

## FINAL REPORT

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TYPE OF REPORT: Final Report (request for renewal)  
PROJECT TITLE: Demographic Monitoring of *Acropora* species

### PROJECT SUMMARY

*Acropora* spp. populations in the Florida Keys and throughout the Caribbean have declined by greater than 90% since the 1980s. The remaining population faces a variety of natural and anthropogenic pressures that threaten population level recovery. This study has two main objectives:

1. Determine the current population status and trends including recruitment from both asexual and sexual sources
2. Determine the relative importance of the various threats facing *Acropora* spp. in the Florida Keys.

Permanent study plots were established at haphazardly selected locations on reefs in the upper Florida Keys and have been monitored since following the protocol outlined by Williams et al. 2006. Fifteen plots were established in 2004 and 15 additional plots were established in 2009-10 under the auspices of this permit at French Reef (2), Sand Island (3), Turtle Rocks (3) and White Bank Dry Rocks (3) Carysfort (1) Key Largo Dry Rocks (1) and Grecian Rocks (2) See table 1.

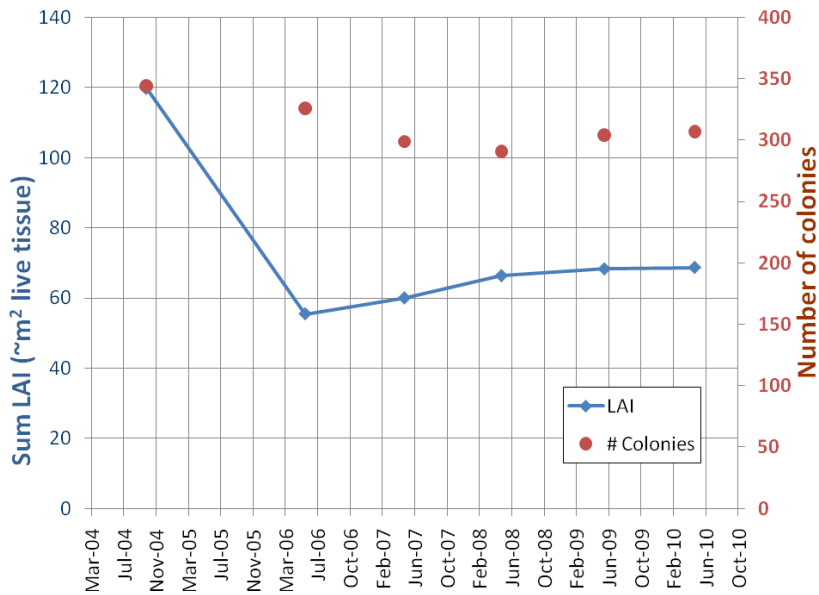
### SIGNIFICANCE OF PROJECT & CONNECTION TO SANCTUARY MANAGEMENT ISSUES

In May 2006 *Acropora* spp. was listed as a threatened species under the US Endangered Species Act. Its current status and population trajectory will inform NMFS Recovery plan as well as sanctuary management actions.

### RESULTS/FINDINGS TO DATE

Since 2004 when our monitoring began there has been a loss of 45% of the *Acropora palmata* from our study plots. Most of this decline occurred as a result of the 2005 hurricane season and since then there has been a modest (~10%) recovery (Fig. 1). The total number of colonies has declined by only 10% however the average dimension of the colonies declined by nearly 25% and after 5 years is nearly back to the 2005 dimension. Additionally, colonies lost on average >20% of their live tissue cover, further compounding the decline in number of colonies. Analysis of threats facing *Acropora palmata* has revealed that in the absence of hurricane impacts, disease is the primary cause of tissue loss to standing colonies and accounts for more than one third (35%) of lost tissue followed by *Coralliophila abbreviata* predation (25%) and skeletal breakage (21%).

The new sites established under this permit do not yet have enough data to allow for meaningful analysis of their performance with the exception of white bank. Three study plots with a total of 135 colonies were established there in spring 2009 and following the extreme cold weather in January 2010 there were no live colonies remaining.



**Figure 1. Total Live area index (an estimate of tissue cover area) and number of colonies in the original 15 study plots established in 2004. Colonies include any living tissue that is attached to the substrate including small fragments and remnant crusts. Note that although there has not been a major decline in # of colonies, the size and type of colonies has shifted dramatically from larger branching colonies**

**Table 1. Location, colony abundance and Live Area Index of 150m<sup>2</sup> area study plots.**

Site	Plot	Latitude	Longitude	LAI	# colonies
Carysfort Reef	CF1	25.22194	80.21055	4,082	9
	CF2	25.22178	80.2106	80,480	26
	CF3	25.2229	80.20956	75,546	12
	CF4	25.22287	80.210137	*	*
Elbow Reef	EL1	25.14259	80.25835	164,106	64
	EL2	25.1429	80.25822	47,392	28
	EL3	25.14394	80.2578	43,001	22
	EL4	25.14508	80.25734	40,102	10
	EL5	25.14518	80.2574	8,691	5
French Reef	FR1	25.03393	80.34941	91,437	40
	FR2	25.03369	80.34959	14,313	25
	FR3	25.03483	80.348782	*	*
Grecian Rocks	GR1	25.11247	80.303769	*	*
	GR2	25.10889	80.305403	*	*
Key Largo Dry Rocks	KL1	25.1236	80.29736	14,478	8
	KL2	25.1229	80.29787	0	0**
	KL3	25.12255	80.29826	4,352	18
	KL4	25.12422	80.298807	*	*
Molasses Reef	ML1	25.00958	80.37481	23,580	9
	ML2	25.00912	80.37473	35,346	28
	ML3	25.01015	80.37328	96,993	23
Sand Island	SI1	25.01827	80.36888	32,421	26
	SI2	25.01825	80.36845	133,226	40
	SI3	25.01813	80.36835	9,380	17
Turtle Rocks	TR1	25.28067	80.20888	167,381	94
	TR2	25.28072	80.20907	57,551	39
	TR3	25.28078	80.20882	64,107	36
White Bank	WB1	25.03908	80.37242	0	0**
	WB2	25.03852	80.37667	0	0**
	WB3	25.03848	80.37687	0	0**

\*Initial survey only- Data not processed yet; \*\* No live colonies remaining.