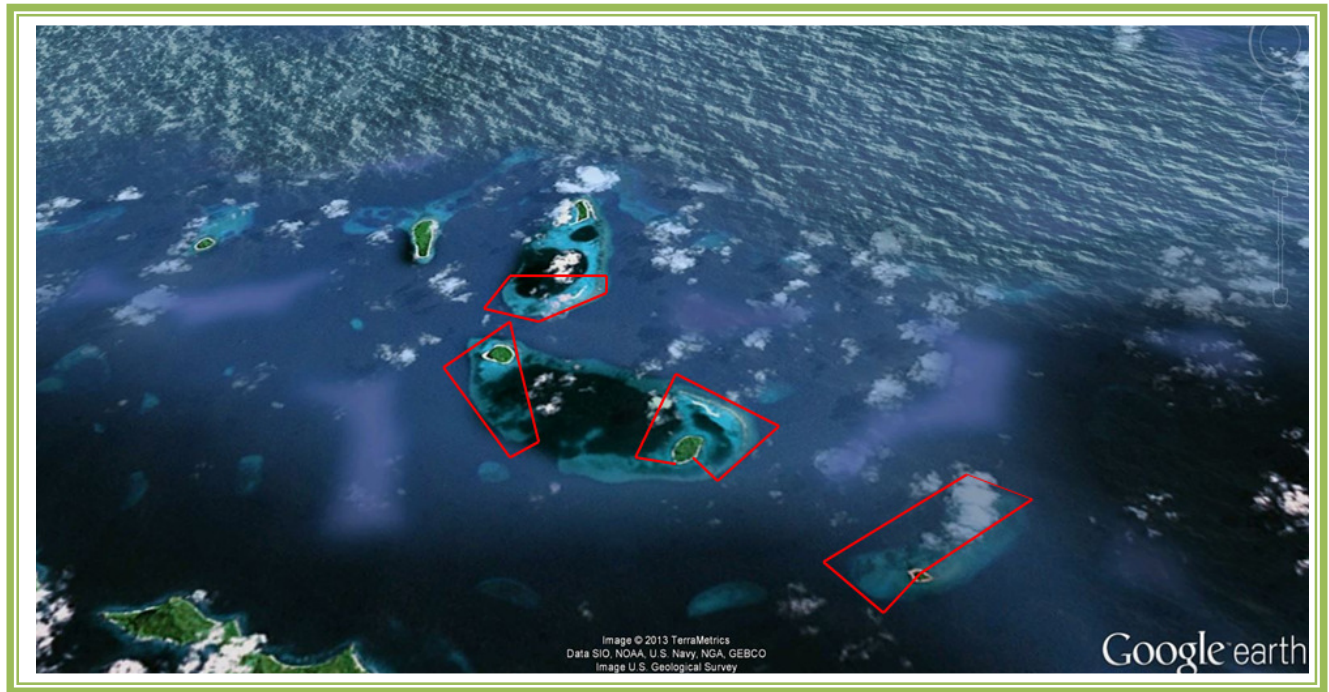
Ms. Kay Kalim  
Deputy Secretary  
Sustainable Environment Programs Wing  
Department of Environment and Conservation  
1st Floor, Bemobile Building  
National Capital District, Port Moresby, Papua New Guinea

© 2013 Coral Triangle Support Partnership. All rights reserved. Reproduction and dissemination of material in this report for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders.

**DISCLAIMER:** This document is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the Coral Triangle Support Partnership (CTSP) and do not necessarily reflect the views of USAID or the United States Government.

**WIYALOKI, NATAULE & PANABALA CMMA MARINE  
RESOURCE MONITORING PROGRAM**

**SURVEY REPORT #: 2  
MONITORING PERIOD: February 2013**



**MONITORING REPORT PREPARED FOR WIYALOKI,  
NATAULE & PANABALA COMMUNITY MANAGED MARINE  
AREA (CMMA)**

## CHAIRMAN'S WELCOME

---



On behalf of the management committee for Wiyaloki, Nataule and Panabala Community Managed Marine Area I warmly welcome you to this second monitoring report. This report will show you the distribution and abundance of your marine resources, and will tell you about the health of your marine environment.

Following the success of the first monitoring program, we are now able to do this second monitoring with less supervision and support from Conservation International. Our data collectors have been inspired by what they saw and learnt and are now taking the lead in organizing and participating in survey assessments. This monitoring program will grow strong as we continue into the year and I believe that soon our neighboring island communities will become part of this program so that our no-take management areas can be extended to include other neighboring communities.

For me personally I have come to understand that in order to be a good manager or custodian of my resources, I have to know what I have so I can plan on how to best utilize what I have. This important element of knowing what I have is being bridged by this community based monitoring program and I am fully supportive of this program and I sincerely thank the office of Conservation International for this opportunity.

I would like to encourage youths from the larger islands (Skelton, Kwaraiwa, Tubetube and Tewatewa) to join this initiative and learn from what has been thought because the leaders of tomorrow in resource management and wise use of our sea today will be in your hands. Getting to understand the importance of best management practices today will shape you to be a good custodian in the near future.

## ABOUT THIS REPORT

---

This is the second monitoring report written for Wiyaloki, Nataule, and Panabala community managed marine area (CMMA). Field data gathered was collected in February 2013 and the data gathered has been analyzed using the procedures and methods described in the last monitoring report and in the analysis section of this report. All monitoring data has been analyzed by Joel Araea of Nuakata, Iabam-Pahilele CMMA as the locals from Wiyaloki are yet to be trained to handle this responsibility.



*Panabala Rocky Outcrop. An area now managed as no-take in the Engineer Group of Islands.*

## 1. INTRODUCTION

This is the second monitoring report that follows the successful completion of the second community based monitoring program for Wiyaloki, Nataule and Panabala Community Based Marine Area. This monitoring program has been conducted with limited supervision from Conservation International. Field coordination and supervision was done by two locally trained members of Nuakata, labam and Pahilele CMMA. Conservation International only provided financial and logistical support.

## 2. METHODS

### 2.1. Field Data Collection

All field sampling techniques used were similar to those described in the first monitoring report. These methods have also been described by English et al. (1997). In this monitoring we assess the percentage of coral cover for sites inside and outside no-take, the population of target fish groups (i.e. herbivore, carnivore and endangered species or IUCN/aesthetic fishes), population of sea cucumber, giant clam and other marine invertebrates (lobster, trochus and crown-of-thorn starfish).

Data for benthic substrates like covers live corals, dead, abiotic substrates and algae and other marine plants have been given codes and data were collected according to these codes (Table I).

**Table I.** Substrate morphology

<b>BC</b>	<b>Branching Coral</b>	<b>SMC</b>	<b>Submassive Coral</b>	<b>RK</b>	<b>Rock substratum</b>
<b>TC</b>	Table Coral	<b>DC</b>	Digitate Coral	<b>DCR</b>	Dead Coral Rubble
<b>MC</b>	Massive Coral	<b>SC</b>	Soft Coral	<b>SG</b>	Seagrass
<b>FC</b>	Foliose Coral	<b>SP</b>	Sponge	<b>S</b>	Sand
<b>EC</b>	Encrusting coral	<b>MA</b>	Macroalgae	<b>OT</b>	Other
<b>DDT</b>	Dead Corals				

As described in the first report and the monitoring reports for Nuakata, labam and Pahilele CMMA, the benthic substrate has been assessed along a 100 meter long transect at 0.5m interval. Any substrate that lies beneath the 0.5m is identified and recorded on waterproof datasheets.

Assessment of reef fishes were restricted to the following fish species (Table 2). These fishes have been selected and grouped according to the ecological functions on reefs. Names of these fishes have also been translated into the local vernacular for the locally trained monitors to easily identify and record.

**Table 2.** List of target monitoring fishes used by members of Wiyaloki, Nataule and Panabala CMMA

Code	Wiyaloki vernacular	Common English Name
1	Koyali	Blueline surgeonfish
2	Kobala	Striated surgeonfish
3	Ulikwalakwalaoto	Orangespine unicornfish
4	Kosa	Bullethead parrotfish
5	Kosa Kalalalawa	Yellowbarred parrotfish
6	Tamwatomwalali	Barred rabbitfish
7	Idali	Silver spinefoot (rabbitfish)
8	Mami	Humphead Maori wrasse
9	Katumweta	Coral trout
10	Bwae	Blackspot snapper
11	Mwakalalalina	Bluespotted hind
12	Kekwalui	Black tipped grouper
13	Ulibalila	Big-eye bream
14	Belawa	Sabre squirrelfish
15	Kuwetom	Moray eel

The marine invertebrates we are studying include sea cucumber, clam shells, trochus, lobster and crown-of-thorn starfish. Other invertebrates that we saw inside or outside our study areas were not recorded however, were used in our general report discussions.

The monitoring stations inside and outside no-takes are a representative samples only. The data they provide in terms of abundance for our monitoring species tells us how much biological diversity there is in that area and how healthy our reefs are for the no-take and outside no-take areas. The list of these representative monitoring stations are provided in Table 3a and 3b.

**Table 3a**  
Monitoring stations inside no-take management area

Designee	Reef Name	Location
NT. 01	Koyogena	Panabala Island
NT. 02	Yadiyadina	Panabala Island
NT. 03	Poupoununa	Wiyaloki Island
NT. 04	Wiyaloki G	Wiyaloki Island
NT. 05	Easana-n	Wiyaloki Island
NT. 06	Sakimalabwana	Nataule Island
NT. 07	Nataule East	Nataule Island
NT. 08	Nataule SW	Nataule Island

**Table 3b**

Monitoring station outside no-take area

Designee	Reef Name	Location
OT. 01	Split Rock	Panabala Island
OT. 02	Kasatavala	Wiyaloki Island
OT. 03	Matamtaval	Wiyaloki Island
OT. 04	Bwasomokaba	Wiyaloki Island
OT. 05	Kamwatali	Nataule Island
OT. 06	Daikon	Nataule Island
OT. 07		Nataule Island
OT. 08		Nataule Island

## 2.2. Data analysis

All monitoring and data analysis protocols used were the same as those used in the first monitoring program. Field data were gathered by locals from Wiyaloki CMMA with supervision from two representative from NIPCMMA. Mr. Joel Araea and Mr. Jameson Solipo supervised and guided the local monitors to effectively carry out the survey and Mr. Araea did all data analysis report draft under the supervision from Conservation International.

**Table 4.** List of the target monitoring fishes grouped into their common groups (Herbivore/carnivore/IUCN) fish groups

Herbivore Fishes	Local vernacular
Blueline surgeonfish	Koyali
Striated surgeonfish	Kobala
Orangespine surgeonfish	Ulikwalakwalaoto
Bullethead parrotfish	Kosa
Yellowbarred parrotfish	Kosa Kalalalawa
Barred rabbitfish	Tamwatamwalali
Silverspine foot (rabbitfish)	Idali

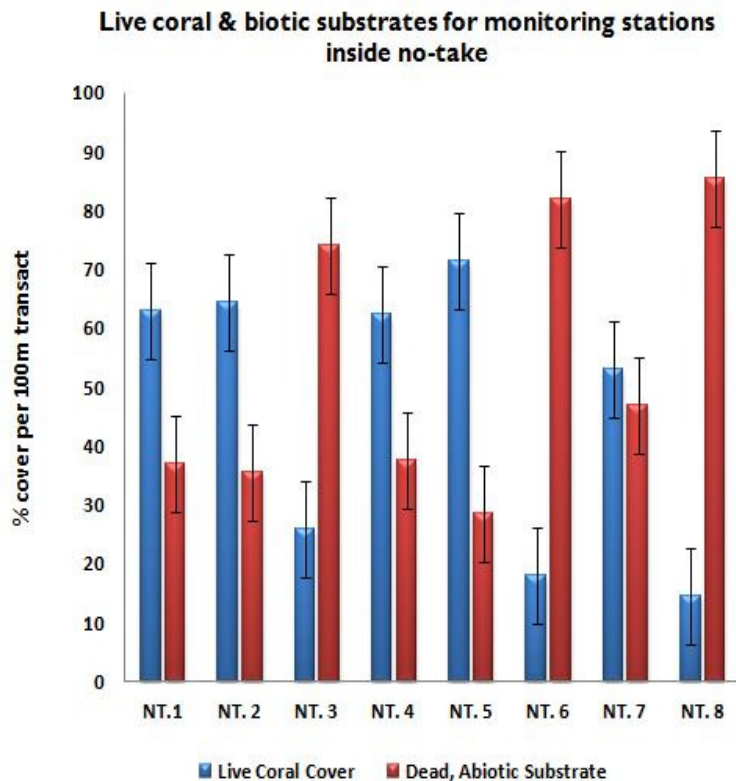
Carnivore Fishes	Local vernacular
Coral trout	Katumweta
Blackspot snapper	Bwae
Bluespotted hind	Mwakalalalina
Black tipped grouper	Kekwalui
Black-eye bream	Ulibalila
Sabre squirrelfish	Belawa

IUCN/aesthetic Fish	Local vernacular
Humphead Maori wrasse	Mami
Moray eel	Kuwetom



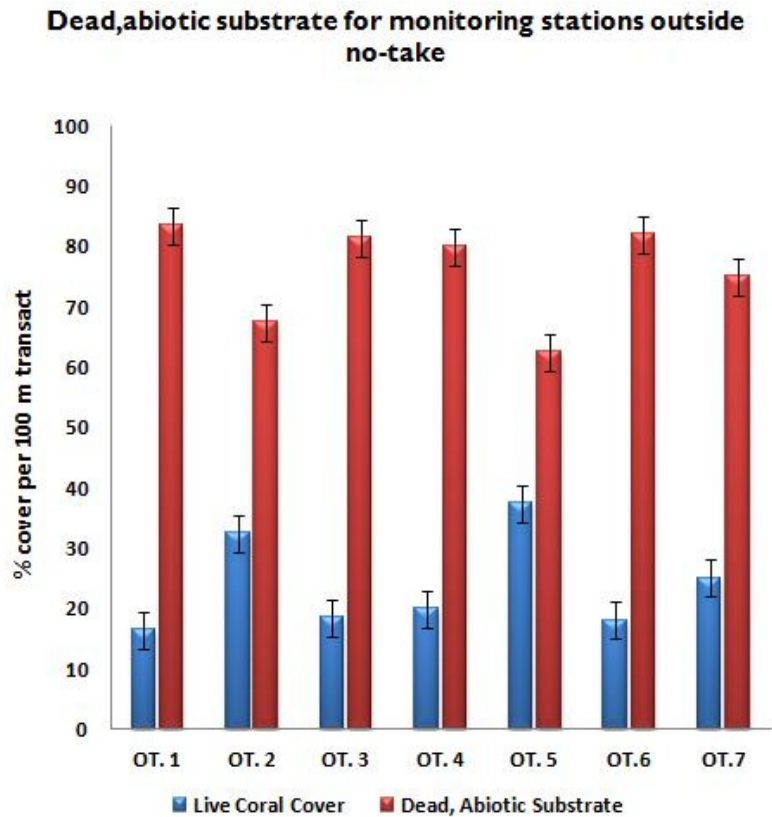
### 3. RESULTS

#### 3.1.1 Benthic substrate for reefs inside no-take



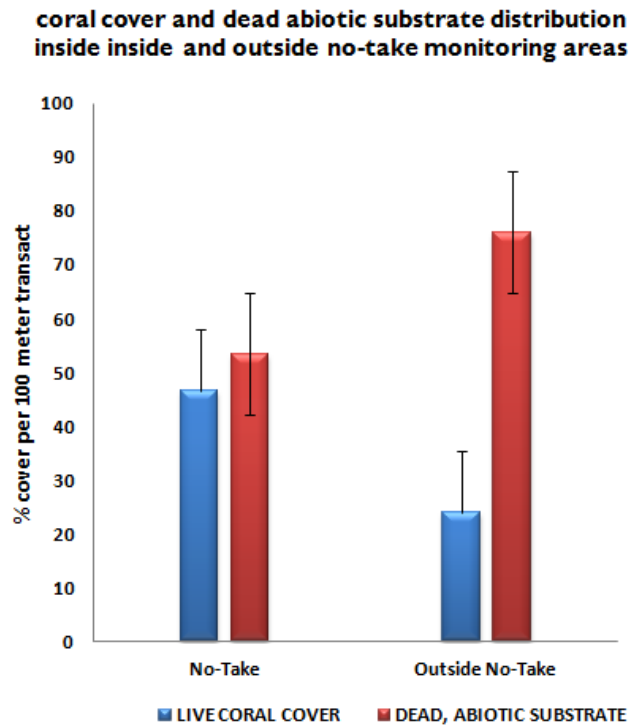
Live coral cover average for no-take was 46.6% while dead and abiotic substrates was 53.4% for this monitoring period. Records for reefs inside no-take areas showed that Easana-n (NT.5) had the highest coral cover with calculated percentage of 71.5%. Second to this was Yadiyadidina (NT.2) with 64.5% and Koyogena (NT.1) with the third high coral cover (63%). Other reefs that recorded over 50% coral cover include Wiyaloki G (NT.4) with 62.5% and Nataule East (NT.7) with a coral cover of 53%. Data from individual substrate type showed that Branched Corals (BC) recorded more domination over other coral morphologies and recorded a cover of 50% cover at Wiyaloki (NT.4) and 41% at Yadiyadidina (NT.2).

### 3.1.2. Benthic substrates for reefs outside no-take areas

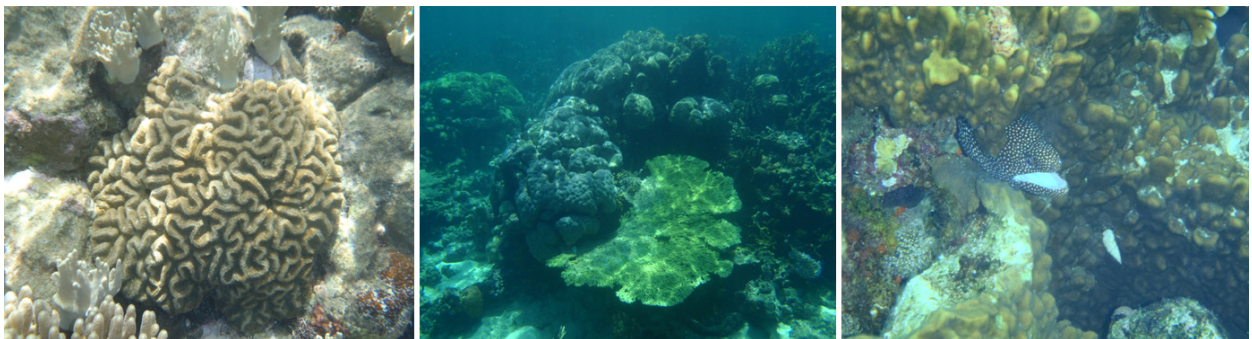


Sampling of 7 monitoring stations representing reefs not inside no-take clearly showed very low coral cover. These reef areas were dominated by dead coral rubble and other abiotic materials. Average for all sampling areas clearly illustrate a low percentage cover of 24% and 76% dead, abiotic materials. The sampling station at Split Rock (OT.1) recorded the lowest cover (16.5%) and very high abiotic cover (83.5%). Many reefs in these open access areas showed high distribution of digitate corals (DC) which Kasatavala (OT.2) recorded 14% within its 200m sampling points and sparse distribution of branched corals (BC) recording 12.5% at Bwasomokaba (OT.4).

### 3.1.3. Benthic substrates for monitoring stations inside and outside no-take combined

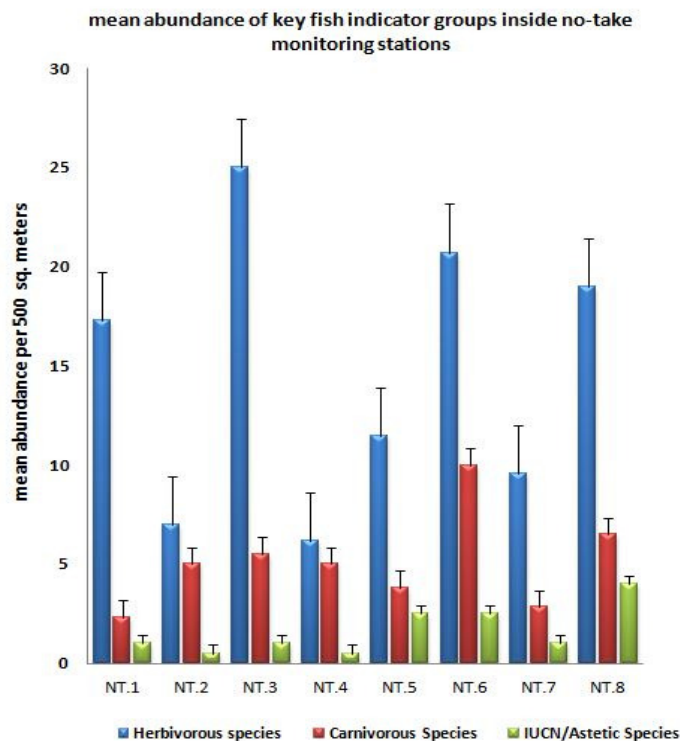


In this graph we can clearly see that there is a near equal distribution of live corals (46.6%) and abiotic substrates 53.4% for reefs inside no-take. Reefs outside no-take shows big difference in the amount of coral cover and dead, abiotic substrates. Data gathered for these open access reefs indicate a low, 23% coral cover while dead, abiotic substrates recorded 76%. Off all abiotic materials distributed on each reef areas, dead coral rubble (DCR) was recorded to having the highest distribution in all 7 sampling stations.



## 3.2 REEF FISH INDICATORS INSIDE & OUTSIDE NO-TAKE AREAS

### 3.2.1. Target Reef Fish indicators inside no-take

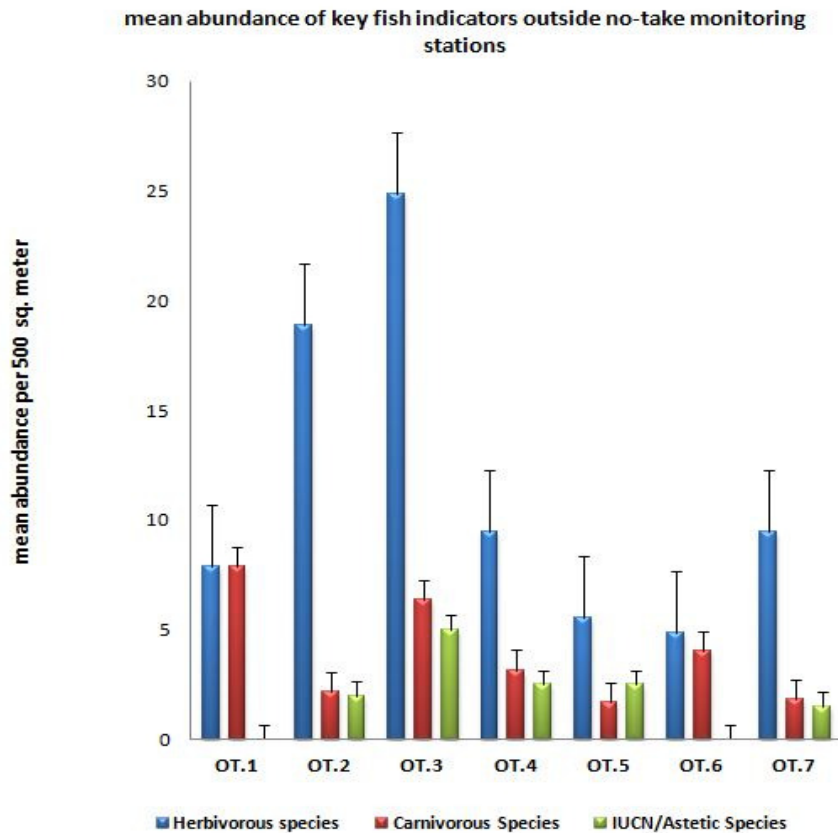


The herbivore fish group (or plant eaters) dominated all 8 monitoring stations inside no-take areas with an average population of 14.5 herbivore/500m<sup>2</sup>. Individual site specific averages defined Poupoununa (NT.3) to have a high average of 25 herbivore/500m<sup>2</sup>. Other sites with high averages were Sakimalabwana (NT.6) with an average of 20 herbivore/500m<sup>2</sup>; followed by Nataule SW with an average of 19 herbivore/500m<sup>2</sup> and Koyogena (NT.1) recording an average value of 17.3 herbivore/500m<sup>2</sup>. Other monitoring stations also had records for this fish group but were lower than these 4 mentioned sampling areas.

The carnivore fishes were represented by our target monitoring species in all the 8 monitoring stations inside no-take areas. The average count of 5.1 carnivore herbivore/500m<sup>2</sup> for 8 sites is considered low. This low average is a result of low averages generated from areas such as 10 carnivore/500m<sup>2</sup> recorded from Sakimalabwana (NT.6) while other 7 monitoring stations had averages that were lower than 6.5 carnivore/500m<sup>2</sup> that was recorded in Nataule SW (NT.8).

Population numbers for the endangered Maori Wrasse and other IUCN/aesthetic species were generally low for the 8 stations inside no-take. On average, this fish group recorded 1.6 species/500m<sup>2</sup>. The monitoring station at Nataule SW point recorded an individual record of 4 species/500m<sup>2</sup> while all sites had averages that were lower than 2.5 species/500m<sup>2</sup>.

### 3.2.2 Target reef fish monitoring indicators outside no-take

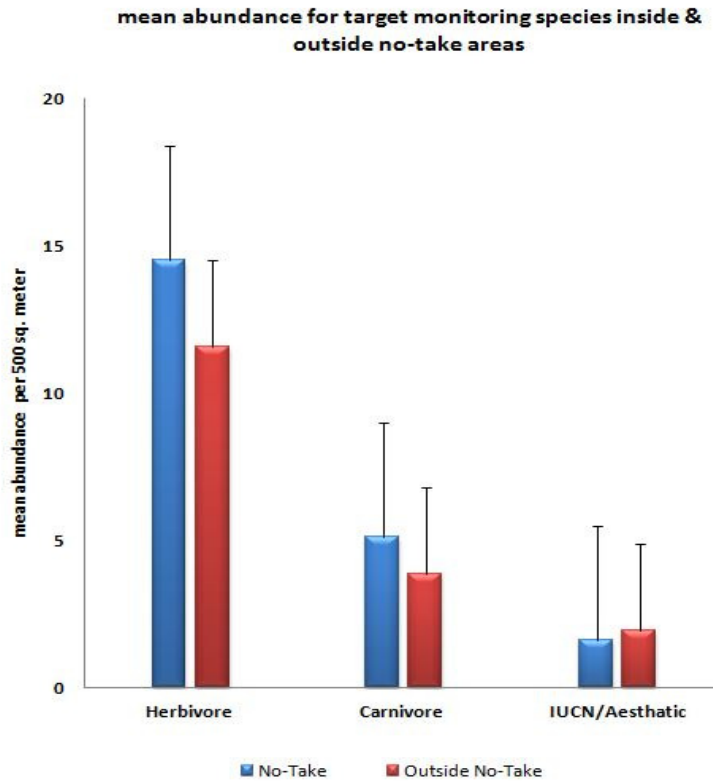


Herbivore fishes continue to show high averages for the open access areas. The monitoring stations at Matamtaval (OT. 3) recorded an average abundance of 24.9 herbivore/500m<sup>2</sup>. The reef area of Kasatavala (OT.2) also recorded a good average of 18.9 herbivore/500m<sup>2</sup>. All other monitoring stations recorded averages that were lower than 6 herbivore/500m<sup>2</sup>.

Records for carnivore fishes was generally low with an overall average of 3.9 carnivore/500m<sup>2</sup> from 7 sampling locations. Site specific averages shows that Split Rock (OT.1) recorded an average of 6.3 carnivore/500m<sup>2</sup> followed by Matamtaval (OT.3) with average of 6.3 carnivore/500m<sup>2</sup>. The lowest recorded average was 1.8 carnivore/500m<sup>2</sup> and was at OT. 8.

Population samples for IUCN/aesthetic fishes recorded an overall average of 1.9 species/500m<sup>2</sup> for all 7 monitoring areas. Matamtaval (OT.3) was the only site to record good average for this group with 5.0 species/500m<sup>2</sup>. These average showed a high presence of Humphead Maori Wrasse found within the sampled area.

### 3.2.3. Mean abundances for target monitoring fishes inside & outside no-take areas combined

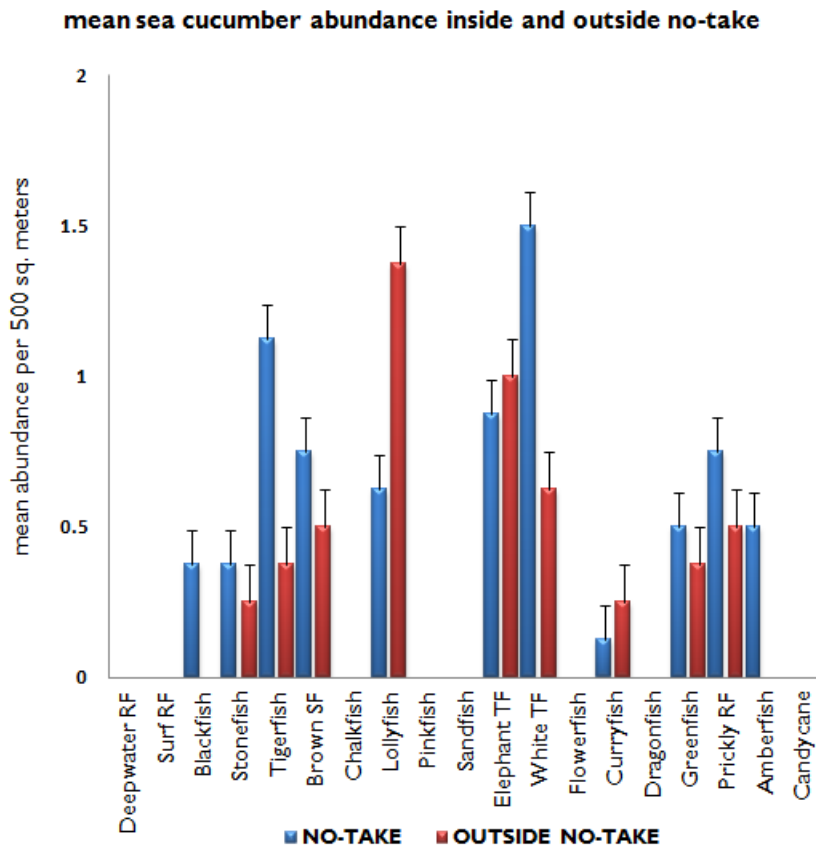


In this graph we can see that population counts for herbivore was higher than those for carnivore and IUCN/aesthetic fish groups. Population for herbivore fishes was high for no-take areas with the average of 14.5 spp/500m<sup>2</sup> while reefs outside no-take recorded an average of 11.5 spp/500m<sup>2</sup>. Population for carnivore fishes averaged 5.1 species/500m<sup>2</sup> for no-take and 3.9 species/500m<sup>2</sup> for sites outside no-take while a near equal average of 1.6 species/500m<sup>2</sup> and 1.9 species/500m<sup>2</sup> were for IUCN/aesthetic species inside and outside no-take areas respectively.



### 3.3 MARINE INVERTEBRATE

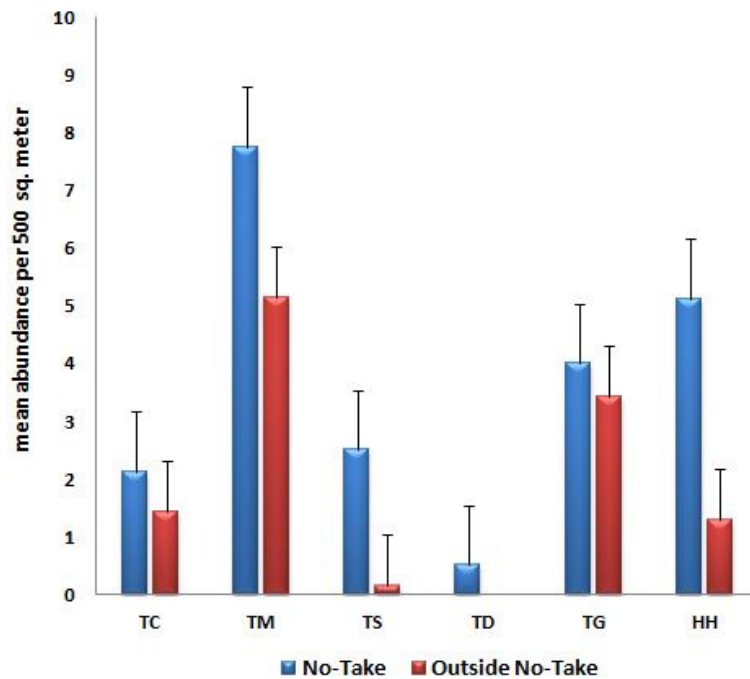
#### 3.3.1. Sea cucumber



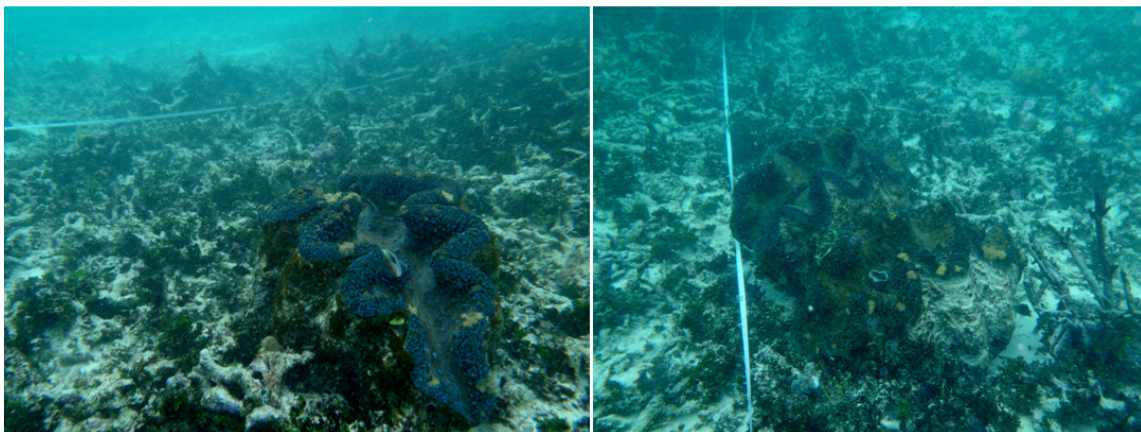
In this monitoring period our local monitoring team counted a total of 11 sea cucumber species inside the 8 sampling reefs representing no-take (closed areas) and 9 species inside the 7 sampling areas for open access reefs. For those that were inside the no-take, white teatfish recorded the highest average of 1.5 species/500m<sup>2</sup> followed by Tigerfish with an average of 1.13 species/500m<sup>2</sup> and Prickly redfish recording an average of 0.75 species/500m<sup>2</sup>. Lollyfish was more abundant on reefs outside no-take with an average count of 1.45species/500m<sup>2</sup> than Elephant trunkfish and White teatfis with respective averages of 1.0 species/500m<sup>2</sup> and 0.63 species/500m<sup>2</sup>.

### 3.3.2. Giant Clam

mean abundance of giant clam species inside and outside no-take monitoring stations

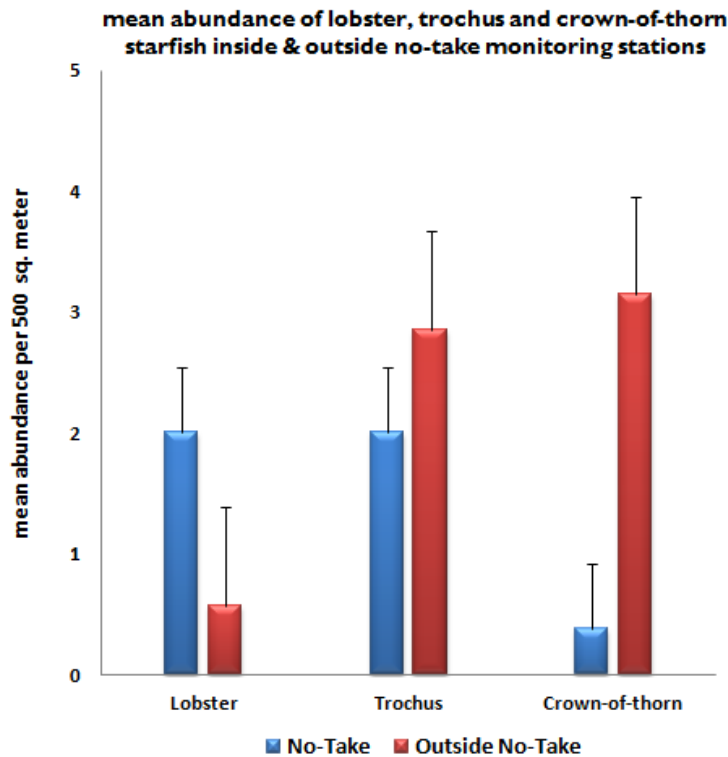


The overall population for giant clam for this monitoring showed high abundance for all species inside no-take than outside no-take areas. At the species level it was clear that Maxima clam (TM) recorded a high average of 7.8 species/500m<sup>2</sup> followed by Bearpaw clam (HH) having the average of 5.1 individual/500m<sup>2</sup> and the Giant Clam (TG) recording 4 individual/500m<sup>2</sup>.





### 3.3.3. Other Marine sedentary resources (Lobster, trochus crown-of-thorn starfish)



The no-take areas recorded high average for lobster (2.0 lobster/500m<sup>2</sup>) while the open access areas or stations outside no-take recorded high averages for trochus (2.9 trochus/500m<sup>2</sup>) and 3.1 CoT/500m<sup>2</sup> for crown of thorn starfish. The population of lobster and trochus increased between the two monitoring period while crown-of-thorn population also increased from an average of 1.25 CoT/500m<sup>2</sup> to 3.1 CoT/500m<sup>2</sup>.

## 4. DISCUSSION

### 4.1. Benthic substrate

In this monitoring our survey results showed that the monitoring stations inside no-take had good coral cover compared to the reefs outside no-take. The amount of coral cover recorded averaged at 46.6% and is a higher than the record for October 2012 which we recorded 41.1%. First thing we want to make clear is that the 5.5% difference between the two monitoring period must be interpreted as coral growth between the 4 month period. This difference has come about from the way by which transact tape is being placed within the marked transact pegs (or markers). When the transact tape measure is placed between the two markers (Start and finish markers), the tape does not always lie exact to that in each monitoring period. The data for coral cover can and will only be determined after a long period of monitoring over the same transact areas. The substrate cover for the no-take and open access areas (outside no-take) will always have some differences between each monitoring. It is only over a period of time that averages for each sites will determine the expected amount and distribution of coral and their percentage coverage.

It is also important to understand that each monitoring stations inside and outside the no-take areas are only replicates used to provide us with data and information on how much coral cover there is in the no-take and outside no-take areas. The results for this monitoring period illustrates that no-take areas are dominated with Branched Corals (BC) which a high percentage of this BC was from Yadiyadidina (NT.02) (49%)

Results for areas outside no-take also showed a similar distribution pattern for this monitoring period and the one before. Dead corals, coral rubble and other abiotic substrates were more dominant for all monitoring stations outside no-take thus, providing high percentage for abiotic substrates. Data from the previous monitoring period showed an average cover of 20.1% while this survey data showed a slight increase to 25.9%. For those live corals recorded, Digitate Corals (DC) was the dominant type and showed high presence than other corals. Kasatavala (OT.2) was the only monitoring area to record over 14% in the last monitoring and 25.9% in this monitoring period. The amount of dead corals and abiotic substrates recorded in this period amounted to 76%. For these dead and abiotic materials, dead coral rubble (DCR) was the dominant substrate type. Fragments of broken corals, uprooted corals and other rubbles seen on many outer barrier and seaward reefs indicate the intensity of currents and storm surges around Wiyaloki, Nataule and Panabala Islands. It is evident that most of these dead materials we recorded were direct impacts of storms and strong wind driven currents. In most instances, these prevalent sea conditions have often been driven by the Southeast Trade Winds.

Having seen the impacts that are on our reefs should drive us to this question of "*what can we do to reduce further loss to our coral reefs?*" Firstly, let us say that there is no direct answer to this question because there is no one solution that can fix this. There are a number of many different ways and approaches that we can take to help buildup the natural strength and ability of our reefs so that it is able to make quick recovery in the event of any natural damages (*i.e. build up the resilience of our reef ecosystem*). There is a long list of activities and actions we must take however, we will focus on one element each time in our monitoring reports. In this report we will discuss the key role our herbivore fishes (*fishes that eat or*

*feed on grass, algae and sea plants*) play in maintaining a low balance of algae and marine plants while promoting growth of corals.

## **4.2. Reef Fish**

### **4.2.1. Herbivore Fishes**

From the graphs in Section 3.2 (3.2.1/3.2.2./3.2.3) it was very clear that the population of herbivore fishes (fishes that eat marine plants) was more abundant and was in a healthy state. The average for the 8 monitoring stations inside no-take was 14.5 herbivore/500m<sup>2</sup>) while the average for the stations outside no-take was 11.6 herbivore/500m<sup>2</sup>. These figures are averages from the respective 8 and sites inside and outside no-take and is only a representation of what is expected on any reefs that are now inside the managed no-take and in areas outside the restricted area. One notable feature of this monitoring was species sizes. While the abundance was observed to be great, the size estimates indicated many small sized fishes. There a number of large individuals from different species sighted however, data and observations from each studies areas shows many small sizes. This monitoring has also recorded a very high species diversity and counts for herbivore. Thus, individual monitoring stations like Poupoununa (NT.3) recorded a good average abundance of 25 herbivore/500m<sup>2</sup> of its sampling area while Sakimalabwana recorded an average of 20 herbivore per 500m<sup>2</sup>square meter.

### **4.2.2. Carnivore Fishes**

The population for carnivore fishes is considered to be low in this monitoring period. An average of 5.1 carnivore was estimated within the 500m<sup>2</sup> transact area for 8 monitoring stations inside no-take reefs. Reefs that are no under management or reefs that are open to fishing had a record of 2.4 carnivore fishes in their 500m<sup>2</sup> study area. There appear to be no major difference in the averages for this monitoring period and that done in October 2012. Although some of the target monitoring species were recorded these averages alone cannot be used to draw conclusion on their population, distribution and abundance inside the management area and in the open access area. A later study by Conservation International using SCUBA shall calculate their biomass and their abundance. Carnivore fishes do establish local territories but are highly mobile therefore, accurate information on each target species cannot be generated from this simple community base monitoring.

While we try to describe these distribution and abundance of carnivore fishes and make comparison in terms of their abundance against Herbivore fishes it is important for us to also consider the fact that these community base monitoring program is usually conducted on shallow water where it may not be a suitable habitat for large sized reef predators. The deepwater monitoring program will confirm and provide more details on the distribution and abundance of carnivore fishes. Presence of those individuals recorded indicate that these fish group is present on the reefs but was not recorded probably because of the depth as mentioned earlier, or because many of the shallow water reefs do not have that complexity to allow for shelter and other basic necessities.



*Despite the low population count inside no-take, here is a catch from a local fisherman showing an adult size coral trout. The deepwater SCUBA monitoring by Conservation International will provide us further information on the distribution, biomass and size for our target monitoring fish groups.*

#### **4.2.3. IUCN/Aesthetic species**

Population distribution for IUCN Red listed Maori Wrasse and other aesthetic fish species had low abundance counts with averages of 6 species/500m<sup>2</sup> representing no-take areas and 1.9 species/500m<sup>2</sup> for those stations outside no-take areas. There is no major difference in the population numbers recorded in this monitoring and for those that were recorded in the last monitoring period. Abundance patterns and population trend can only be seen once the monitoring period has been done over a period of time. At this stage it is too soon to determine the trend in abundance therefore, we cannot present any reasons for the abundance seen in October 2012 and February 2013.

#### **4.2.4. Pelagic food fishes**

Although data was not collected for pelagic fishes, it is important to mention that this fish group contribute a lot to the diets of the people of Wiyaloki, Nataule and Panabala CMMA. As shown in the pictures below, local fishermen catches sardine, scads, rainbow runner and skipjack tuna when they school through the islands reef areas.



### 4.3. Sea Cucumber

A simple comparison on the number of sea cucumber found during this monitoring and that recorded in October 2012 showed very little difference in each species distribution and abundance. It is good to see that stocks of White teatfish is high on many reefs as this species has been a high value species in the beche-de-mer fishery and have been severely depleted in many parts of the province. Hence, the averages gathered in Wiyaloki, Nataule and Panabala sea area is a lot higher than average recorded from Nuakata and labam-Pahilele marine areas. With a good population of this species and close aggregations it is highly likely that this species will flourish in numbers in the coming years. Other species of sea cucumber were also present but in sparse distribution. As mentioned in section 3.3.1, only 11 species have been recorded inside no-take and 9 species outside no-take. These number for species count is only for those found within the 500m<sup>2</sup> transact area or (study areas). There were other species also sighted on the reefs inside and outside no-take but were not within the sampling areas therefore their abundance have not been considered. Other sea cucumber species like flowerfish and candycane species are also present inside Wiyaloki, Nataule and Panabala CMMA.



### 4.4. Clam Shell

The Maxima Clam (TM) appeared to be the most abundant species with wider distribution and abundance in the monitoring stations inside no-take and in those many areas outside no-take. Averages recorded in the last monitoring period was 6.9 TM/500m<sup>2</sup> while the averages gathered for this monitoring period was 7.8TM/500m<sup>2</sup> for no-take (NT) areas. The species that recorded the second highest abundance was Bearpaw clam (HH) with an average of 5.1HH/500m<sup>2</sup>. There was an increase of 3.9% from what we recorded in October which had the average count of 4.9HH/500m<sup>2</sup>. In general, distribution of giant clam appeared to be the highest in the no-take than sites outside no-take. Records for the giant clam (TG) ranked third in its abundance with an average of 4.0 TG/500m<sup>2</sup> in this monitoring and 1.0/500m<sup>2</sup> in the last monitoring. Samples for reefs outside no-take showed a similar species distribution but with less abundance. TM recorded an average of 5.1TM/500m<sup>2</sup> followed by TG having an average of 3.4TG/500m<sup>2</sup> and the Crocus or Boring shell with the average of 1.4TC/500m<sup>2</sup> for the 7 sampled stations.

#### **4.5. Other invertebrates (*Lobster, trochus, crown-of-thorn starfish*)**

##### ***Lobster***

Mean abundance for rock lobster in this period has increased by 62.5%. The average for the last monitoring period was 0.75 lobster/500m<sup>2</sup> and that has increased to 2.0 lobster/500m<sup>2</sup> resulting in the increased percentage stated earlier. These significant increase in abundance cannot be explained now but will be made available once more information on the species is known. Monitoring stations outside no-take areas showed an opposite result. In October, an average of 2.0 lobster/500m<sup>2</sup> was recorded and in this monitoring period, an average of 0.6 lobster/500m<sup>2</sup> was recorded.

##### ***Trochus***

There appeared to be no consistency in the number of trochus shells recorded in this monitoring period and the last period. Reefs inside no-take zones recorded an average of 2.0 trochus/ and the sites outside the managed areas had an average of 2.9 trochus/500m<sup>2</sup>. There was a decrease of 35% in the number of trochus over the last 4 months for no-take areas. In October Kamwatali (OT.5) recorded the highest counts of trochus (15 trochus/500m<sup>2</sup>) and recorded 13 trochus/500m<sup>2</sup> in this monitoring.

##### ***Crown-of-thorn (CoT) starfish.***

Population of crown-of-thorn star fish (CoT) continue to remain low for no-take monitoring areas. For monitoring stations outside no-take, there was an increase of 60%. From an average of 1.25 CoT/500m<sup>2</sup>, it rose to 3.14 CoT/500m<sup>2</sup>. Evidence of crown-of-thorn predation was noted by the feeding scars left on many table and branched corals. The monitoring data to be done in July will be key to determining if the population is maintained, decreased or has elevated. Depending on the results from this coming monitoring appropriate actions will be taken to manage their population.

#### **5. CONCLUSION**

This second monitoring was completed successfully with good participation from youths and elders from Wiyaloki, Nataule and Panabala CMMA. The local monitors showed improvement in the way they collected their data. The level of competent and perseverance shown by the locals was overwhelming and is a good indication for success in monitoring.

## **6. REFERENCES**

Araea J, (2012). Wiyaloki, Nataule & Panabala Marine Survey Report 1. October 2012. WNPCMMA. 22pp

Araea J, (2012). Nuakata Island Community Based Resource Monitoring Program. Survey Report 7. July 2012. NIPCMMA. 16pp

Bellwood R. D. Hugh P. T and Hoey, S.A (2006). Sleeping Functional Groups dives coral reef recovery. *Current Biology* 16: 2434 – 2439

Jones G.P., Srinivasan M., Almany G.R (2007). Population Connectivity and Conservation of Marine Biodiversity. *Oceanography* Vol.20. No. 3

Lieske E and Myers R (2001). *Coral Reef Fishes. Indo-Pacific and Caribbean*. Princeton University Press. 400pp.

Wangunan N (2010). Community based reef monitoring for Nuakata and labam-Pahilele Community Managed Marine Areas (NIPCMMA). *Conservation International* 32pp.

Wangunan N (2009). Analysis of target marine ecological indicators and documentation of tides and sea surface currents inside Nuakata and labam-Pahilele CMMA. *Conservation International*. 25pp









# CORAL TRIANGLE INITIATIVE

ON CORAL REEFS, FISHERIES AND FOOD SECURITY

