

**FY2010 Coral Reef Ecosystem Monitoring in the Federated States of Micronesia
Micronesia Conservation Trust (MCT)**

Award Period: 10/01/2010 - 09/30/2011

1. Work Accomplishments:

The four-awarded organizations have completed all activities stated in their proposals to MCT. All awards have been expended and implementing organizations have analyzed their data to the best of their abilities and submitted their final reports.

Project: *Coral and Fish Monitoring in the State of Kosrae, FSM*

PI: Andy George

Organization: Kosrae Conservation and Safety Organization (KCSO)

Project Objectives: The proposed project will consolidate efforts of the Marine Resource Division of the State Government and KCSO to monitor and assess changes in coral covers over time as well as health and population of corals and fish in 9 permanent monitoring sites in Kosrae.

Objectives

- 2.1 *Additional on-site training in the design of databases, data management, and analysis for the state monitoring programs;*
- 2.2 *Continued assistance on field data collection with regards to coral population assessments, benthic data, and indicator fish estimates*
- 2.3 *Purchase materials, supplies, equipment*
- 2.4 *Prepare reports*

Project Summary from (10/01/2010 to 09/30/2011): The 2010 coral and fish monitoring project was completed in September 2011. All collaborating efforts from our partners, both on island and off island made it possible to accomplish all activities set in the workplan. This year, Okat southern channel and Utwe buffer zone were included in the project. However, the project team agreed to monitor only food fish within these new stations throughout this year. In addition, beginning of the second quarter, the project team started to monitor all edible fish species.

KCSO and partners received training in data manipulation and management. Using this knowledge the project team set up a database and stored all collected data. Now this data is easily accessible and can be used to generate reports to provide important information to Kosrae's communities and government leaders. Monitoring team members also received in house training in coral and fish identification.

KCSO Monitored site names, GPS coordinates and Monitoring dates.

Site Name	Coordinates		Number of Visits	Visit Dates
	Latitudes	Longitudes		
TMPA	N 05° 21' 39.9"	E 162° 58' 05.5"	4 of 4	1/19/2011 3/17/2011 6/03/2011 9/16/2011
Okat South Channel	N 05° 21' 01.8"	E 162° 57' 19.0"	4 of 4	1/12/2011 3/17/2011

				6/03/2011 9/16/2011
UBR Core Zone	N 05° 16' 19.4"	E 162° 57' 35.6"	4 of 4	1/13/2011 3/16/2011 6/02/2011 9/15/2011
UBR Buffer Zone	N 05° 16' 46.3"	E 162° 57' 59.0"	4 of 4	1/13/2011 3/16/2011 6/02/2011 9/15/2011

Methodology:

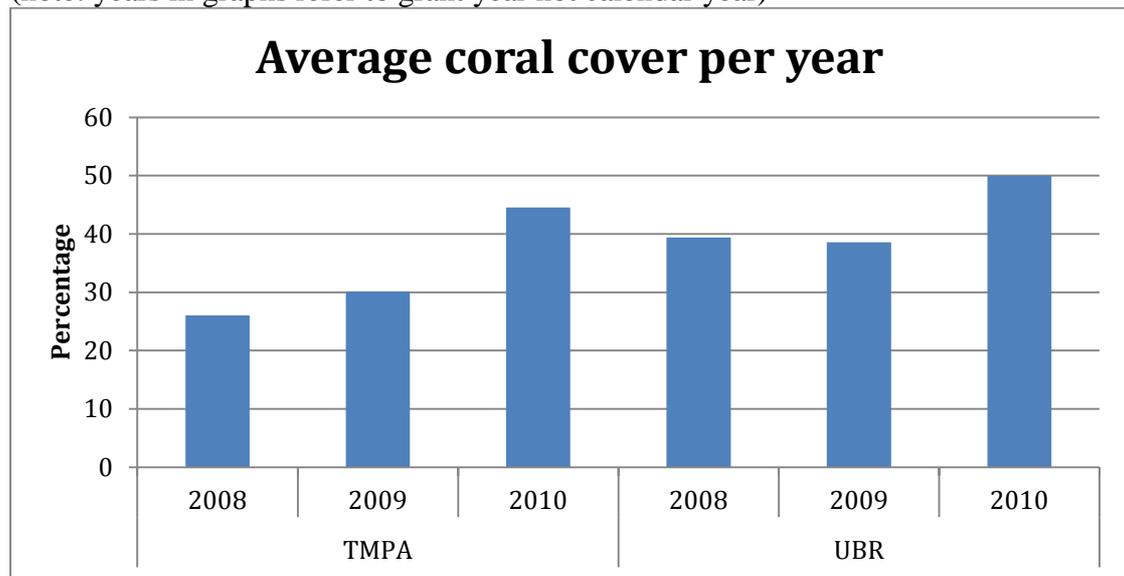
There are two monitoring methods we used to collect our data. The first one is the Belt Transect, which is utilized to assess the abundance and size of food fish, numbers of aquarium fish, and presence of macro invertebrates. There are 5 x 50 meter lines laid following the depth contour where an imaginary tunnel of 5 meters is visualized along the lines. Every selected biological species seen and observed within the 5 meter tunnel of 250 meters are recorded. The sequence of each dive is first the fish diver descends, followed by the line man. As soon as each line reaches 50 meters, the line man signals the fish divers to begin the next 50 meter transect. Behind them is the invertebrate diver who will also check the steadiness of the transect lines for the coral diver.

The other method is the photo quadrant. The coral diver descends last and takes pictures at every meter using a one square meter tripod. There are 250 pictures taken along the line. Each photo has 5 points, which will be identified to the highest level (genus/species).

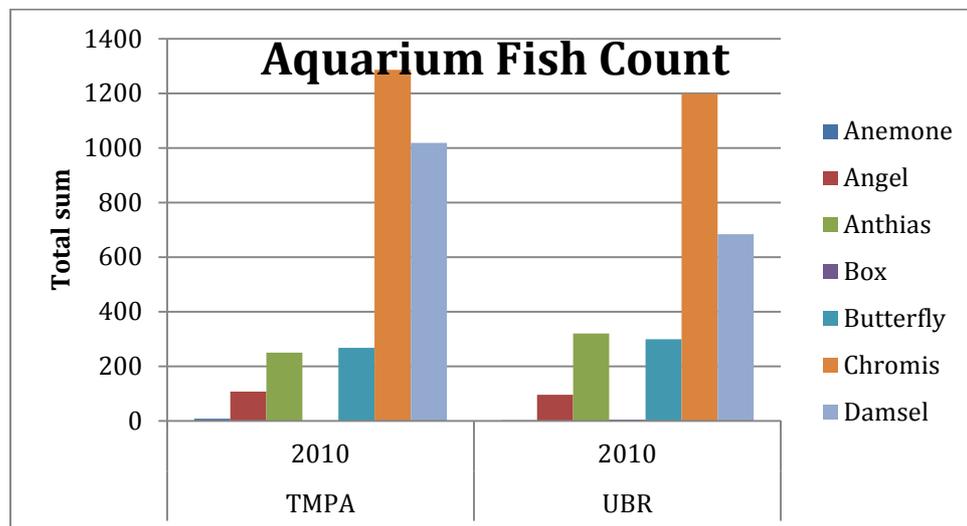
Normally we have 6 people who have different roles and responsibilities to carry out each monitoring activities. We have a boat operator, one line man, one coral diver, two fish divers and an invertebrate diver. Project team members include staff from the Kosrae Conservation and Safety Organization, Kosrae Island Resource Management Authority, Fisheries Division under the Department of Resources and Economic Affairs, Kosrae Village Resort and community volunteers. The monitoring activity is an ongoing collaborative effort among this group.

Data and Analysis:

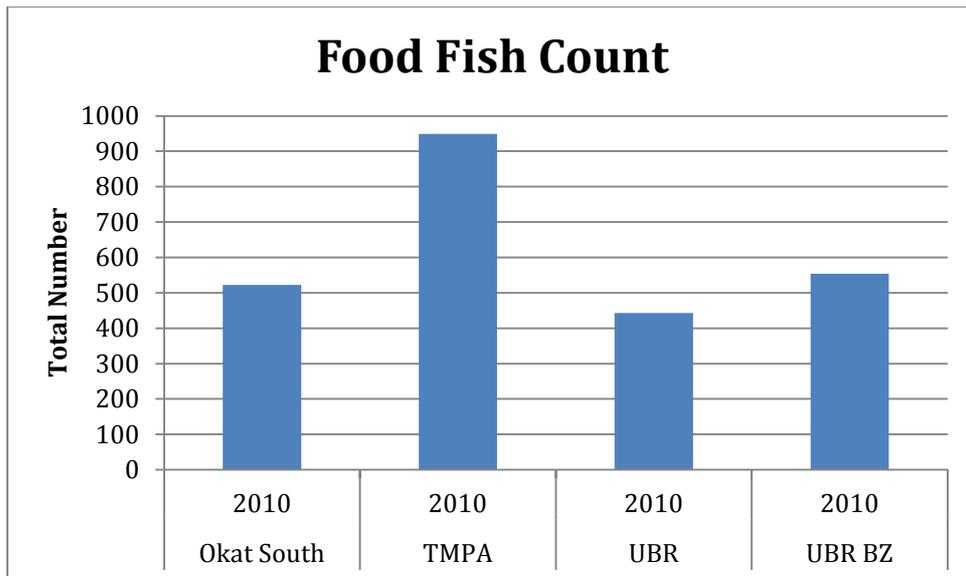
(note: years in graphs refer to grant year not calendar year)



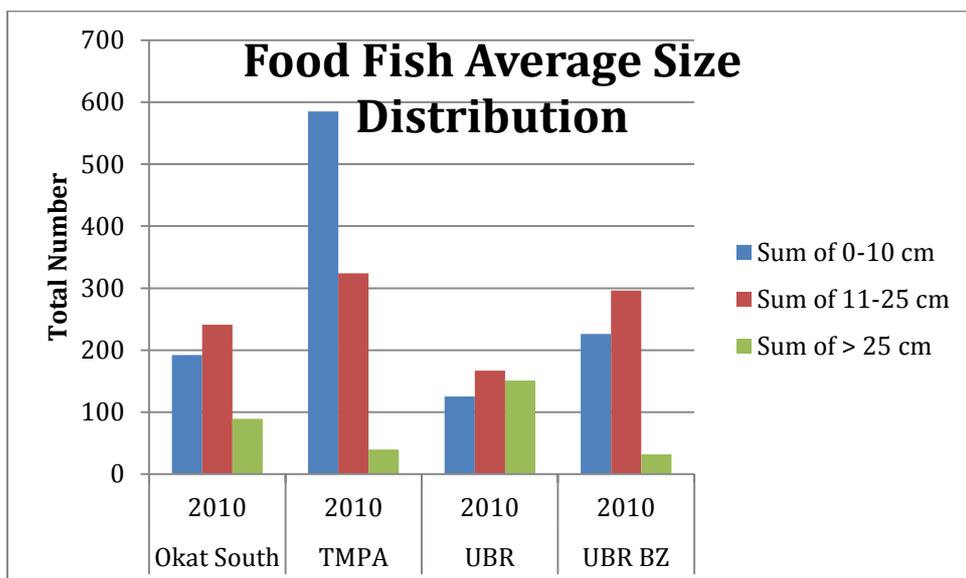
The graph shows the years of coral monitoring at Tafunsak Marine Protected Area (TMPA) and Utwe Biosphere Reserve (UBR). At TMPA, average percent cover in 2008 was 26.04 percent cover and increased to 30.14 percent in 2009. In 2010, data shows an increased percent cover to 44.53 percent. At the UBR in 2008, data showed 39.41 average percent cover and decreased to 38.58 percent in 2009. In 2010, it increased to 49.97 percent. The collected data shows that the coral percent cover is increasing overtime.



Aquarium fish are monitored only for abundance. Based on 2010 collected data, the chromis are the most abundant. In 2010 at TMPA, there were 1,286 chromis counted during the four monitoring. The graph shows that the two sites are very close in species presence.



The project team monitored all edible fish at four sites as shown on the graph. In comparing the sites, there are more fish at TMPA with a total of 949 pieces counted in 2010. UBR was the lowest with a total of 443 pieces in 2010.



For food fish, the project team also recorded the size estimation. There were three size class categories as shown on the graph. Size varies at each site. Medium sizes, as shown on the graph are most abundant at most sites. Data also revealed there are less big fish in the sites.

Key Findings and Management Impacts:

Percent coral coverage at the Tafunsak Marine Protected Area (TMPA) and Utwe Biosphere Reserve (UBR) are increasing over time from 2008 to 2010. This finding is useful in demonstrating to communities and government leaders the importance of MPAs.

During the last week of June 2011, the project team conducted community meetings with the local leadership in Tafunsak and Utwe. The coral and fish data were

presented during the meetings. The meeting with the Utwe community was very timely because the mayor and the communities were working on their Biosphere Reserve Management Plan. The data collected by the project team provided them with an understanding of status of their marine resources and they were able to use this information to development their management plan. Moreover, the results of the fish data moved them to propose a seasonal closure on *Siganusrandalli* (Randall rabbit fish) during aggregating and spawning periods. We will continue to provide government leaders and communities information about the health of our resources and the threats affecting them, so that they can be informed and continue to make important management decisions about their resources.

Project: *Coral and Fish Monitoring in the State of Pohnpei, FSM*

PI: Eugene Joseph

Organization: Conservation Society of Pohnpei (CSP)

Project Objective: The proposed project will consolidate efforts of the Marine Resource Division of the State Government and CSP to monitor and assess changes in coral covers over time as well as health and population of corals and fish in all five established monitoring sites in Pohnpei.

Objectives

- 2.1 *Additional on-site training in the design of databases, data management, and analysis for the state monitoring programs*
- 2.2 *Continued assistance on field data collection with regards to coral population assessments, benthic data, and indicator fish estimates*
- 2.3 *Purchase materials, supplies, equipment*
- 2.4 *Prepare reports*

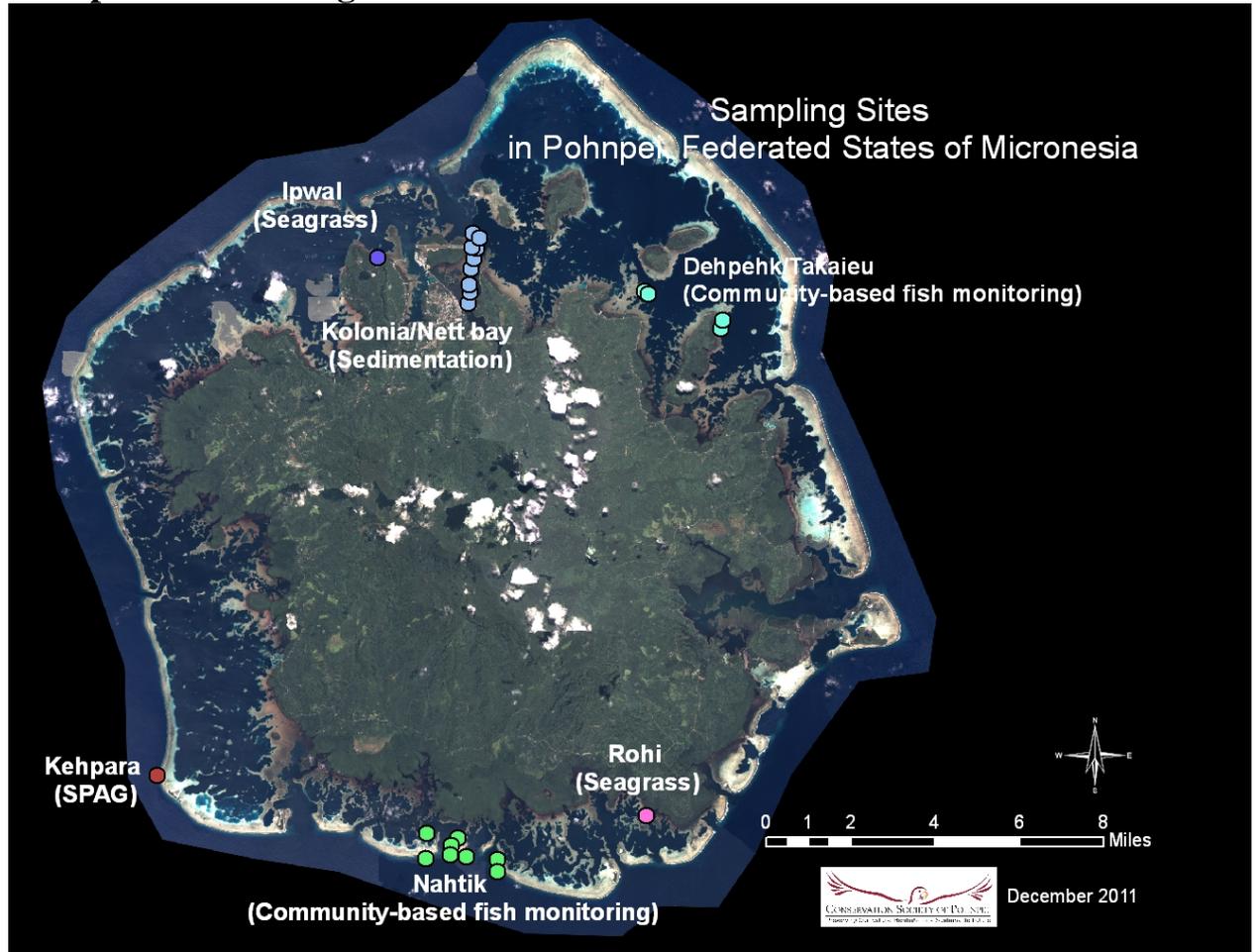
Project Summary from 10/01/2010 to 09/30/2011: Pohnpei Coral Reef Monitoring (CRM) team completed the first round of monitoring using the new protocol developed and adopted during the 2nd Micronesia Challenge Measure meeting held in Palau. CSP continues to partner with Division of Forestry and Conservation and Office of Fisheries and Aquaculture in conducting coral reef monitoring throughout Pohnpei. There are two sets of monitoring protocol being implemented by the CRM team. There is the MPA monitoring where we monitor MPA effectiveness and then there is the general coral reef monitoring where we assess the overall health of Pohnpei's reef. This report will cover the general coral reef monitoring program. There are sixteen (16) permanent sites around Pohnpei that encompass four different coral reef habitats (back reef, fore reef, patch reef and fringing reef). Two imaginary lines cut across the island from the northeast down to the southwest. Some of the sites fall inside the MPAs. This protocol is designed to give us a general view of Pohnpei's coral reef system's health. In addition, the CRM team continues to collect monthly sedimentation-collection to evaluate run-off fluctuations at Nett/Kolonia bay.

Methodology:

The Pohnpei CRM team uses the same methodologies developed at the 2nd Micronesian Challenge Measures Meeting. These monitoring methods were developed for the purpose of homogenizing methodologies across the Micronesian region in order to better compare results as a whole. A belt transect of 550m transects is used, to gather fish, invertebrate and benthic data over a 250m stretch of reef at a

depth of 10m. The person conducting fish counts does so within an area of 5m X 5m on both sides of the transect tape. For counting invertebrates, all indicator species are counted with a 2m X 2m area for each of the 550m transects. Benthic data uses similar protocols, wherein a photo is taken every meter along the 50m transect line for each of the 5 transects, giving a total of 250 photos for the 250m stretch of reef. The photos are then inputted into the Coral Point Count (CPC) software for benthic data analysis. CRM team consists of staff members from Pohnpei Division of Forestry and Marine Conservation, Office of Fisheries and Aquaculture and the Conservation Society of Pohnpei.

Pohnpei's Monitoring Sites



Pohnpei Monitored site names, GPS coordinates and Monitoring dates:

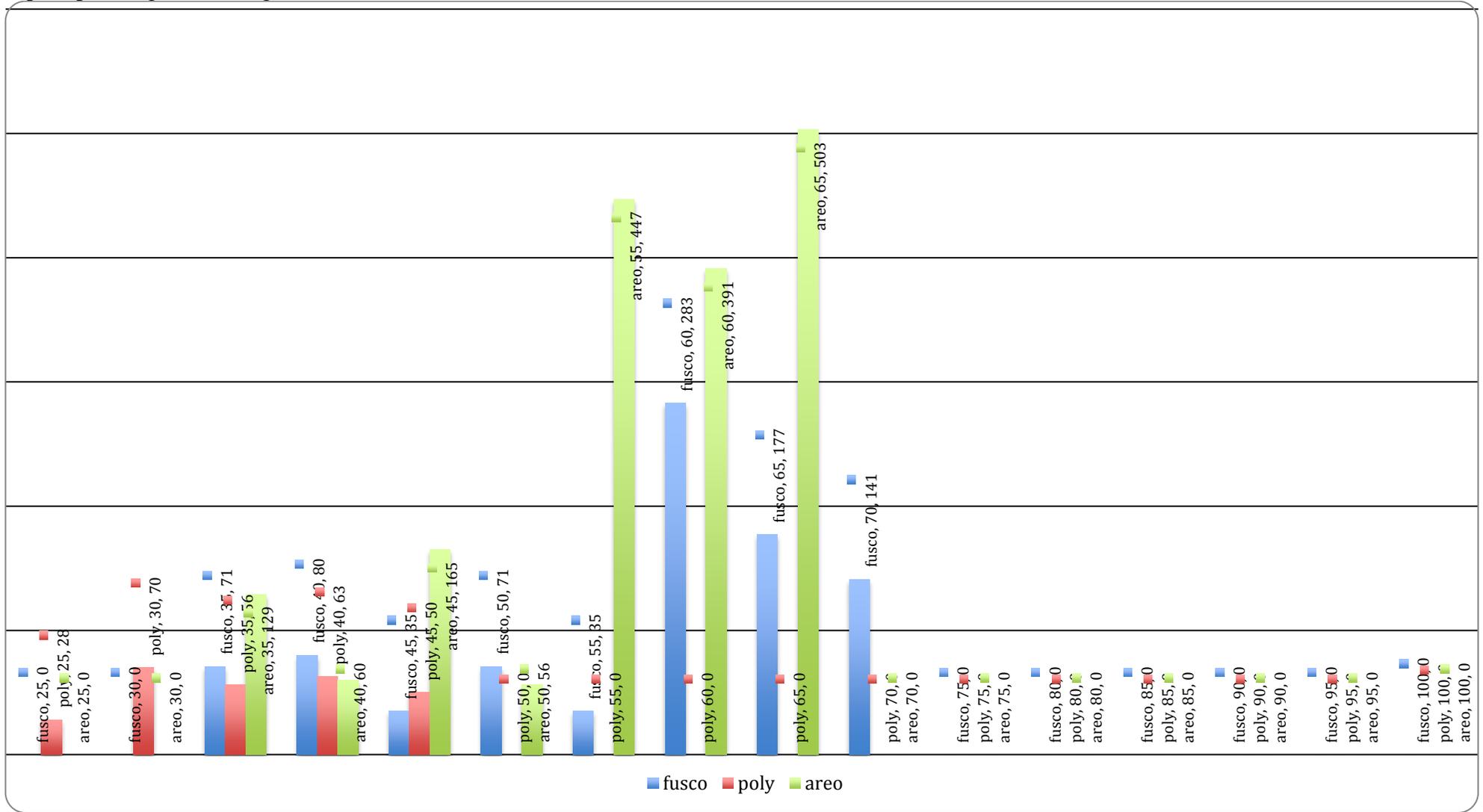
Site Name	ID	Coordinates		Number of Visits	Visit Dates	Visit Date (Final Report)
		X	Y			
Nahtik (Community-based fish monitoring)	NI1	158.2154	6.77931	1	February 16th, 2011	June 8th, 2010 : June 11th, 2010 : June 15th, 2010 : June 18th, 2010 : June 22nd, 2010 : June 25th, 2010
	NI2	158.2132	6.776633			
	NI3	158.2127	6.773533			
	NI4	158.2183	6.77285			
	NO1	158.229	6.771633			
	NO2	158.2046	6.780717			
	NO3	158.229	6.767633			
	NO4	158.2044	6.77218			
Dehpehk/Takaieu	DI1	158.3061	6.9567	1	February	July 6th, 2010 :

(Community-based fish monitoring)	DI2	158.3066	6.959556		18th, 2011	July 9th, 2010 : July 13th, 2010 : July 16th, 2010 : July 20th, 2010 : July 23rd, 2010
	DO1	158.2794	6.969667			
	DO2	158.2808	6.968833			
Ipwal (Seagrass)	PO2.2	158.1875	6.981459	2	April 6th, 2011 : July 19, 2011	
Rohi (Seagrass)	PO2.1	158.2804	6.787001	2	April 20th, 2011 : July 6th, 2011	
Kolonia/Nett bay (Sedimentation)	D1	158.2188	6.965472	6	End of every month from April to September	
	D2	158.2195	6.969278			
	D3	158.2191	6.972056			
	D4	158.2197	6.977389			
	D5	158.2206	6.981139			
	D6N	158.2217	6.98478			
	D6O	158.2199	6.984944			
	D7	158.2201	6.989861			
	D8	158.2226	6.98817			
Site Name	ID	Coordinates		Number of Visits	Visit Dates	Visit Date (Final Report)
		X	Y			
Kehpara (SPAG)				2	March 14-16, 2011 : April 13-15, 2011	July 5th, 2011 : July 8th, 2011 : July 12th, 2011 : July 15th, 2011 : July 19th, 2011 : July 22nd, 2011
Nahtik (Community-based fish monitoring)	NI1	158.2154	6.77931	1	February 16th, 2011	June 7th, 2011 : June 10th, 2011 : June 14th, 2011 : June 17th, 2011 : June 21st, 2011 : June 24th, 2011
	NI2	158.2132	6.776633			
	NI3	158.2127	6.773533			
	NI4	158.2183	6.77285			
	NO1	158.229	6.771633			
	NO2	158.2046	6.780717			
	NO3	158.229	6.767633			
	NO4	158.2044	6.77218			
Dehpehk/Takaieiu (Community-based fish monitoring)	DI1	158.3061	6.9567	1	February 18th, 2011	August 9th, 2011 : August 12th, 2011 : August 16th, 2011 : August 19th, 2011 : August 23rd, 2011 : August 26th, 2011
	DI2	158.3066	6.959556			
	DO1	158.2794	6.969667			
	DO2	158.2808	6.968833			
Ipwal (Seagrass)	PO2.2	158.1875	6.981459	2	January 20th, 2011 : April 6th, 2011	
Rohi (Seagrass)	PO2.1	158.2804	6.787001	2	January 24th, 2011 : April 20th, 2011	

Kolonja/Nett bay (Sedimentation)	D1	158.2188	6.965472	5	End of every month from December to April
	D2	158.2195	6.969278		
	D3	158.2191	6.972056		
	D4	158.2197	6.977389		
	D5	158.2206	6.981139		
	D6N	158.2217	6.98478		
	D6O	158.2199	6.984944		
	D7	158.2201	6.989861		
	D8	158.2226	6.98817		

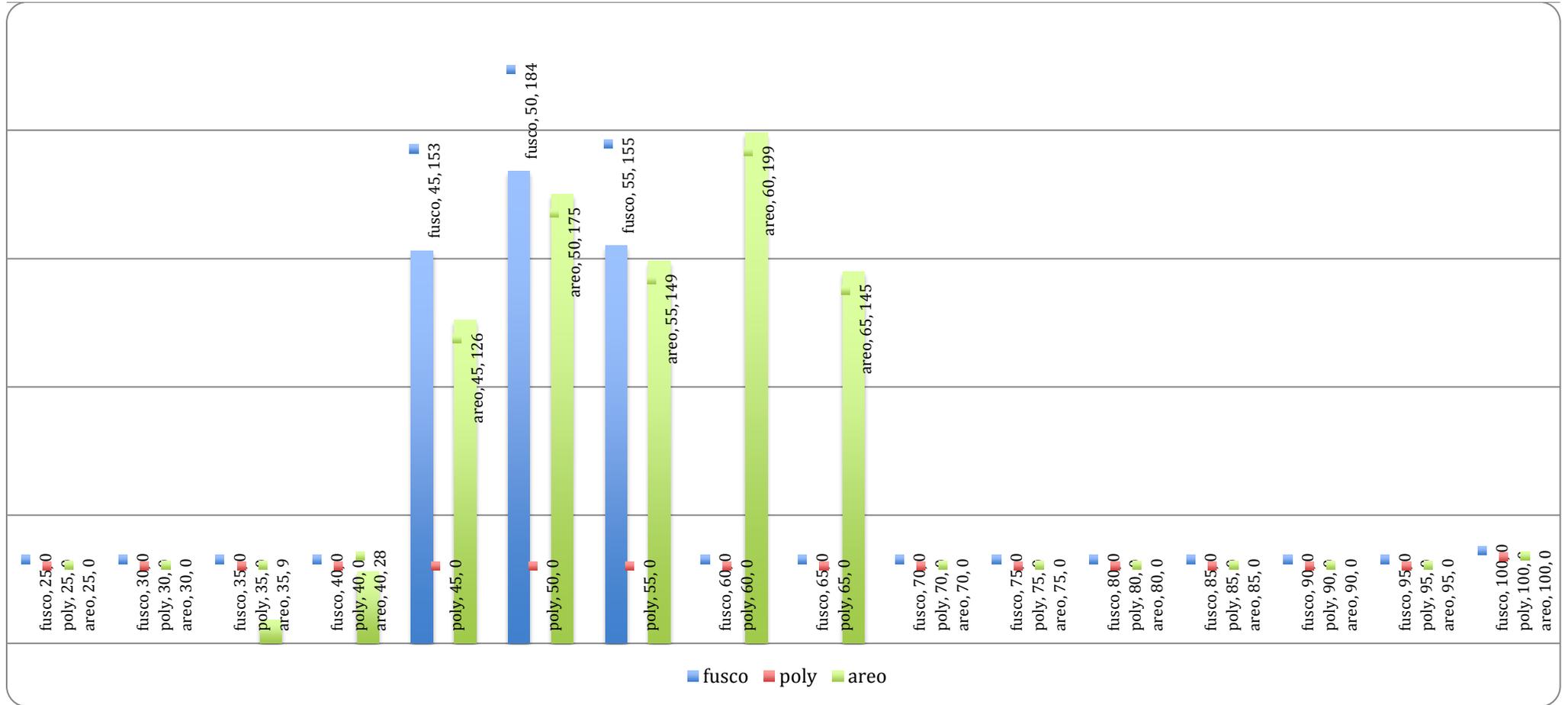
Data and Analysis:

Grouper Spawning Monitoring Data - March 2010

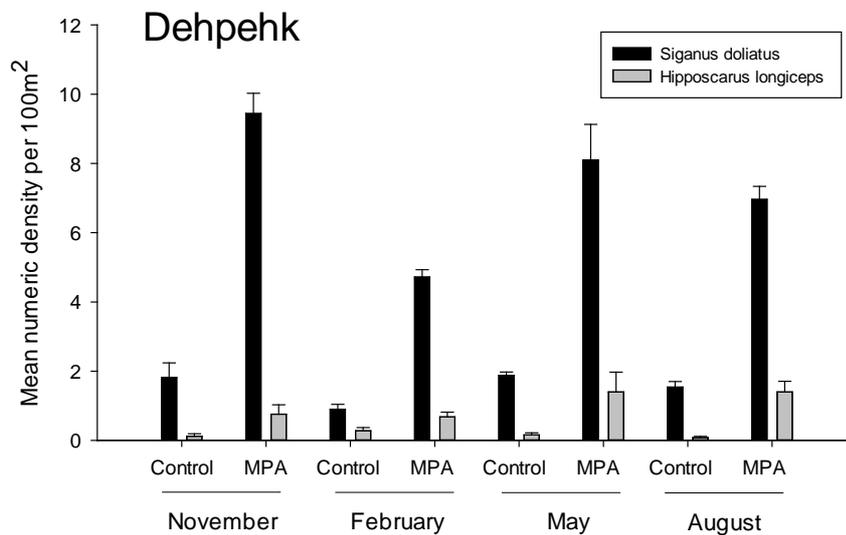
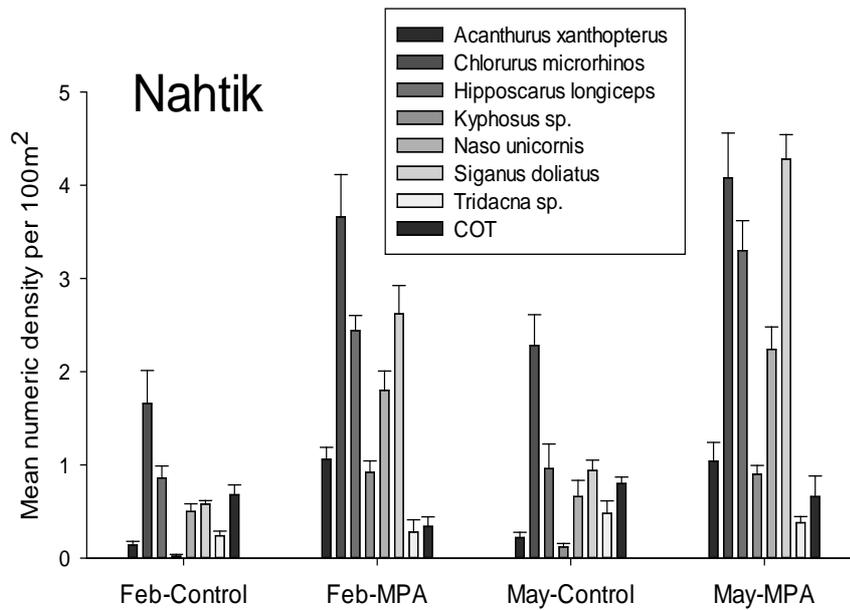


Note: Total species (Fusco, Poly, Areo) counted inside Kehpara Fish Spawning Area. More population at larger length (Fusco and Areo). Presence of poly at 40 and 45 centimeter.

Grouper Spawning Monitoring Data – April 2010

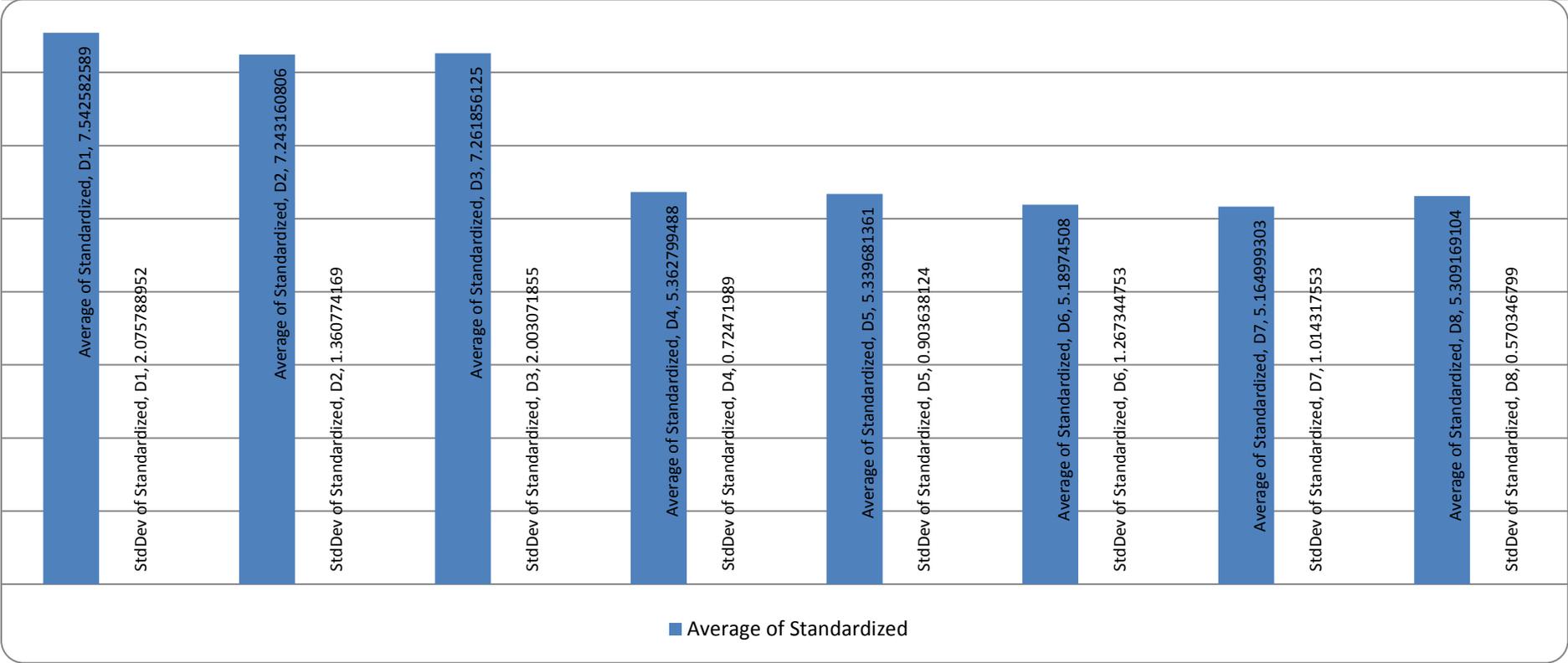


Note: Total species (Fusco, Poly, Areo) counted inside Kehpara Fish Spawning Area (FSA). Data not showing presence of Poly at this month. More species at larger length.



Both MPA's show very strong trends for increased fish density. Given the low error bars, the trends can be considered 'statistically' significant. 2 - 3 times higher density inside the protected area than outside. These data can be very encouraging for community to see the results showing a rebound in fish population that should benefit their reef health and their 'outside' fishing grounds. Where invertebrates are monitored, their densities are too low to understand how MPAs are affecting them in this given time period.

Sedimentation Monitoring



Sediment though the past 2 years has been consistent and this is expected. Sediment rates from watersheds take years to change like coral cover. Direct effects of sedimentation are D1 to D3, very significant and consistent through time after that no further trends. Temporal dynamics seem to be weather rather than watershed related, dry versus wet season.

Project: *Coral and fish monitoring in the State of Chuuk, FSM*

PI: Curtis Graham

Organization: Chuuk Conservation Society (CCS)

Project Objective: The project consolidated efforts of the Marine Resource Division of the State Government and CCS to monitor and assess changes in coral covers over time as well as health and population of corals and fish in all established monitoring sites in Chuuk.

Objectives

2.1 Continued assistance on field data collection with regards to coral population assessments, benthic data, and indicator fish estimates

2.2 Additional on-site training in the design of databases, data management, and analysis for the state monitoring programs

2.3 Prepare reports

2.4 Purchase materials, supplies, equipment

Project Summary from (10/01/2010 to 09/30/2011): In 2011, the Chuuk Conservation Society was awarded the amount of \$13,420.00 in support of Chuuk's coral reef monitoring program. The coral reef monitoring program, is a collaborative effort between the Chuuk Conservation Society and the Chuuk Department of Marine Resources dedicated to understanding general health, diversity and size class distributions of fish, invertebrates and corals within our Chuuk Lagoon. Monitoring protocols developed with the help of Dr. Peter Houk from the Pacific Marine Resources Institute have been incorporated to collect data in areas deemed of priority significance throughout the Chuuk Lagoon. The original intent of the program was to establish 15 permanent monitoring sites. Due to lack of staffing and technical expertise in data management and analysis, a more realistic number of 7 priority sites were established, with the goal of adding sites as staffing and experience improved in subsequent years. The actual data collection has been completed for 2010 and 2011, giving us two years worth of data for the 7 sights. Following discussions between the Chuuk Department of Marine Resources, PMRI, CCS and input from key community members, a list of monitoring sites was compiled that could as closely as possible, provide an adequate picture of what is happening on specific reefs throughout the Chuuk Lagoon. From these surveys, we can have a better idea of what is happening throughout the entire lagoon and can thus make informed decisions based on this information. These sites have been chosen based upon the following criteria:

As reefs differ based on their location and type, these parameters were also taken into consideration throughout the selection process in order to include patch reefs, inner barrier reefs, fringing reefs, bays as well as lagoon passes.

While the data gathered at our respective sights gives resource managers an idea of what is happening on the reefs, it is perhaps even more important for the resource owners of those sights. As a result of Chuuk's traditional resource tenure system, every reef throughout the entire lagoon is owned by some family or clan. It is important for our government agencies and environmental NGO's to know the health of our resources and the threats affecting them, but it is even more critical that the people in our communities

are aware as well, for without their consent, no management activities may take place within their waters. Resource owners are oft wary of allowing “outsiders” into their waters, but through our community awareness programs we can use the data acquired through our monitoring efforts to convince community members to set in place management measures to ensure the sustainability of their resources. This is of paramount importance for why we do our monitoring.

Chuuk Monitored site names, GPS coordinates and Monitoring dates:

SITE NAME	REEF TYPE	AREA OF BIODIVERSITY SIGNIFICANCE	MPA
Pokuru	Inner Barrier Reef	Yes	No
Sanat	Inner Barrier Channel	Yes	No
Puwe	Patch Reef	No	No
Truk Stop	Fringing Reef	No	No
Enengenimon	Inner Barrier Reef	Yes	No
Aroch	Patch Reef	No	No
Sopweru	Inner Barrier Channel	Yes	No

Table 1: Site specific information regarding reef type, ABS site and MPA status.

Site Name	Coordinates		Number of Visits	Visit Dates
	X	y		
Puwe	7°34'18.50"N	151°53'14.37"E	2	1/22/2010 & 8/2/2011
Aroch	7°16'16.92"N	151°56'57.30"E	2	8/28/2010 & 2/12/2011
Sopweru	7°38'57.28"N	151°53'16.23"E	2	10/26/2010 & 10/20/2011
Pokuru	7°13'35.00"N	151°46'57.22"E	2	3/26/2010 & 10/4/2011
Sanat	7°14'23.32"N	152°00'40.90E	2	6/10/2010 & 9/29/2011
Truk Stop	7°26'31.23"N	151°50'17.51"E	2	6/10/2010 & 5/3/2011
Enengenimon	7°26'03.74"N	151°59'32.18"E	2	10/26/2010 & 10/20/2011

Table 2: Dates, # of visits & GPS locations per monitoring site.

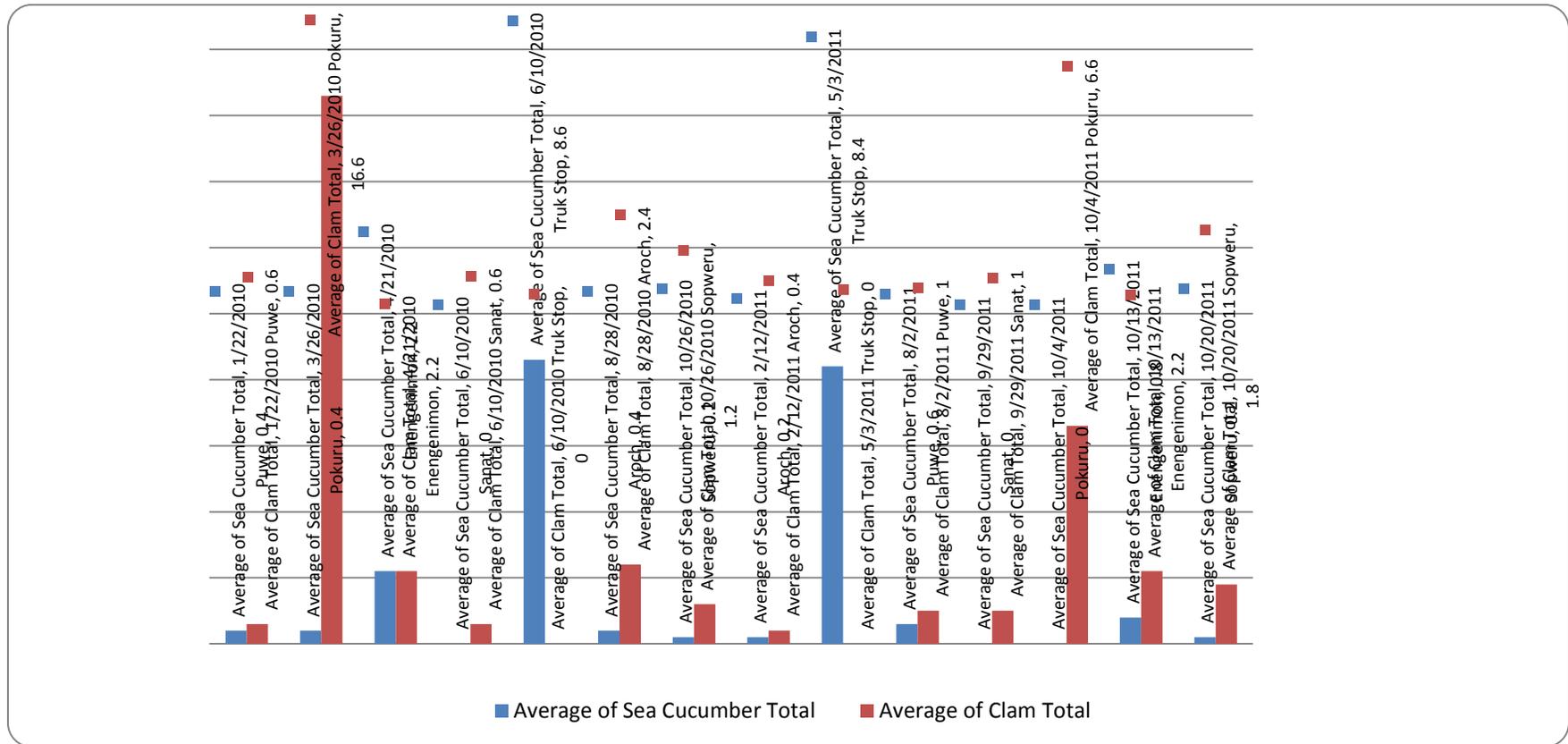
Methodology:

The Chuuk coral reef monitoring program uses the same methodologies developed at the 2nd Micronesian Challenge Measures Meeting. These monitoring methods were developed for the purpose of homogenizing methodologies across the Micronesian region in order to better compare results as a whole. A belt transect of 5, 50m transects is used, to gather fish, invertebrate and benthic data over a 250m stretch of reef at a depth of 10m. The person conducting fish counts does so within an area of 5m X 5m on both sides of the transect tape. For counting invertebrates, all indicator species are counted with a 2m X 2m area for each of the 5, 50m transects. Benthic data uses similar protocols, wherein a photo is taken every meter along the 50m transect line for each of the 5 transects, giving a total of 250 photos for the 250m stretch of reef. The photos are then input into the Coral Point Count (CPC) software for benthic data analysis.

Monitoring team members consists of one staff member from the Chuuk Department of Marine Resources and another from the Chuuk Conservation Society (CCS), with one staff member from the Chuuk Department of Marine Resources hired within the last two months to assist with laying of the transect tape.

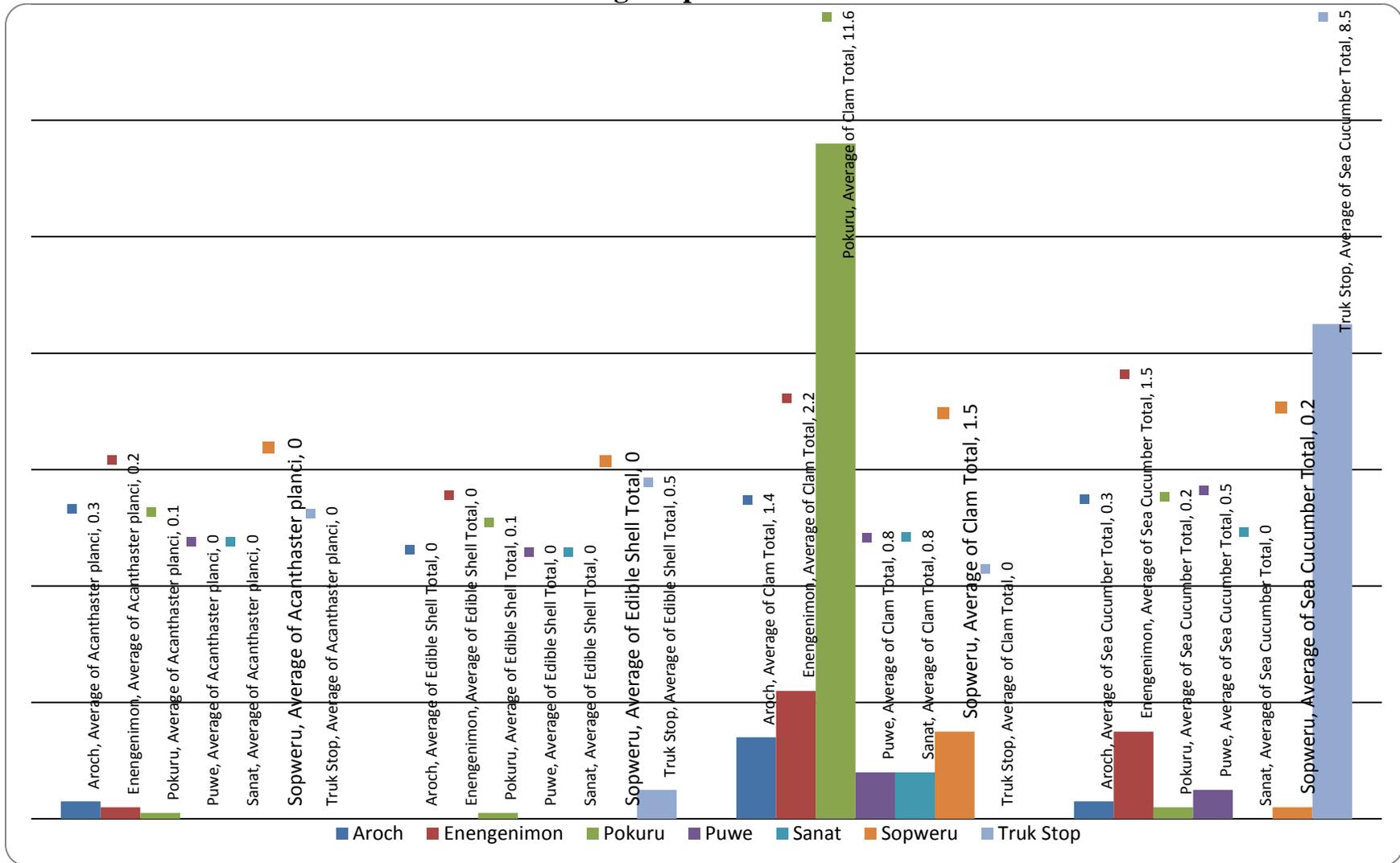
Data and Analysis:

Clam and Sea Cucumber Distribution Site Comparisons



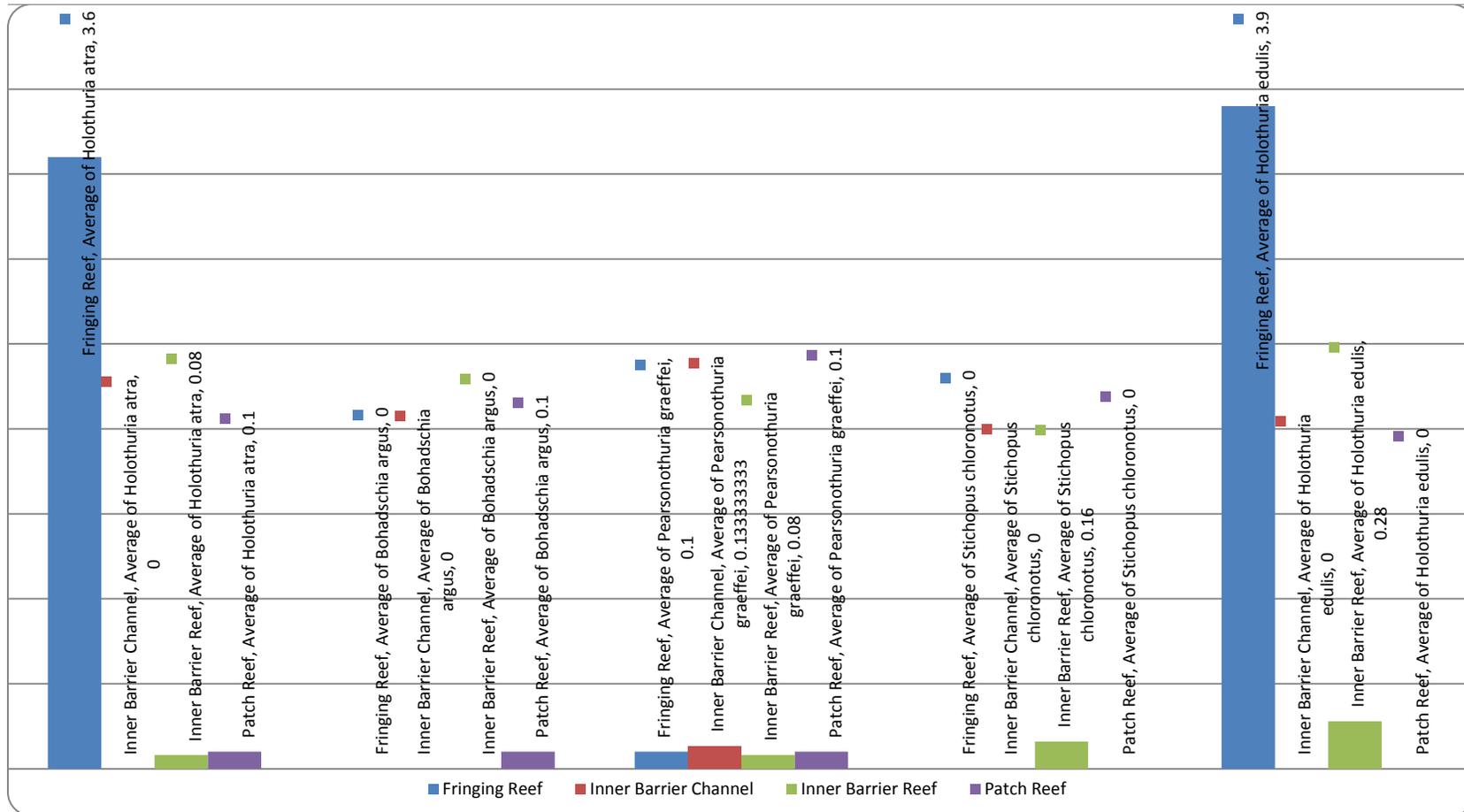
Graph 1: Site specific analysis of averages of sea cucumbers and clams over time spanning 2010-2011, indicates no dramatic differences in population, with the exception of Pokuru where average population from 2010 to 2011 decreases by roughly half. Sea cucumbers and clams were chosen as an indicator as they are the two most heavily harvested invertebrate groups on the reefs. It is possible that average populations at other sites were so low to begin with, with the exception of Truk Stop where there is no dramatic shift in trend, that any shift in trend would be indiscernible. Of considerable note are the dramatically low estimates for sea cucumbers and clams with ranges no greater than two per site, with the exceptions being Pokuru and Truk Stop, indicating a potential problem of overharvesting occurring on these reefs.

Invertebrate Average Population Estimates for Each Site



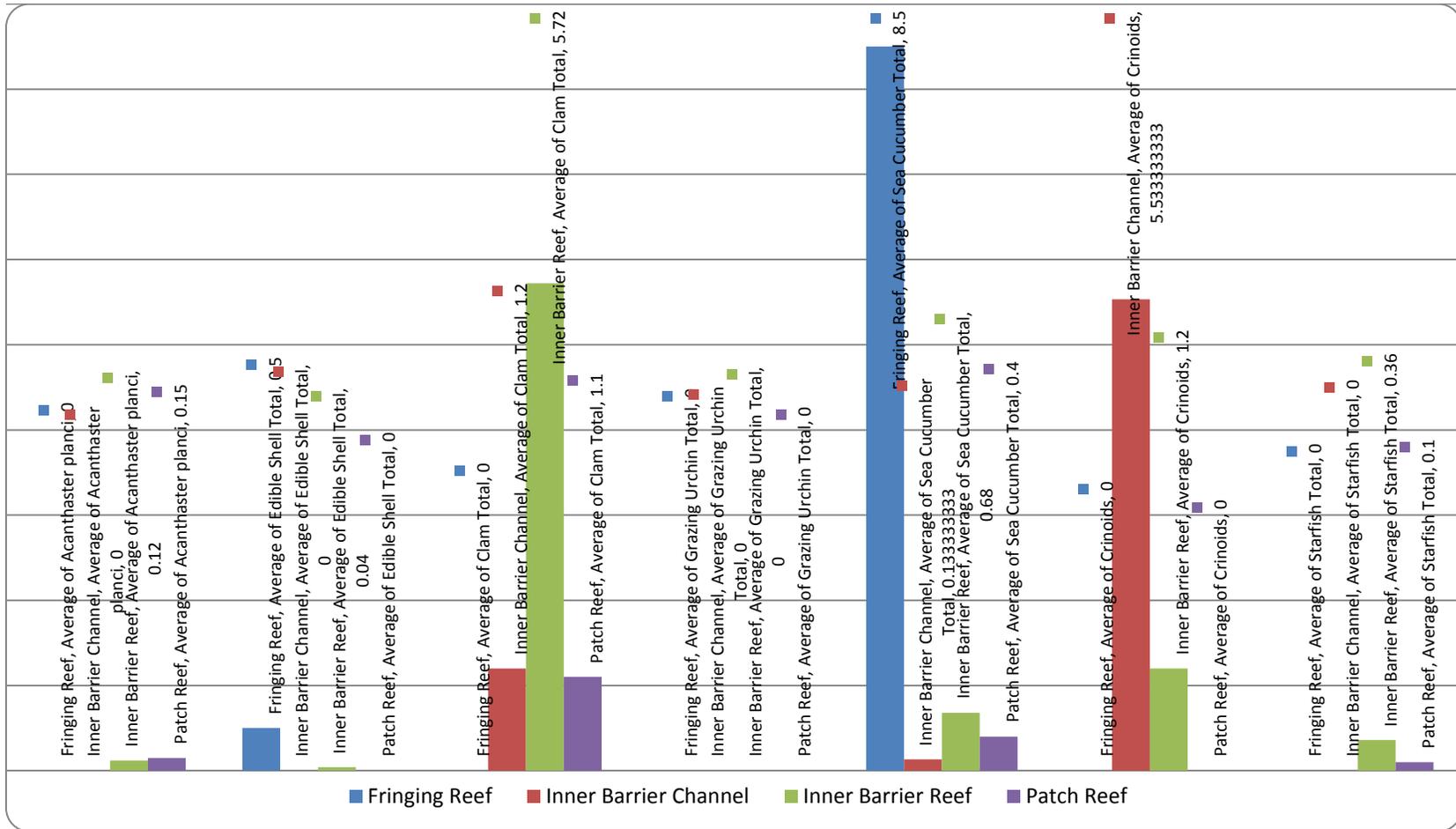
Graph 2: Analysis of average population estimates per site indicates no significant difference per site with the exceptions of Pokuru for clams and Truk Stop for sea cucumbers. All other sites hover at roughly the same ranges in averages of crown of thorns, edible shells, clams and sea cucumbers. Also of note are the disturbingly low estimates for edible shells (trochus, lambis lambis, turbo sp.) at all the sites. Although the Truk Stop site had the highest estimates, they still ranged at roughly 1 per survey, indicating a disturbing trend in the data. Crown of thorns starfish was shown to be approximately the same at all sites, with estimates of 1 or less.

Species Diversity at Reef Type Level



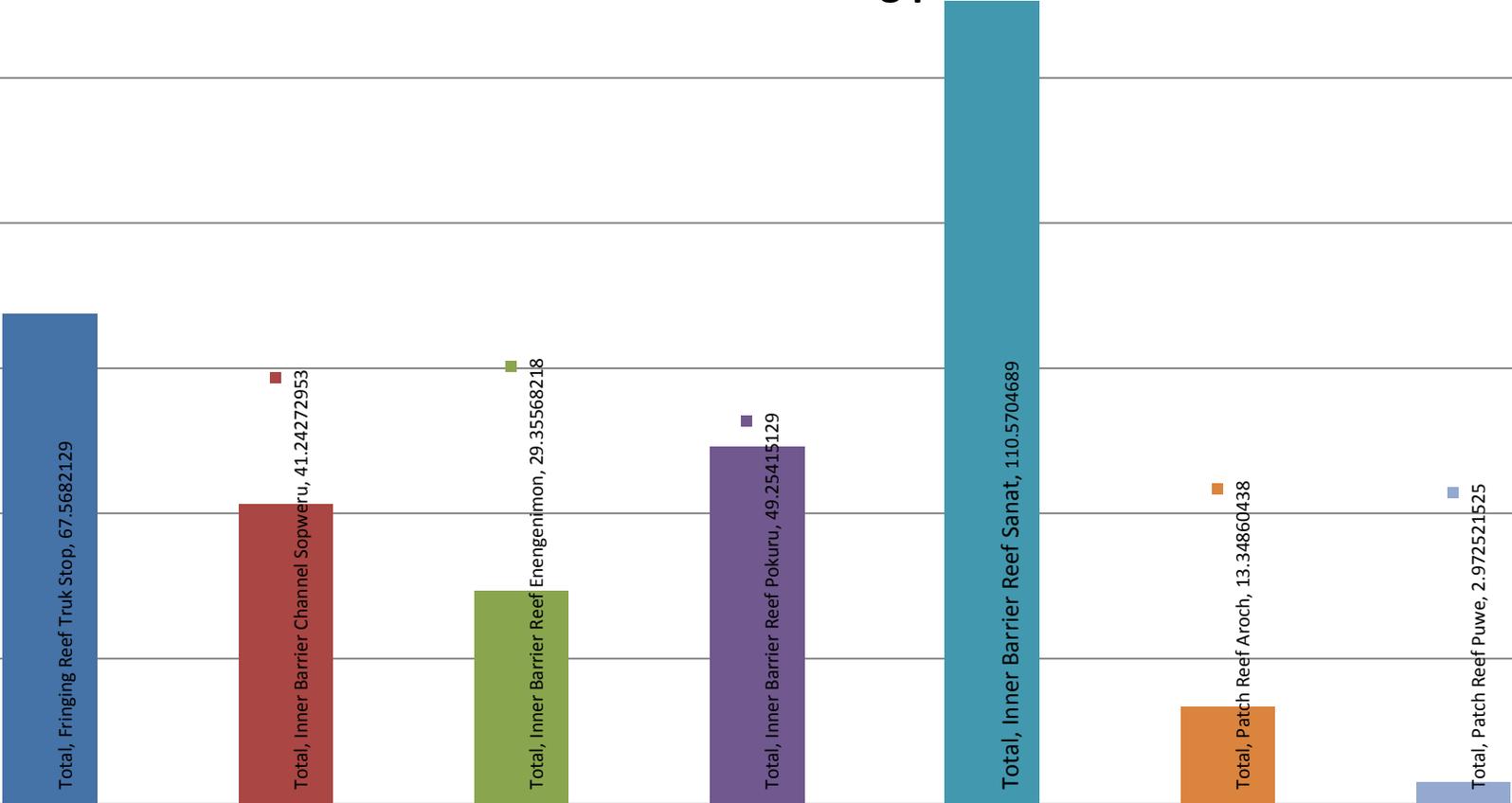
Graph 3: A comparison to show species diversity at the reef type level, indicates a significant difference in the more common species of sea cucumbers found during monitoring. Two species, *Holothuria atra* & *Holothuria edulis*, were dramatically higher than other species common on our reefs. The high estimates were mainly from the fringing reef of Truk Stop, but other than that one site, numbers were low for inner barrier channels, inner barrier reefs and patch reefs. It could be that these species are predominantly found on fringing reefs or that Truk Stop is a site where this species thrives. More fringing reefs sites would need to be monitored to offer a comparison to justify this trend.

Distribution of Invertebrate Over Different Reef Types

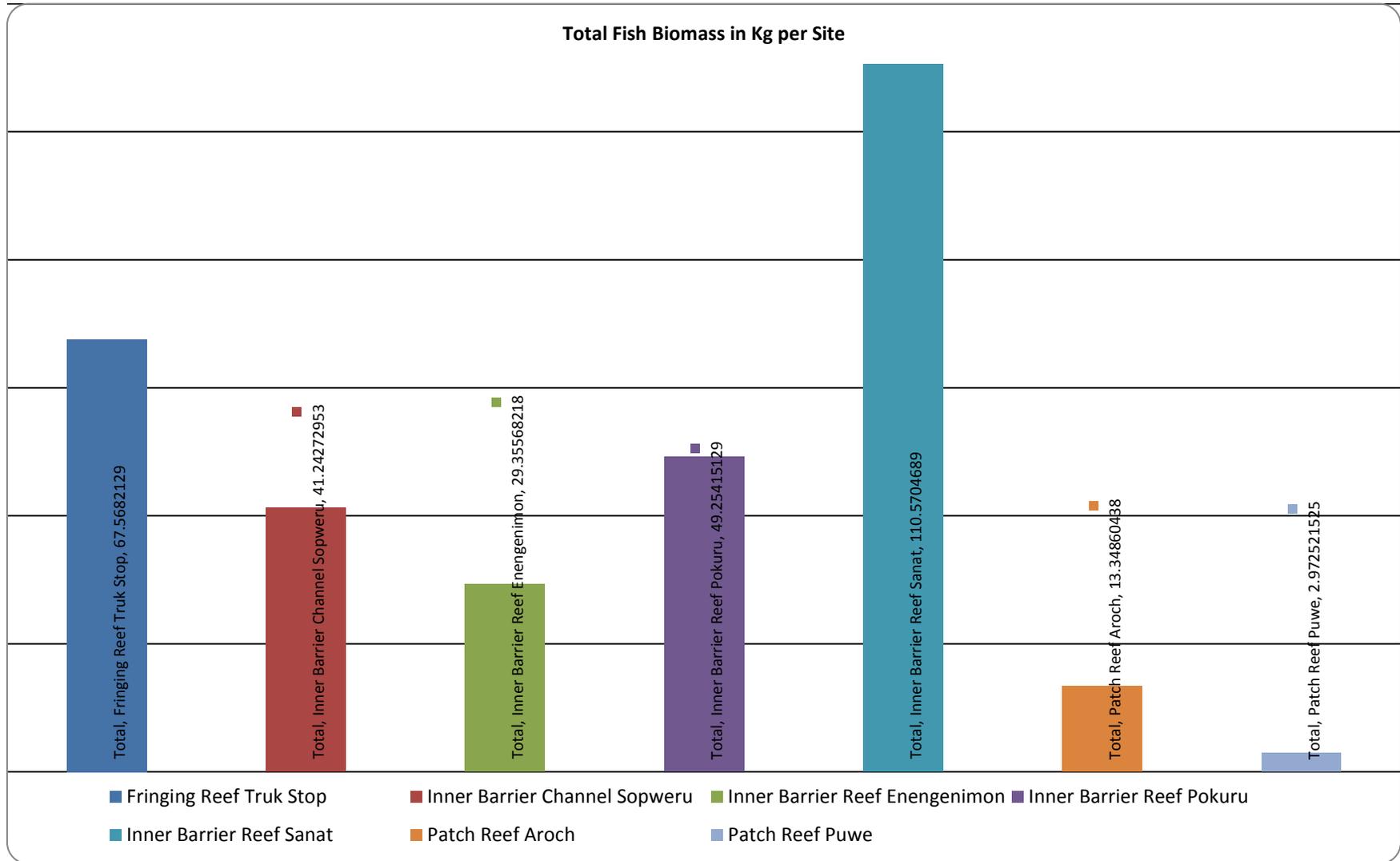


Graph 4: Significance differences can be found in the averages of clams, sea cucumbers and crinoids based on reef type. Sea cucumbers were highest along fringing reefs (Truk Stop) but these estimates were dominated by two main species, *Holothuria atra* and *Holothuria edulis*, accounting for a very uneven distribution of species at this site. Sea cucumber estimates were dramatically different at other reef habitats with inner barrier channels being the lowest. Clam totals were highest for inner barrier reefs, most likely due to their distance from major population & commercial centers. Previous studies in Chuuk (Chuuk REA Reports, have likewise shown the inner barrier reefs to be of high diversity, which may be a factor in the high estimates for clams in these areas. Of considerable note as well are the low estimates of clams on fringing reefs near high islands which are the main population & commercial hubs of the Chuuk lagoon. Crinoid estimates, as expected, were highest in inner barrier channels where wave action and currents provide conditions where crinoids thrive.

Total Fish Biomass in Kg per Site



- Fringing Reef Truk Stop
- Inner Barrier Channel Sopweru
- Inner Barrier Reef Enengenimon
- Inner Barrier Reef Pokuru
- Inner Barrier Reef Sanat
- Patch Reef Aroch
- Patch Reef Puwe



Graph 5. Total biomass of foodfish observed during exploratory monitoring on Chuuk using a single transect 250 m long by 5 X 5m wide at each site, grouped by function and family. This graph helps to understand that inherent differences exist in the composition of fish at Sanat and Truk Stop, despite both of them having a high overall biomass. Truk stop was dominated by a large school of small-bodied parrotfish, while at Sanat, both large-bodied snappers and parrotfish accounted for the majority of the biomass. Therefore, the integrity of the fish assemblage appears to be higher at the latter.

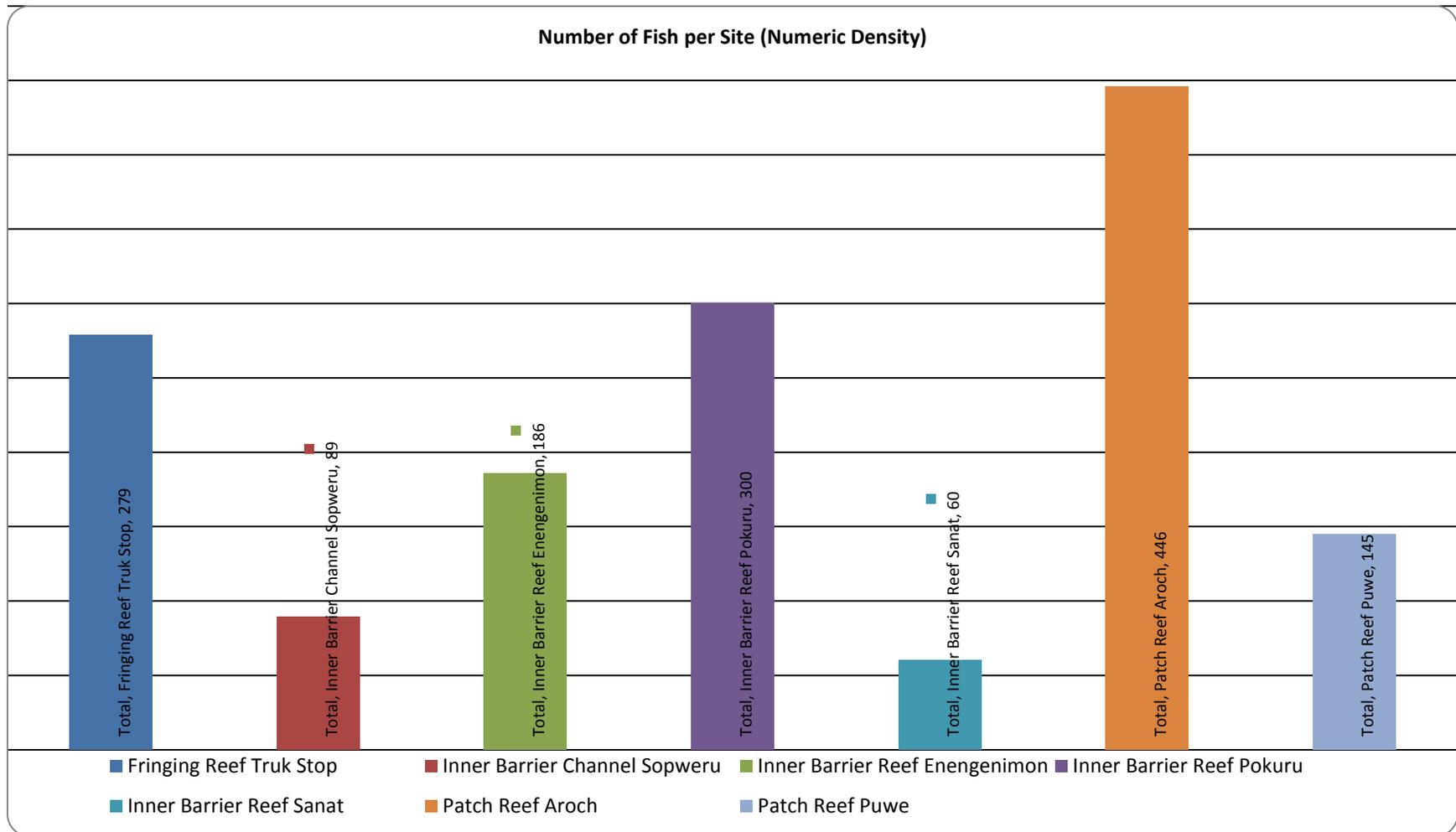


Figure 9. Numeric density of foodfish observed during exploratory monitoring on Chuuk using a single transect 250 m long by 5 X 5m wide at each site, by function and family. In general, when examining density, we see that small-bodied parrotfish and surgeonfish typically account for the greatest proportion of fish observed. The overall small contribution of large-bodied fish, especially secondary and tertiary predators, suggests that fishing pressure is notable across Chuuk.

Key Findings and Management Impacts:

The Chuuk state monitoring program, has 7 established sites within the Chuuk Lagoon (Table 1), with data collected for fish and invertebrates for 2010 and 2011. Much of this data is exploratory in nature, meant to provide enough baseline data to assist our local team and regional partners in the development of a more comprehensive monitoring program with a spread that is Chuuk specific. Fish monitoring was conducted without replicate transects at each site, thus limiting our ability to calculate means or standard deviation. Through this exploratory stage we mean to develop better sampling designs with replication but this exploratory analysis will help determine the spread of our future design. The Chuuk monitoring program likewise conducts benthic monitoring, however, not enough data has been collected analysis of the data to be conducted. Benthic data collection will continue to strengthen our monitoring down the road.

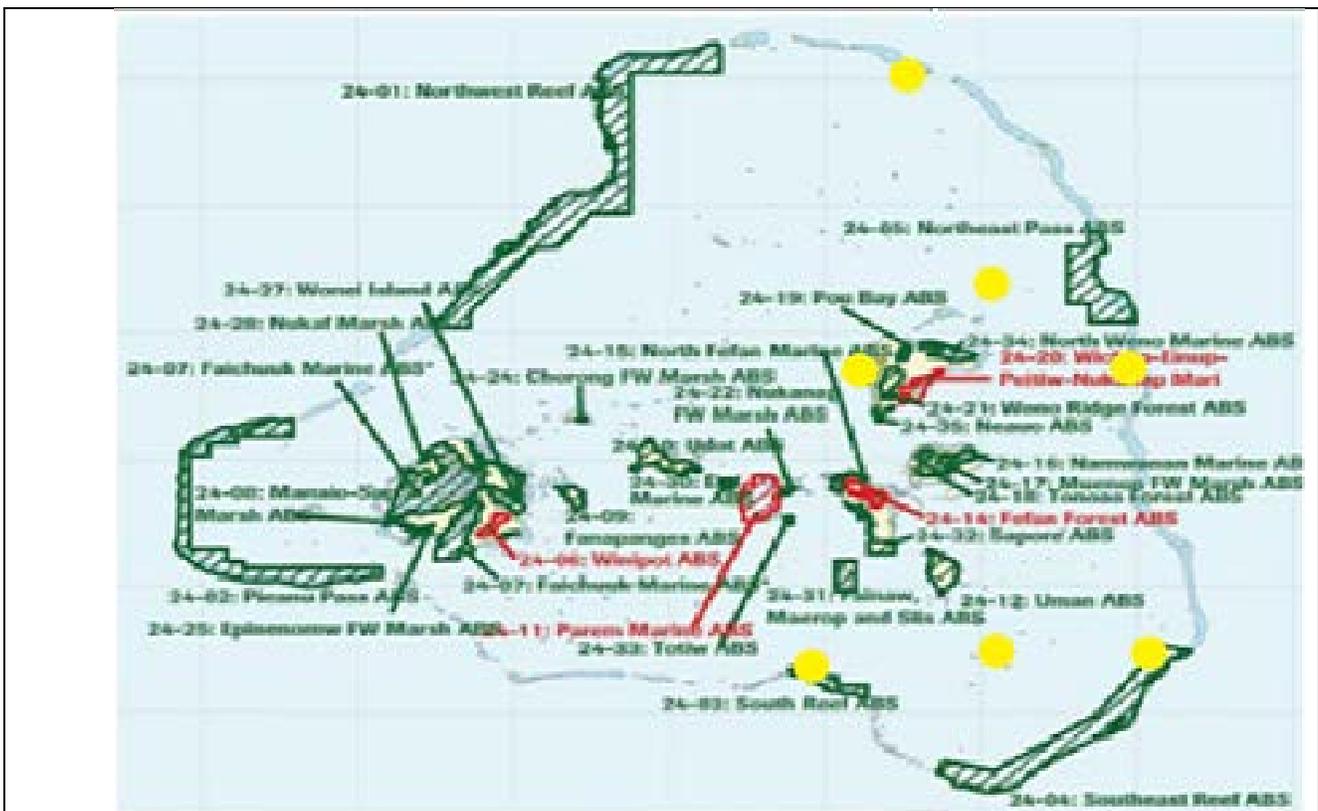


Table 3: Chuuk Lagoon Areas of Biodiversity Significance in relation to established monitoring sites.

As we have gathered more data and done additional monitoring with partners brought in to train our monitoring team, we have noticed some disturbing trends, namely in the low populations of sea cucumbers on our reefs. The Chuuk Conservation Society and partners have started lobbying for legislation to limit or ban the export of sea cucumbers and place additional measures to manage the resource. We have just recently had the island of Parem enact a municipal ordinance, closing off a section of their reef as a no-take zone as a result. Due to concerns over the perceived decline in sea cucumber and clam populations in the Chuuk lagoon, a formal request has also been made to have an overall marine invertebrate stock assessment done in Chuuk Lagoon and the outer island regions to help verify these lingering concerns. Assistance has been requested through the FSM National Government and the Secretariat of the Pacific Communities (SPC).

Results from monitoring is also instrumental to the development of Marine Protected Areas in Chuuk. The Chuuk Conservation Society is currently working with three communities to develop management plans for their protected areas. Sharing data from our monitoring program, has helped convince resource owners of the need to effectively manage their resources, and informed efforts on the development of management plans for their areas . Monitoring data also supplements the socio-economic surveys we conduct in our communities. This provides our communities a more holistic understanding of what is happening on the reefs and why when we do our community awareness and/or management planning activities.

The Chuuk monitoring program also links up to regional endeavors such as the Micronesian Challenge and adds local support for implementation of the FSM National Biodiversity Strategic Action Plan (NBSAP). While our monitoring program operates independently of our regional partners in terms of actually gathering the data, the Micronesian Challenge has forced us to put more emphasis on data management, sharing and analysis at the regional level. A critical step was taken during the 2nd Micronesian Challenge Measures Meeting, wherein methodologies and indicators for measuring the “effective management” of our marine resources, were agreed upon, providing a framework through which data across the region can be compared and analyzed as a whole. As a result, the Micronesian Challenge Database was created to allow for local monitoring programs linked to the MC, to house their data. Once data is input into the database, people with more professional experience in data analysis can analyze the data more thoroughly and provide us the answers we seek on the ground. In February of 2012, the Chuuk monitoring team will be participating in a workshop to familiarize ourselves with this process.

Project: *Coral and fish monitoring in the State of Yap, FSM*

PI: Vanessa Fread

Organization: Yap Community Action Program (YapCAP)

Project Objective: The proposed project will consolidate efforts of the Marine Resource Division of the State Government and Yap Cap’s Environmental Program to monitor and assess changes in coral covers over time as well as health and population of corals and fish in all established monitoring sites in Yap based on the results of the Rapid Ecological Assessment (REA).

1. *Additional on-site training in the design of databases, data management, and analysis for the state monitoring programs*
2. *Continued assistance on field data collection with regards to coral population assessments, benthic data, and indicator fish estimates*
3. *Purchase materials, supplies, equipment*
4. *Prepare reports*

1. **Project Summary from (10/01/2010 to 09/30/2011:** Work Accomplished for this grant/project for work period (*October 01, 2010 – September 30, 2011*)

- Implementation and actual coral reef data collection was delayed, but it was completed by Sept. 30, 2011;

- This year's Yap Coral Reef Monitoring Team consisted of 14 members consisting of staff from Yap CAP (2) and trained Community Representatives (12);
- Activities completed and methods used to implement activities included:
 - Met with Dr. Peter Houk from PMRI (one of the Yap Coral Reef Monitoring Program Advisors) to review field work plan and protocols during his visit to Yap from May 1 – 11, 2011;
 - The Yap Coral Reef Monitoring Team joined Dr. Peter Houk in re-surveying the Rapid Ecological Assessment sites that were surveyed in 2007 to obtain 2011 information for analysis and at the same time enhance their skills in monitoring methods/protocols;
 - Conducted team meeting and refresher training with team members before commencing data collections this summer;
 - Commenced and completed data collections utilizing a 14 member team consisting of trained Yap CAP staff and community representatives;
 - We monitored 10 established monitoring sites on Yap Island at two depths 10 meters and/or 3 meters - 1) Nimpal Channel Marine Conservation Area (MCA); 2) Gachuug Channel - Nimpal Channel MCA Reference Site; 3) Peelaek Channel MCA; 4) Gabach Channel - Peelaek Channel MCA Reference Site; 5) Miil Channel; 6) Goofnuw Channel; 7) Reey MCA; 8) Gael Outer Reef - Reey MCA Reference Site; 9) Atliw Channel, and; 10) Fanif (Gilfith) Outer Reef.
- We collected the following parameters using the indicated methods/protocols below:
 - Transect Tape: 2 divers, 5 x 50m transects;
 - Fish Count Surveys: 2 divers, 10m x 50m belt transects utilizing the developed fish list of locally and commercially significant fish species;
 - Benthic Photo Quadrat Surveys: 4 divers, 40-50 frames/photos using a 50cm x 50cm photo quadrat, per 50m transect;
 - Macro-invertebrate Surveys: 2 divers, 10m x 50m belt transects utilizing the developed macro-invertebrate list of locally and commercially significant invertebrate species;
 - Coral Population Quadrat Surveys: 2 divers, 6 samples along the 250m (5 x 50m transect) sample area utilizing a 1m x 1m quadrat;
- During Dr. Peter Houk's visit in May we also discussed Yap's coral reef monitoring database and how best to enter and manage the data;
- We continue to work with PMRI and PICRC on data analysis and enhancements/improvements to Yap's Coral Reef Monitoring Program;

- All datasheets have been filed and are currently being entered by the team into our database. Once all data sets have been entered they will be analyzed with the assistance of Dr. Peter Houk and a report will be compiled.

Yap Monitored site names, GPS coordinates and Monitoring dates:

Site Name	Coordinates		Number of Visits	Visit Dates
	X	Y		
Gabach Channel	9°29'16.773"N	138°07'08.731"E	1	09/26/2011
Gabach Outer Reef	9°29'02.676"N	138°07'42.722"E	1	09/12/2011
Gachuug Channel	9°31'09.80"N	138°04'11.71"E	1	09/27/2011
Gachuug Outer Reef	9°30'57.29"N	138°03'42.22"E	1	09/19/2011
Goofnuw Channel	9°34'15.779"N	138°12'09.386"E	1	09/29/2011
Goofnuw Outer Reef	9°33'23.027"N	138°12'49.400"E	1	09/14/2011
Miil Channel	9°36'04.914"N	138°07'56.034"E	1	09/27/2011
Miil Outer Reef	9°36'12.581"N	138°07'15.906"E	1	09/29/2011
Nimpal Channel	9°32'46.540"N	138°05'06.588"E	1	09/28/2011
Nimpal Outer Reef	9°32'30.10"N	138°04'32.58"E	1	09/20/2011
Peelaek Channel	9°31'07.468"N	138°10'51.915"E	1	09/26/2011
Peelaek Outer Reef	9°31'18.553"N	138°11'35.745"E	1	09/13/2011
Reey Outer Reef	9°27'30.555"N	138°02'28.121"E	1	09/15/2011
Gael Outer Reef	9°28'46.489"N	138°02'39.276"E	1	09/16/2011
Atliw Channel	9°34'00.161"N	138°05'47.027"E	1	09/28/2011
Gilfith Outer Reef	9°34'48.719"N	138°06'07.397"E	1	09/21/2011

Yap Coral Reef Monitoring Sites

- Atiluw Channel
- Gabach Channel
- Gabach Outer Reef
- Gachuug Channel
- Gachuug Outer Reef
- Gael Outer Reef
- Gilfith Outer Reef
- Goofnuw Channel
- Goofnuw Outer Reef
- Miil Channel
- Miil Outer Reef
- Nimpal Channel
- Nimpal Outer Reef
- Peelak Channel
- Peelak Outer Reef
- Reey Outer Reef



Data and Analysis and Management Impacts:

We currently have data sets from 2007, 2009, 2010, and this year (2011). We are currently working with Dr. Peter Houk from PMRI on data analysis and processing of all data sets collected from 2007 – 2011 for a better picture/understanding of the current overall health of coral reefs in Yap. Fish market data collected in Yap in 2008 and data from a Marine REA conducted on Yap in 2007 and 2011 are also available (these findings are currently under review for publication in scientific journals). Yap CAP is working with PMRI on data analysis and publications of findings from various studies and data that is being collected as part of Yap's Coral Reef Monitoring Program.

There is currently a movement in Yap by Government Leadership to support more environment initiatives including Community-based Marine Conservation Areas (MCA) through legislation (e.g. legal

framework to support community-based MCAs). They are also discussing legislation to help protect specific fish species (e.g. Napoleon Wrasse and Bumphead parrotfish). All the data that has been collected thus far over the years as part of Yap's Coral Reef Monitoring Program as well as other survey activities (e.g. Marine REA, Fish Market Survey) will be used to support these current efforts and help draft legislation for protection of Yap's coral reefs and support of community efforts to manage their natural resources. Data will also be used to support community outreach and better understanding of what is happening on reefs in Yap. Lastly, the data collected thus far will be used to assist communities understand what is happening within their Marine Conservation Areas and how effective management is within these areas. There have been discussions of expanding the current boundary of the Nimpal Channel Marine Conservation Area this year based on data that has been collected over the years. Yap CAP continues to assist communities on Yap with community-based marine management and species specific management. Data collected and continued support from MCT and NOAA is very much needed to further this work and consultations with communities in Yap.

Tabular Summary of Expenditures: NOAA 2010

<i>Project Title</i>	Approved Funds	Expended Funds (10/01/10 to 09/30/11)	Expended Funds (to date)	Remaining Funds
<i>Coral and Fish Monitoring in the State of Kosrae, Federated States of Micronesia</i>	\$16,316.75	\$16,316.75	\$16,316.75	\$0
<i>Coral and Fish Monitoring in the State of Pohnpei, Federated States of Micronesia</i>	\$16,278.72	\$16,278.72	\$16,278.72	\$0
<i>Coral and fish monitoring in the State of Chuuk, Federated States of Micronesia</i>	\$13,420.00	\$13,420.00	\$13,420.00	\$0
<i>Coral and fish monitoring in the State of Yap, Federated States of Micronesia</i>	\$16,650.00	\$16,650.00	\$16,650.00	\$0
<i>MCT Monitoring and Evaluation</i>	\$5,758.06	\$5,758.06	\$5,756.06	\$0
<i>MCT coordination and overhead</i>	\$11,576.47	\$11,576.47	\$11,576.47	\$0
<i>TOTAL</i>	\$80,000.00	\$80,000.00	\$80,000.00	\$0