NOAA 2011 Final Report

Conservation Society of Pohnpei

Executive Summary:

Pohnpei Coral Reef Monitoring (CRM) team completed another round of monitoring using a refined Long Swim or Timed Swim monitoring protocol as recommended by our partners from the University of Guam (UOG) to survey large reef food fish. Adopted by CRM team, this method is to help in meeting the goals of the Micronesia challenge to help detect change in MPA effectiveness. Unlike the 5X50 meter transect, this method is designed the capture large reef food fish and key indicator species that cannot be detected in 5X50 meter transects. 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 the CRM team monitors MPA effectiveness and then there is the general coral reef monitoring where the CRM team assesses the overall health of Pohnpei's reef. This report will mainly cover the MPA effectiveness coral reef monitoring program. There are 32 permanent sites around Pohnpei that encompass five MPA's (Dehpehk, Mwahnd, Lenger, Kehpara and Nahtik). This protocol is design to give us a general view of the larger reef fish population inside and outside MPA's. In addition, the CRM team continues to collect monthly sedimentation-collection at (8) stations to evaluate run-off fluctuations at Nett/Kolonia bay. Continue working with two MPA communities to improve their monitoring method. Collect annual Spawning and Aggregation (SPAG) data for three species of groupers at Kehpara MPA to detect change overtime in density and size. Collect quarterly Sea-grass monitoring to detect change in sea-grass health. Sea-grass data is not presented in this report due to data is send and analyzed at the University of New Hampshire, data can be acquired at (www.seagrassnet.org).

Methodology:

This method involves three divers, two observers swimming alongside at a constant speed and similar depth of 10 meters recording fish abundance and size. The two divers conducting fish counts does so within an area of 5m X 5m on both sides for 20 minutes and estimates the size in centimeters. The third diver trail along within 3-5 meters towing a GPS to track the distance the observers cover. This new method of GPS tow is use fully when recording the exact areas surveyed and the areas covered on each dive. Unlike the 5X50 meter transect method, the Time Swim method is able to pick-up more larger reef fish and key indicator species. CRM team members consist of one staff member from Pohnpei Division of Forestry and Marine Conservation, Office of Fisheries and Aquaculture and Conservation Society of Pohnpei.

Site Information:

Site Name		Coordinates		# Visits	Dates	Reef Type	MPA	ABS
		X	Y					
Dehpehk	DI1	158.306133	6.9567	1	11/17/11	Fringing	YES	Yes
Dehpehk	DI2	158.3065833	6.959555556	1	11/17/11	Fringing	YES	Yes
Dehpehk	DO1	158.2794444	6.969666667	1	11/17/11	Fringing	NO	NO
Dehpehk	DO2	158.28075	6.968833333	1	11/17/11	Fringing	NO	NO
Kehpara	KI1	158.123833	6.8013	1	01/20/12	Inner	YES	Yes
Kehpara	KI2	158.125717	6.7948	1	01/20/12	Inner	YES	Yes
Kehpara	KI3	158.11395	6.794467	1	01/18/12	Outer	YES	Yes
Kehpara	KI4	158.11262	6.80458	1	01/18/12	Outer	YES	Yes
Kehpara	KO1	158.13555	6.7971	1	01/20/12	Inner	NO	Yes
Kehpara	KO2	158.139333	6.794617	1	01/20/12	Inner	NO	Yes
Kehpara	KO3	158.128133	6.7831	1	01/18/12	Outer	NO	Yes
Kehpara	KO4	158.139833	6.7804	1	01/18/12	Outer	NO	Yes
Lenger	LI1	158.21817	7.0053	1	09/20/11	Fringing	YES	Yes
Lenger	LI2	158.22349	7.009	1	09/20/11	Fringing	YES	Yes
Lenger	LO1	158.24242	7.00257	1	09/22/11	Fringing	NO	NO
Lenger	LO2	158.2513	7.01415	1	09/22/11	Fringing	NO	Yes
Mwahnd	MI1	158.29705	7.009017	1	11/02/11	Inner	YES	Yes
Mwahnd	MI2	158.289	7.01309	1	11/02/11	Inner	YES	Yes
Mwahnd	MI3	158.302783	7.0164	1	10/18/11	Outer	YES	Yes
Mwahnd	MI4	158.308	7.012617	1	10/18/11	Outer	YES	Yes
Mwahnd	MO1	158.279533	7.021033	1	11/02/11	Inner	NO	Yes

Mwahnd	MO2	158.275567	7.022917	1	11/02/11	Inner	NO	Yes
Mwahnd	MO3	158.286967	7.027833	1	10/18/11	Outer	NO	Yes
Mwahnd	MO4	158.277983	7.035317	1	10/18/11	Outer	NO	Yes
Nahtik	NI1	158.21535	6.77931	1	01/19/12	Inner	YES	Yes
Nahtik	NI2	158.213217	6.776633	1	01/21/12	Inner	YES	Yes
Nahtik	NI3	158.2127	6.773533	1	01/19/12	Outer	YES	Yes
Nahtik	NI4	158.218267	6.77285	1	01/19/12	Inner	YES	Yes
Nahtik	NO1	158.228967	6.771633	1	01/19/12	Inner	NO	Yes
Nahtik	NO2	158.204583	6.780717	1	01/21/12	Inner	NO	Yes
Nahtik	NO3	158.229	6.767633	1	01/21/12	Outer	NO	Yes
Nahtik	NO4	158.20438	6.77218	1	01/21/12	Outer	NO	Yes
Ipwal (Seagrass)	PO2.2	158.187467	6.981459	3	Quarterly	Fringing	NO	No
Rohi (Seagrass)	PO2.1	158.280434	6.787001	3	Quarterly	Fringing	NO	Yes
Sediment Monitoring	D1	158.218833	6.965472	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D2	158.219472	6.969278	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D3	158.219139	6.972056	10	Monthly	Fringing	NO	No
Sediment Monitoring	D4	158.219722	6.977389	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D5	158.220611	6.981139	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D6	158.2217	6.98478	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D7	158.220139	6.989861	10	Monthly	Fringing	NO	NO
Sediment Monitoring	D8	158.22256	6.98817	10	Monthly	Fringing	NO	NO

Project Outcome:

The Pohnpei Coral Reef Monitoring program has 32 established permanent sites within the main island (Map 1), inclusive data collected for fish, sediment and sea-grass for 2011 and 2012. This is a newly introduce method of monitoring with the expectation of more data collections that would enable us to see trends in fish density and size through time. Since this monitoring was focused on looking at large reef fish of Pohnpei, the mean rate of change trends in population and size for all sites are respectable for comparison to the co-existing general coral reef monitoring program.

MPA vary in their success, it's clear that inner reef MPA have more fish than inner reef non-MPA. However, this is not the case for all Inner reefs MPA for some are working well and some are not. Outer reef MPA are not working well. This may be due to natural variability or non-effective MPA. Observer bias is pretty big that is why some trends were not significant. Data are as follows:

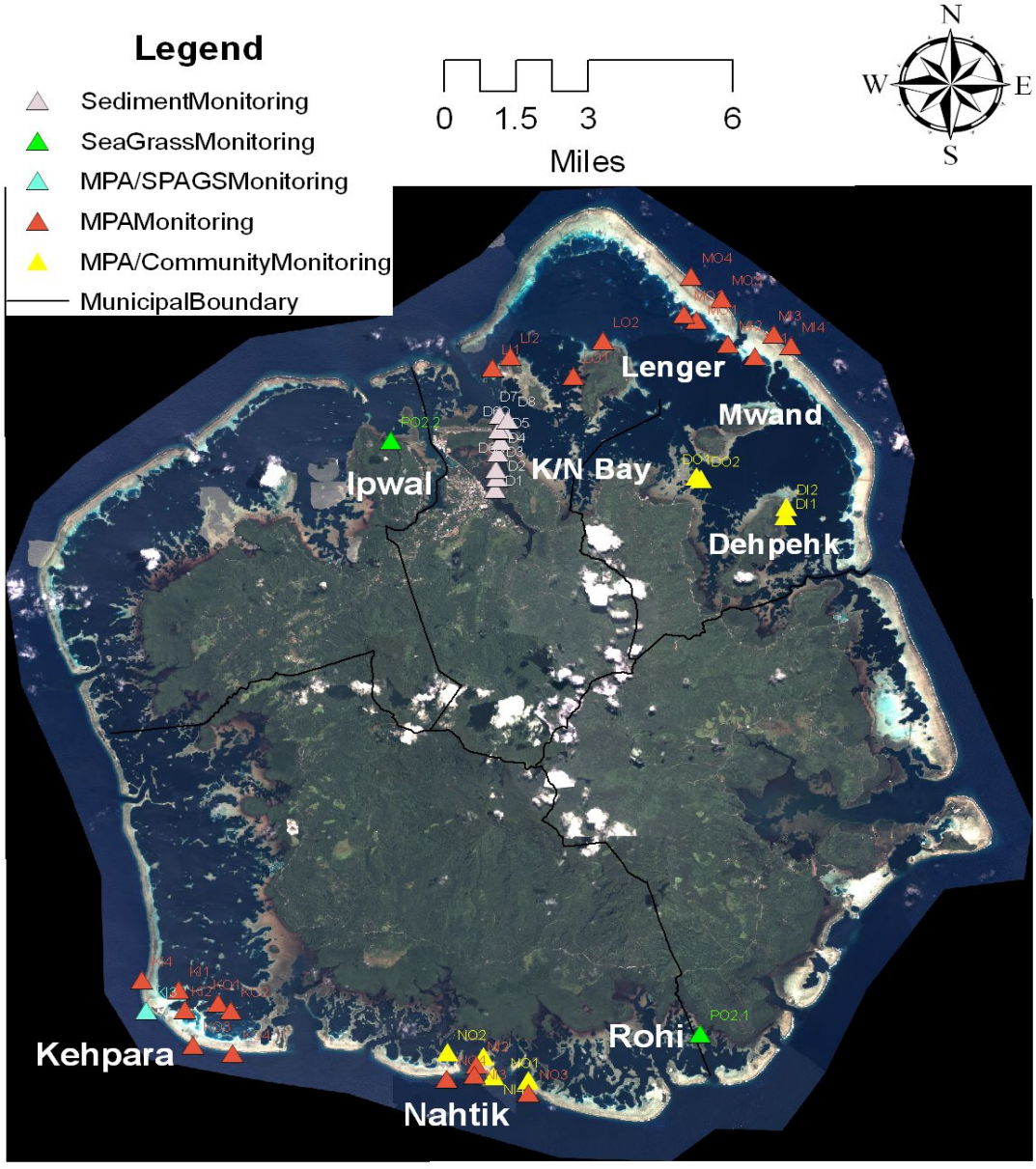


Figure A. Principal Components Ordination (PCO) plot highlighting fish assemblage differences between all inner reef monitoring sites. Fish that were most influential in driving the plot structure, which had spearman rank correlations of 0.5 or higher with the PCO axes, are shown. Marine protected areas (MPA) tended to have greater abundances of a suite of desirable food fish; however there was a lot of variability between the successes of each MPA. For instance, MPA "K" (Kehpara),"M" (Mwahnd), and "N" (Nahtik) all had significantly more food fish than their respective reference sites, while MPA "L" (Lenger) and "D" (Dehpehk) did not show any significant differences from their respective reference sites.

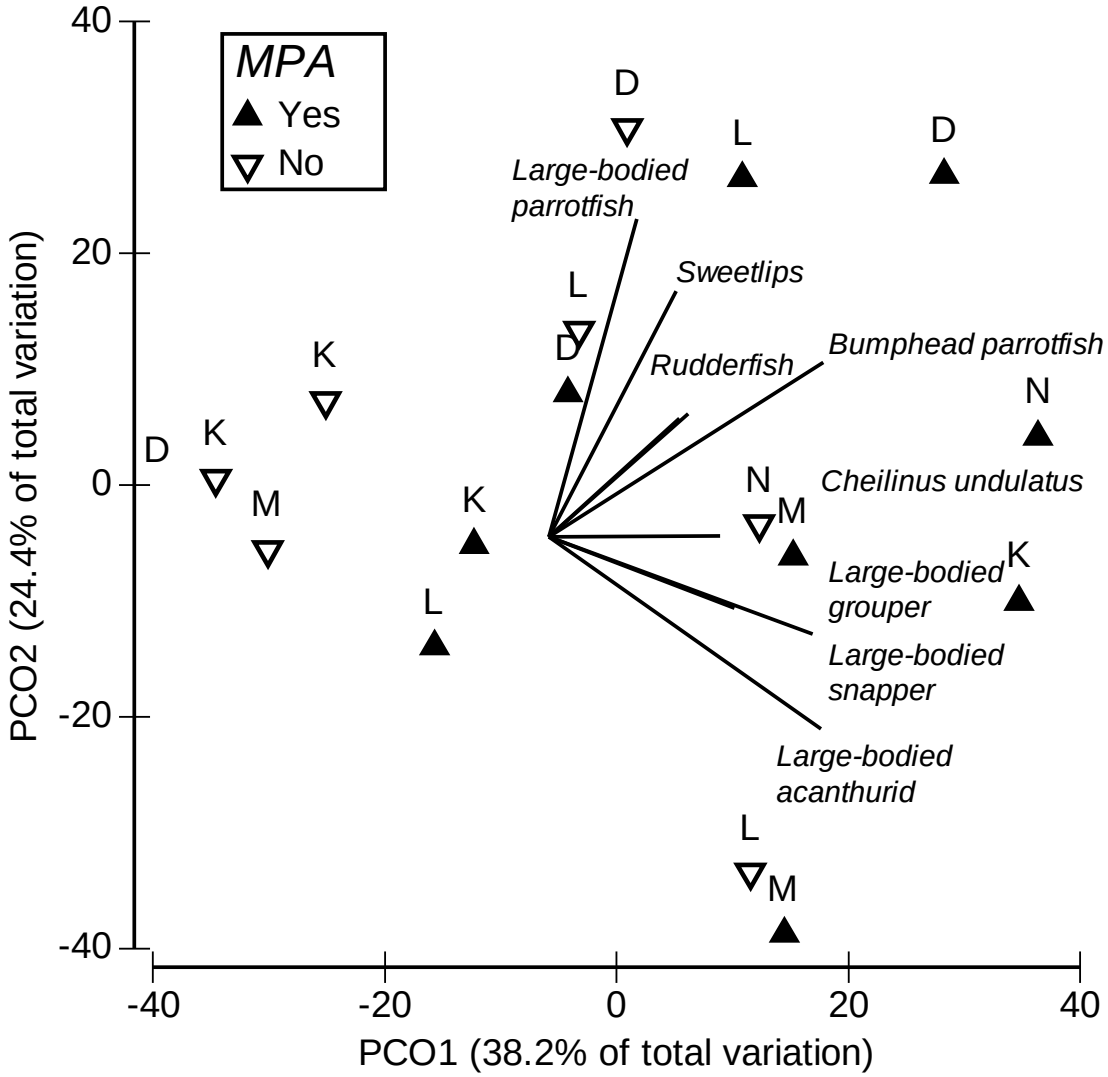


Figure A2. Principal Components Ordination (PCO) plot highlighting fish assemblage differences between all outer reef monitoring sites. Fish that were most influential in driving the plot structure, which had spearman rank correlations of 0.5 or higher with the PCO axes, are shown. In general, outer reef MPA showed little differences in comparison with their references sites, as only MPA "M" (Mwahnd) had significantly greater abundances of several food fish. It appears that unregulated fishing persists more within outer reef MPA compared with inner reef MPA, or there is much greater natural variability in fish abundances on outer reefs.

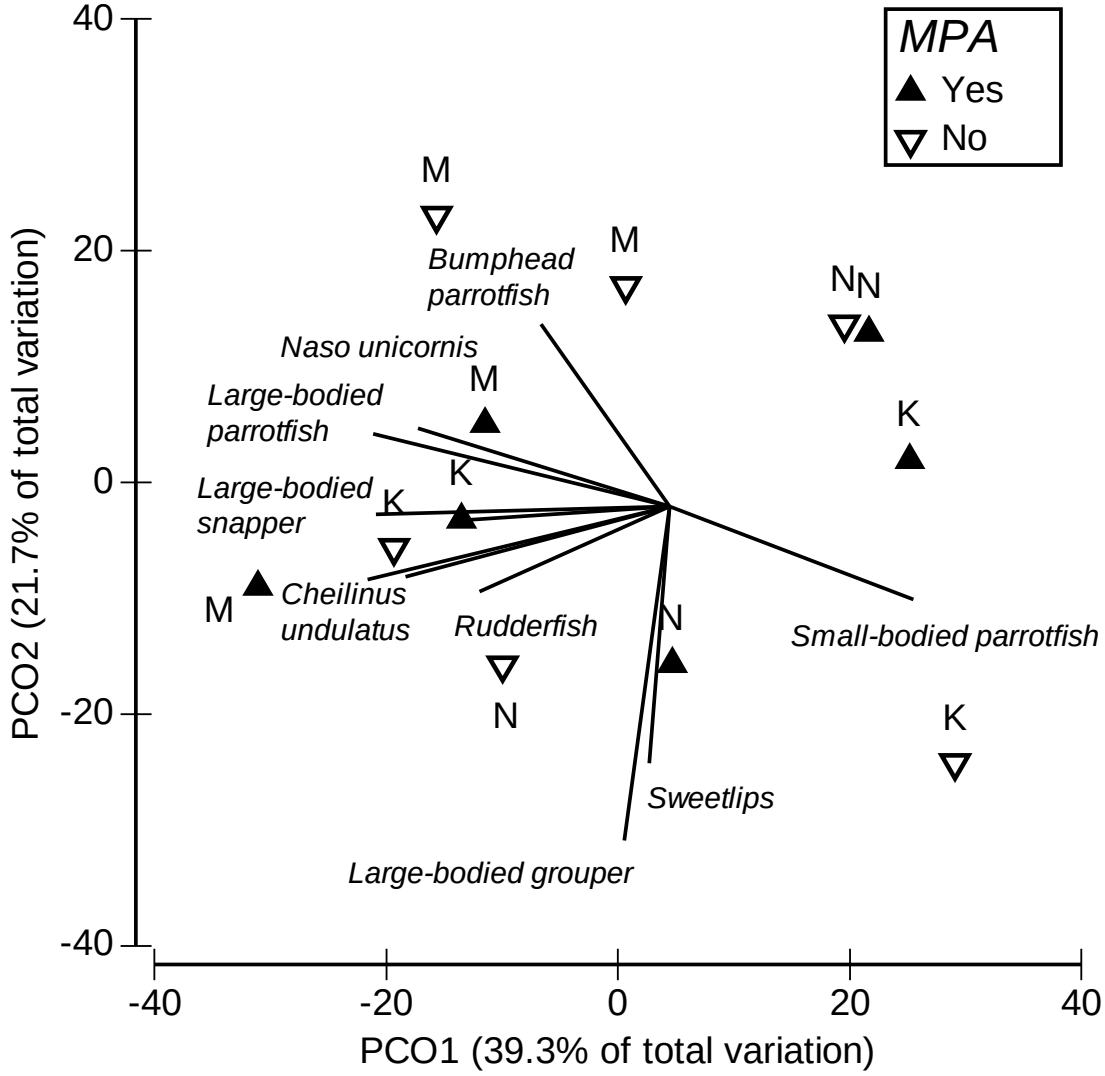


Figure B. Size class distribution for food fish observed inside and outside of inner reef MPA. Food fish were significantly larger inside of MPA when all of the inner reefs were all grouped together ($P<0.01$, pair wise t-test). However, as noted above, individual MPA varied in their success.

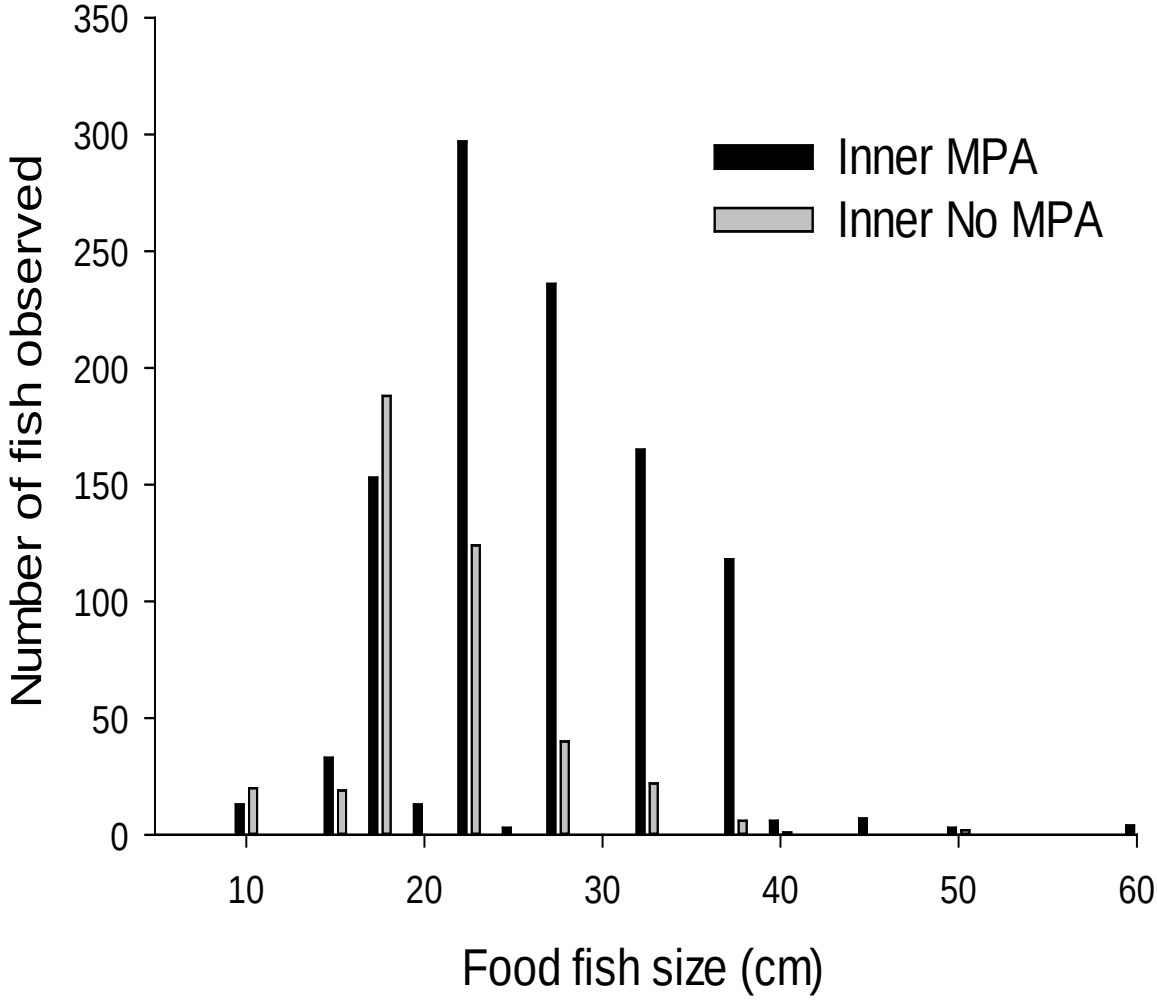


Figure B2. Size class distribution for food fish observed inside and outside of outer reef MPA. Food fish were not significantly different inside of MPA when all of the outer reefs were all grouped together. This is consistent with the above results showing limited success of outer reef MPA, or higher natural variability.

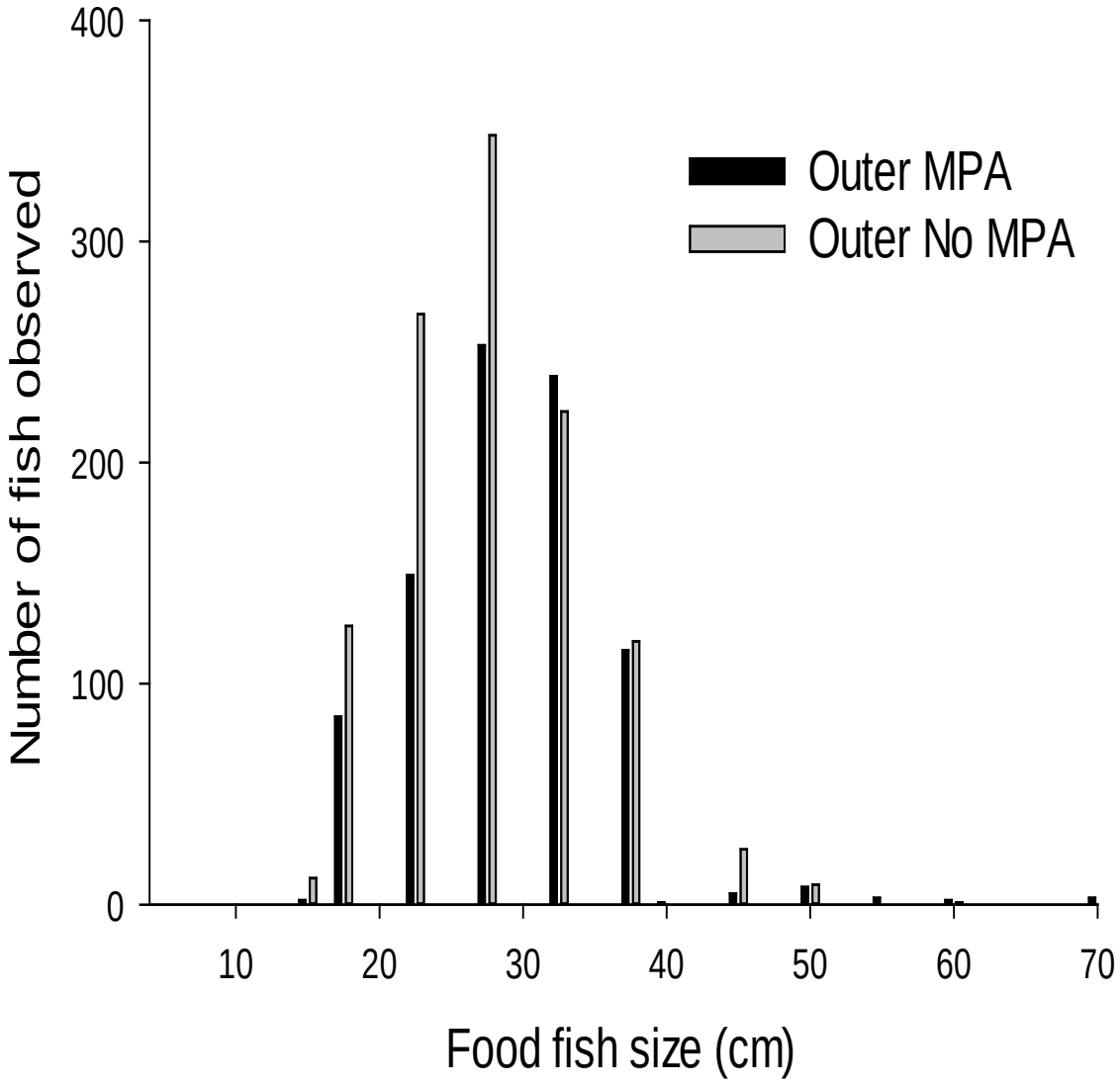
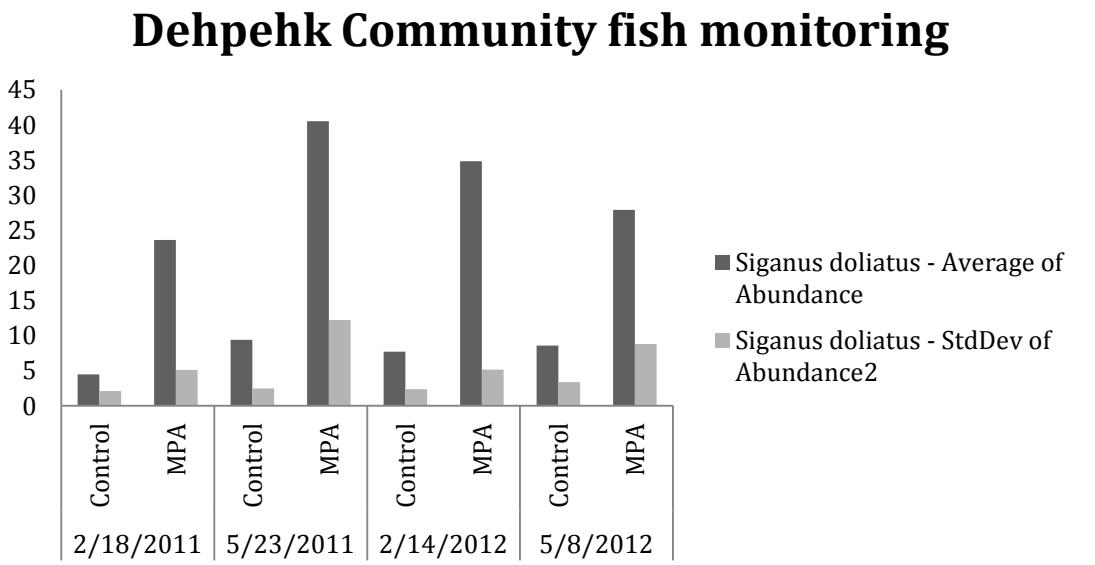


Figure C. Community monitoring are facilitated by CSP where data collection are conducted by Community Conservation Officers (CCO). Trained in simple belt transect (5X50 meter) community monitoring is conducted on a quarterly basis based on key species known to each respective MPA. Community Data shows fish significant difference at MPA vs. Control sites.



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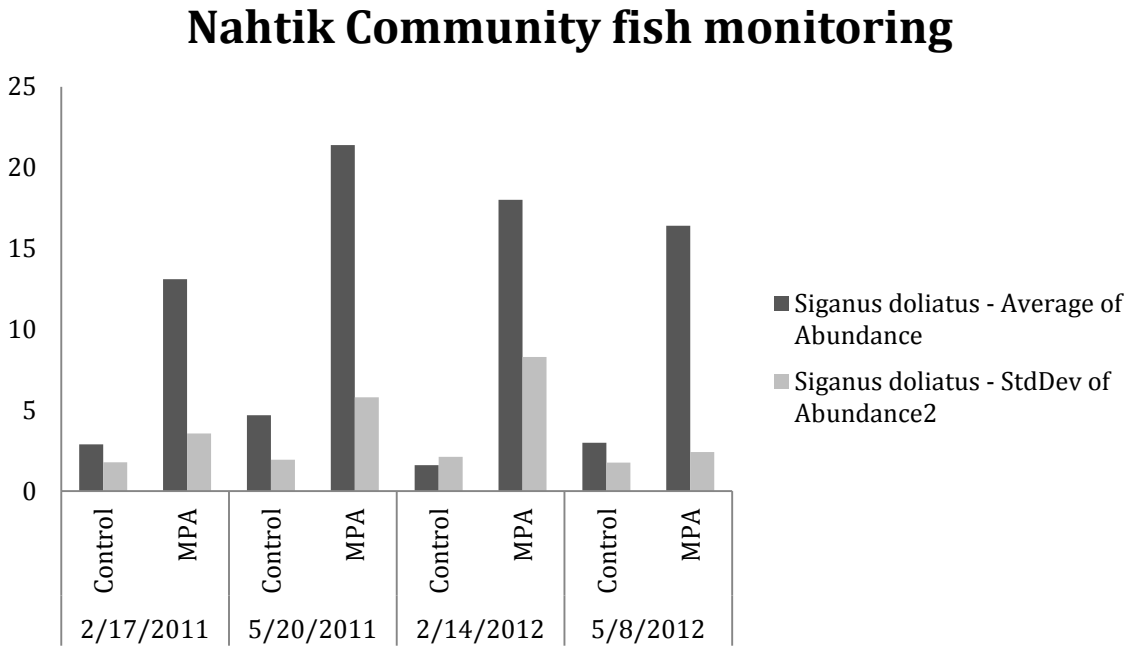

Figure C and C2, over the past two years both MPA's show very strong trends for higher fish population inside the MPA then the non MPA. 2 - 3 times higher density inside the protected area than outside. Siganus doliatus a highly targeted rabbit fish species for both MPA communities is showing a rebound in population that should benefit their reef health and their 'outside' fishing grounds.

Sedimentation Monitoring

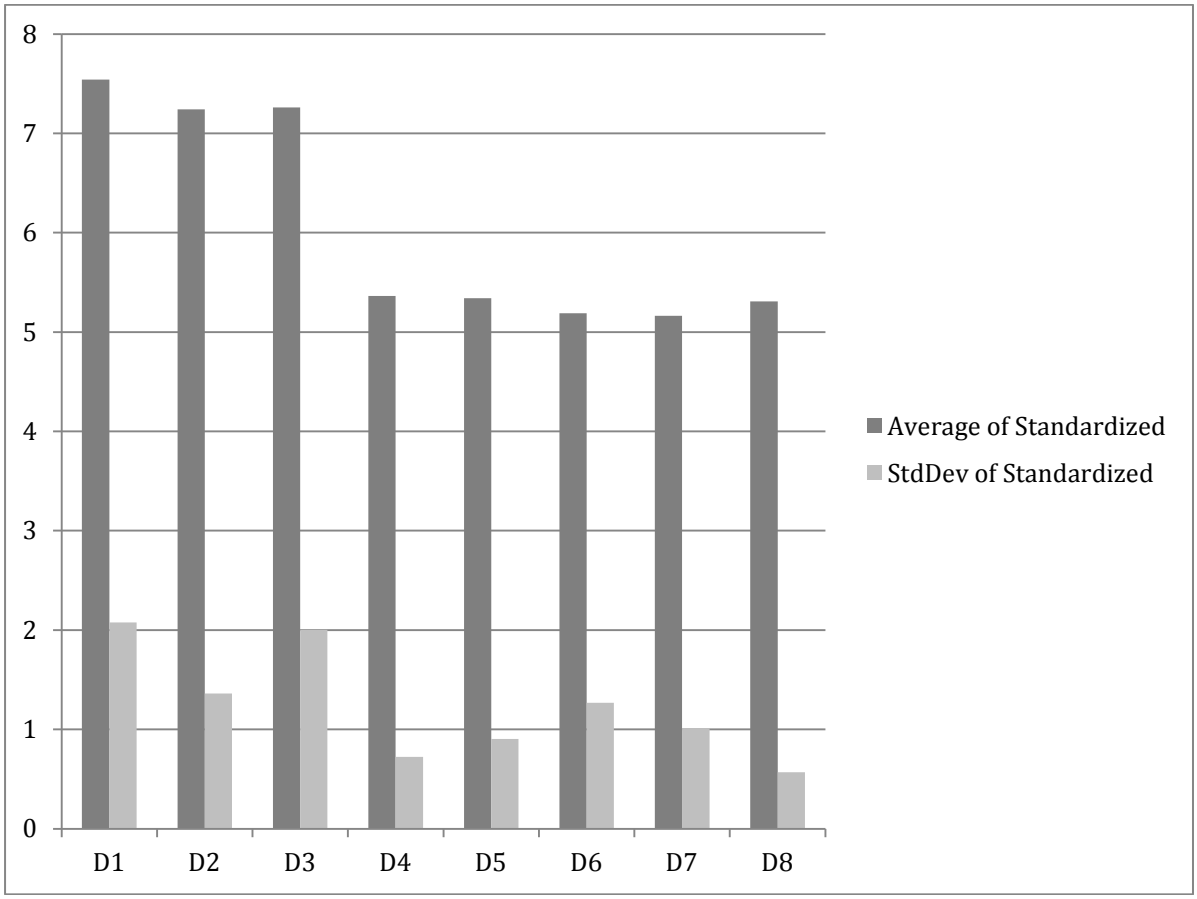

Figure D. Sediment though the past 2 years has been consistent. Direct effects of sedimentation are D1 to D3, very significant and consistent through time after that no further trends. Temporal dynamics seem to be weather, dry versus wet season.

Grouper Spawning Monitoring Data - March 2012

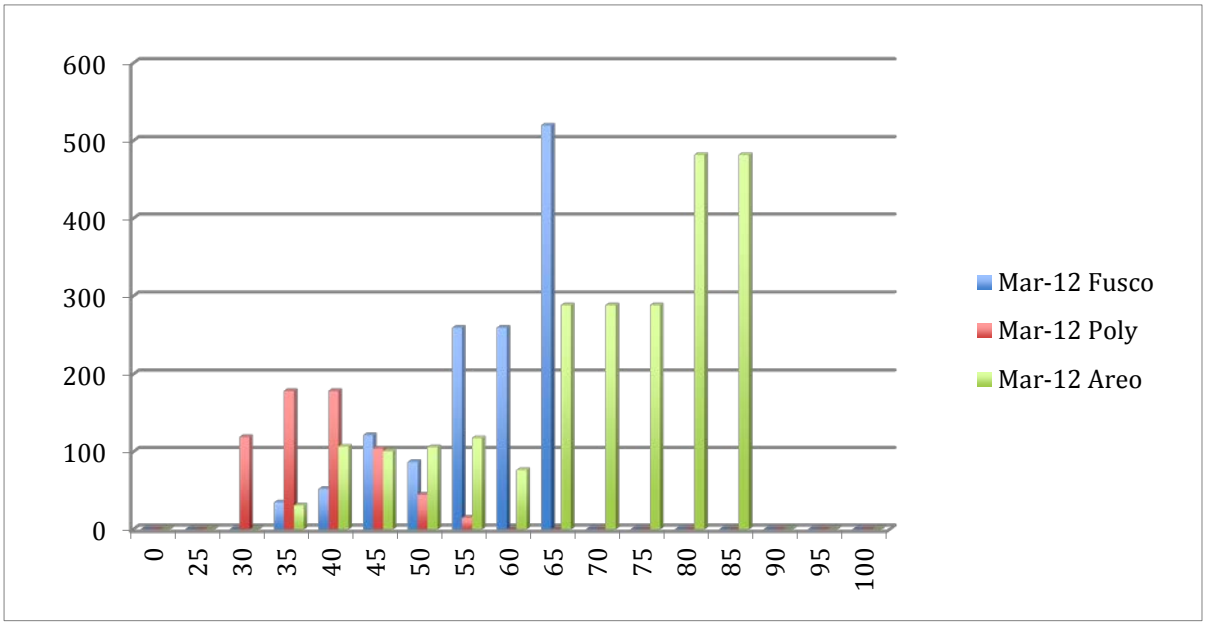

Figure E. Note: Total species (Fusco, Poly, Areo) counted inside Kehpara Fish Spawning Area. More population at larger length (Fusco and Areo). Presence of poly at 40 and 45 centimeter.

Grouper Spawning Monitoring Data – April 2012

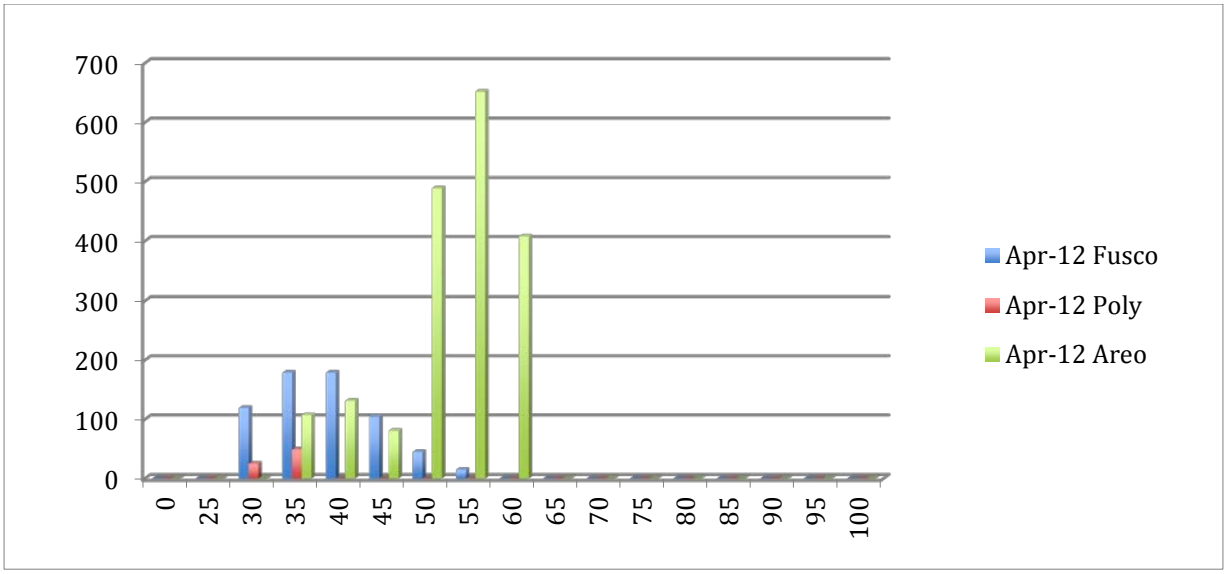

Figure E2. Note: Total species (Fusco, Poly, Areo) counted inside Kehpara Fish Spawning Area (FSA). Data not showing presence of Poly at this month. More species at larger length.

Accomplishments and Challenges:

A. Work Accomplished:
    a. Continued monitoring for benthic/substrate and invertebrate & fish population estimates.
    b. Meetings with monitoring team and partners to update skills and address efficiency of program.
    c. Partnership support.

B. Obstacles & Delays:
    a. Delays in following schedules due to other commitments by partners and equipment malfunction and repair.
    b. 16 coral monitoring sites including 32 MPA monitoring sites, sedimentation-monitoring, annual grouper spawning monitoring and community monitoring are too much for $20K per year.
    c. Changing of staff within partner agencies.

Next Steps:

a. Raise matching funds to support monitoring program.
b. Familiarize monitoring team members in use of MC database and begin uploading data to database.
c. Further training for new members and regular refresher trainings in monitoring protocols and fish/invert/benthic taxonomy.
d. Secure scuba diving supplies and obtain high-resolution camera for photoquad.
e. Continue working with MCT, PMRI & PICRC to identify a means of getting more professional assistance in terms of data analysis and reporting.

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