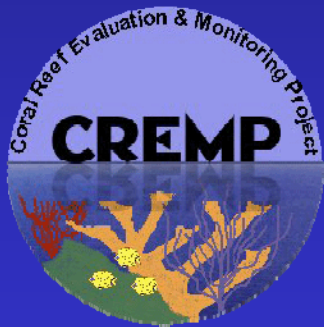


**Coral Reef Evaluation and Monitoring Project
US EPA Water Quality Protection Program
Steering Committee Presentation
February 12th, 2014**

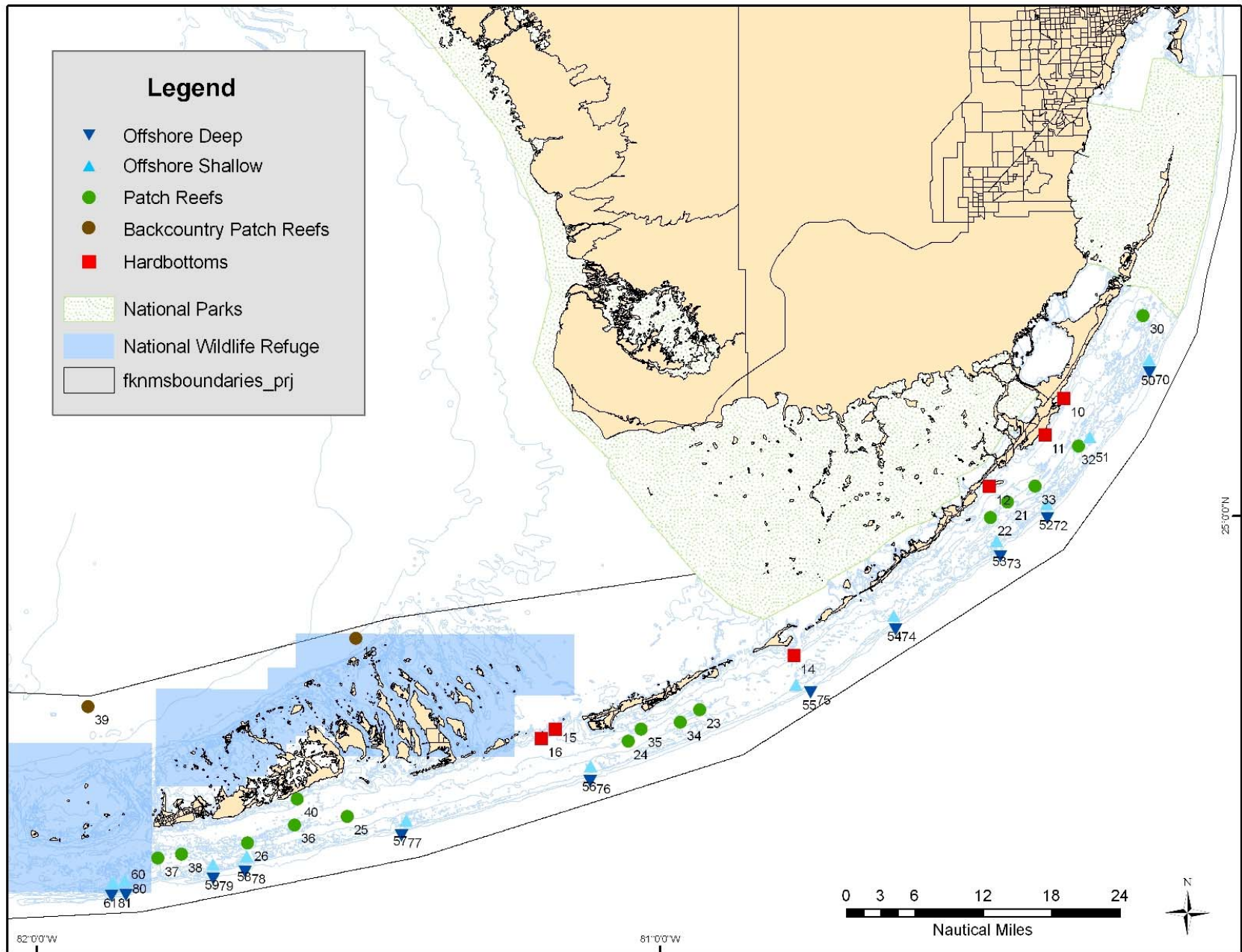
**Rob Ruzicka, Mike Colella, Jim Kidney,
Vanessa Brinkhuis, Lucy Bartlett, Dr. Kate Lunz,
Kevin Macaulay, Karen Neely**



**CREMP is funded by US EPA Water Quality Protection Program
Federal Award No. X7-95447709**

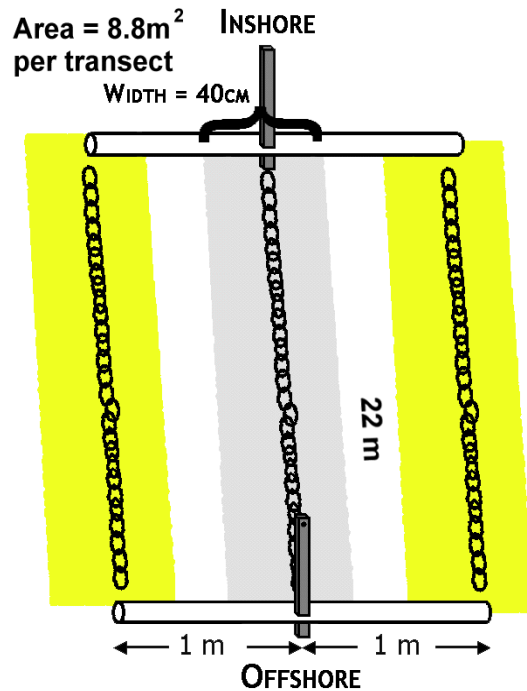
**A presentation of the Florida Fish and Wildlife Conservation Commission/
Fish & Wildlife Research Institute**

CREMP Spatial Framework – 2012 & 2013

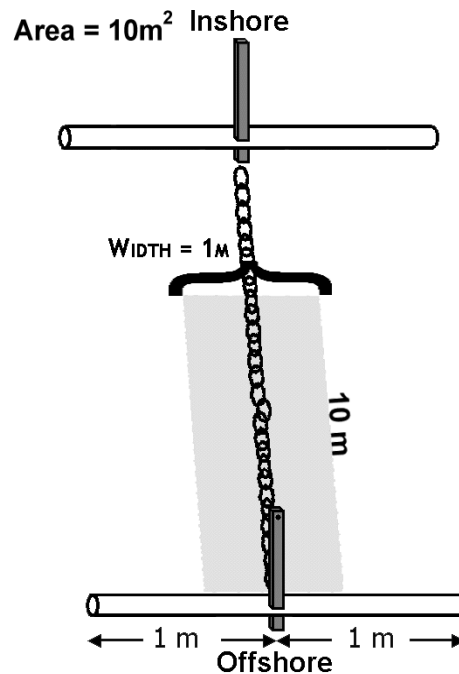


Methods - Present

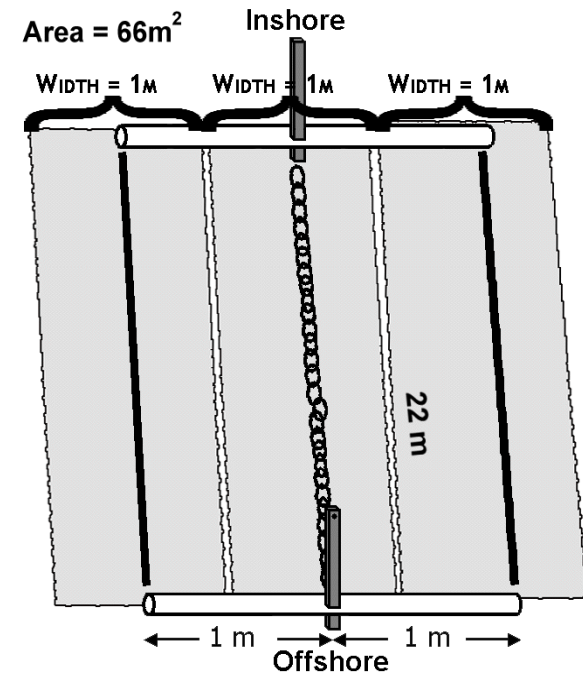
Video Transects



Demographic Surveys



Xestospongia muta



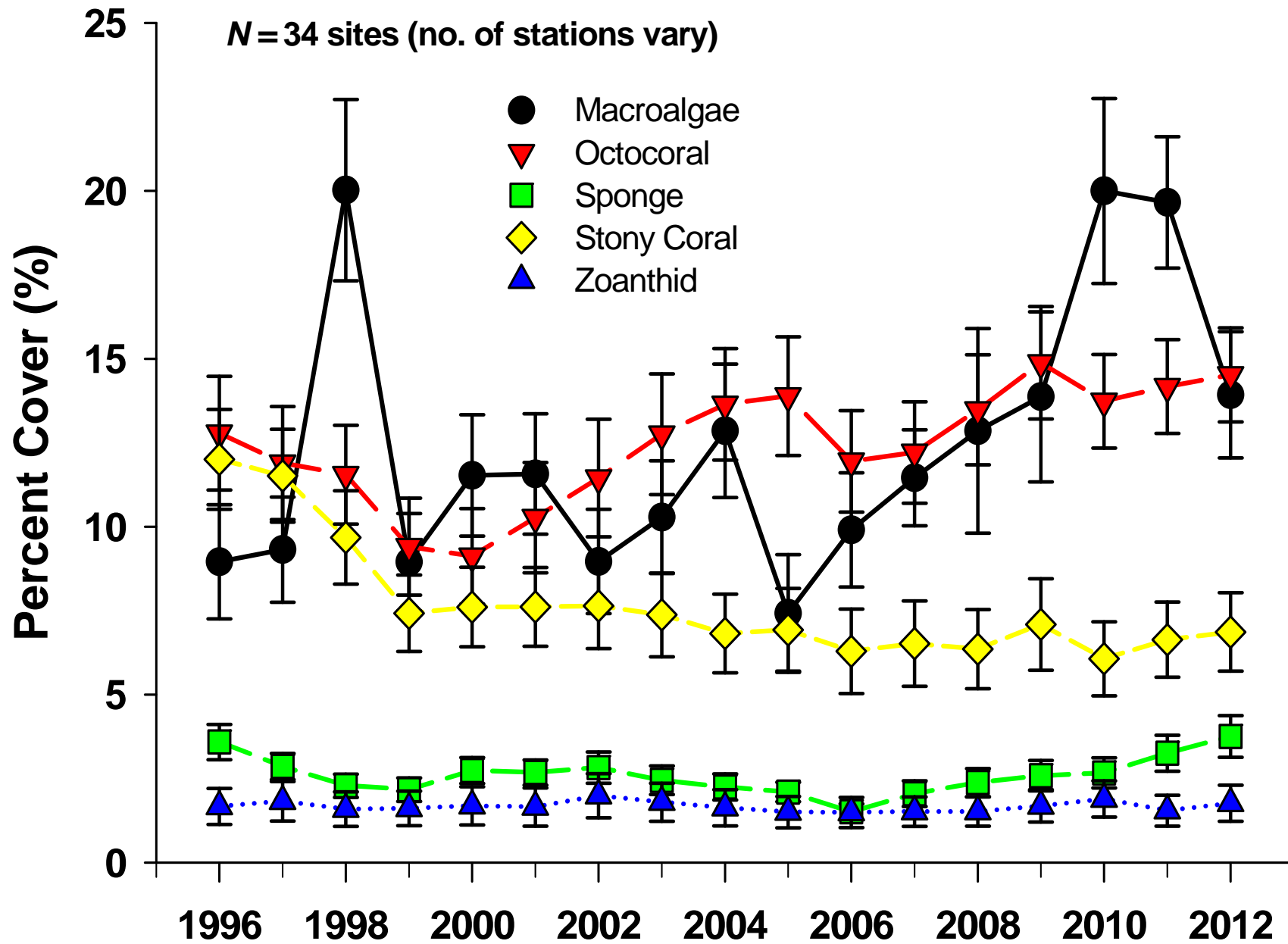
- Camera surveys only on 300 transect, whole station new patch reefs
- Stony coral demographics - 40 sites; all stations
- Octocoral demographics – 18 sites; all stations
- *Xestospongia* demographics – 11 sites; 2 stations per site

Benthic Cover Results 2011 vs. 2012 – Habitat Comparisons

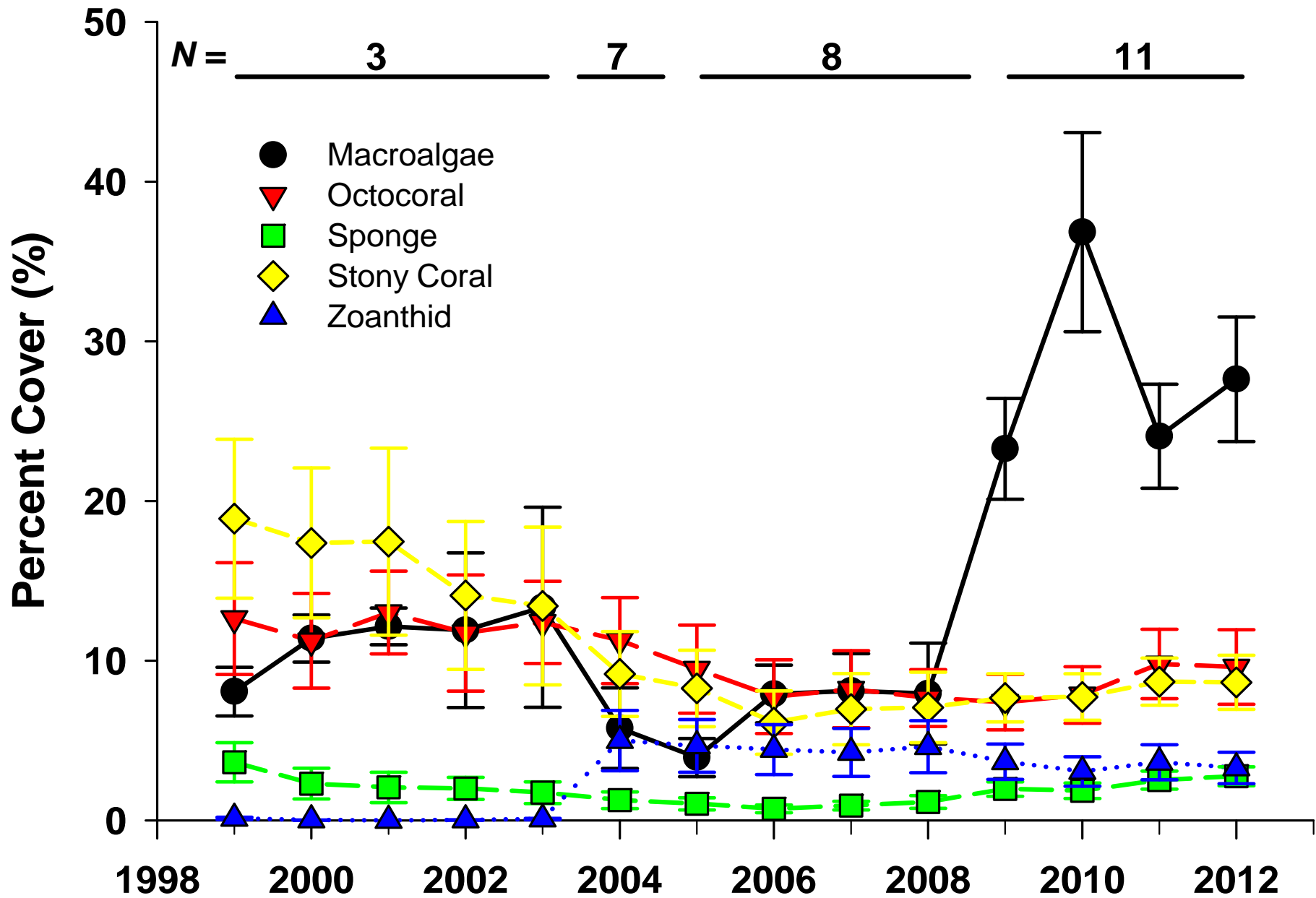
	Stony Coral			Octocoral			Sponge			Macroalgae		
	2011	2012	Diff.	2011	2012	Diff.	2011	2012	Diff.	2011	2012	Diff.
BCP (2)	2.3±1.9	2.4±1.8	NC	0.0±0.0	0.0±0.0	NC	1.5±0.5	2.0±0.8	NC	46.1±7.6	33.0±8.1	NC
OD (11)	3.5±0.4	3.4±0.4	NC	12.8±1.0	13.2±0.9	NC	5.1±1.0	6.0±1.1	↑	23.4±2.1	16.7±3.2	↓
OS (12)	4.9±1.0	5.1±1.1	NC	16.2±1.2	16.6±1.1	NC	0.9±0.2	1.2±0.3	↑	14.2±2.5	11.6±2.8	NC
P (15)	14.5±2.6	15.3±2.6	↑	14.2±3.1	14.8±3.0	NC	4.2±0.8	4.4±1.0	NC	13.0±2.7	10.4±2.9	↓
OVERALL (40)	8.0±1.3	8.3±1.3	NC	13.7±1.3	14.2±1.3	NC	3.3±0.5	3.8±0.6	↑	17.9±1.9	13.6±1.8	↓

- Significant increases in green, decreases in red
- Overall coral cover was similar between years
- Sponge cover increased while macroalgal cover decreases
- $N = 40$ sites

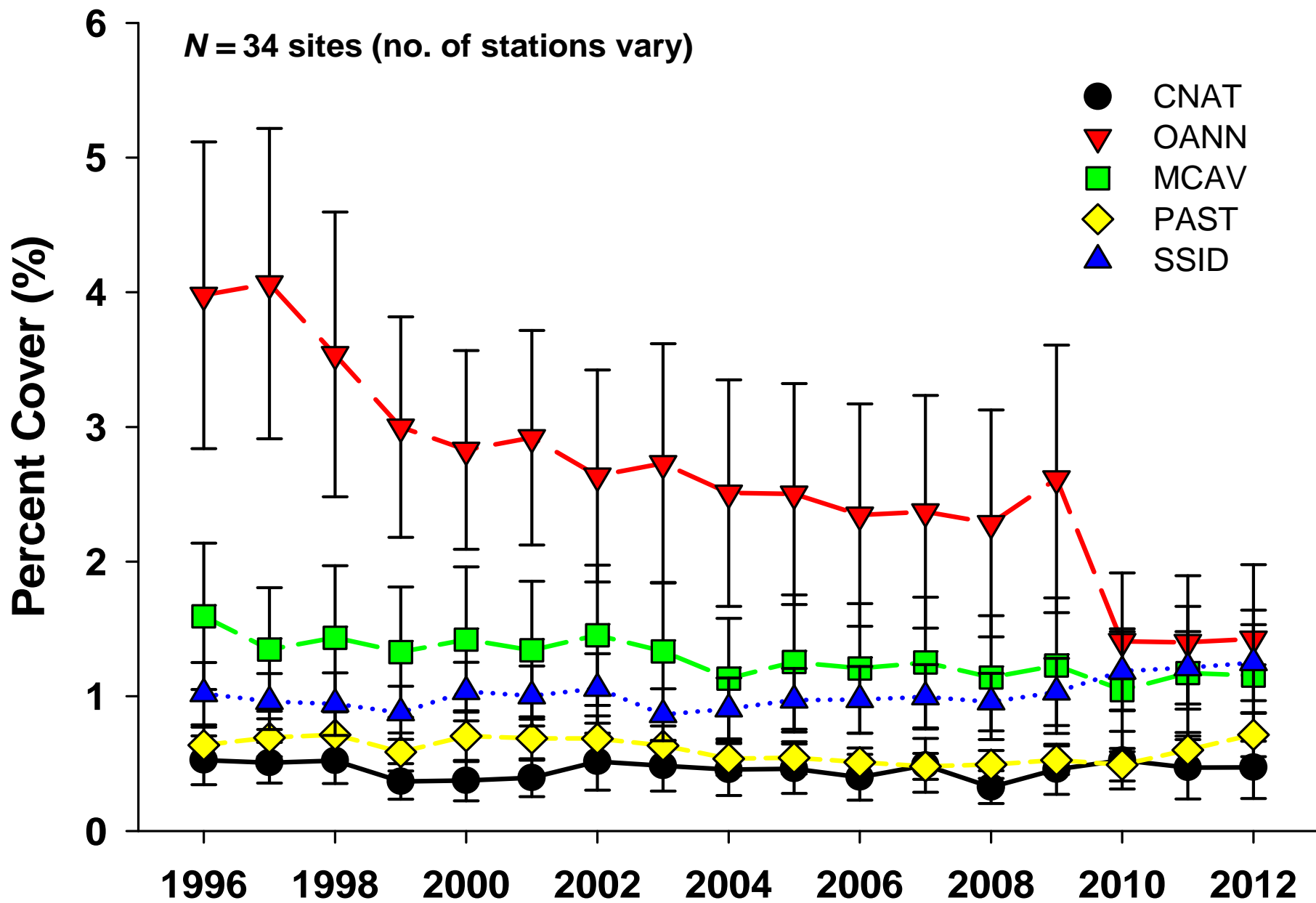
Long Term Trends in Benthic Cover – Florida Keys



Long Term Trends in Benthic Cover – Dry Tortugas



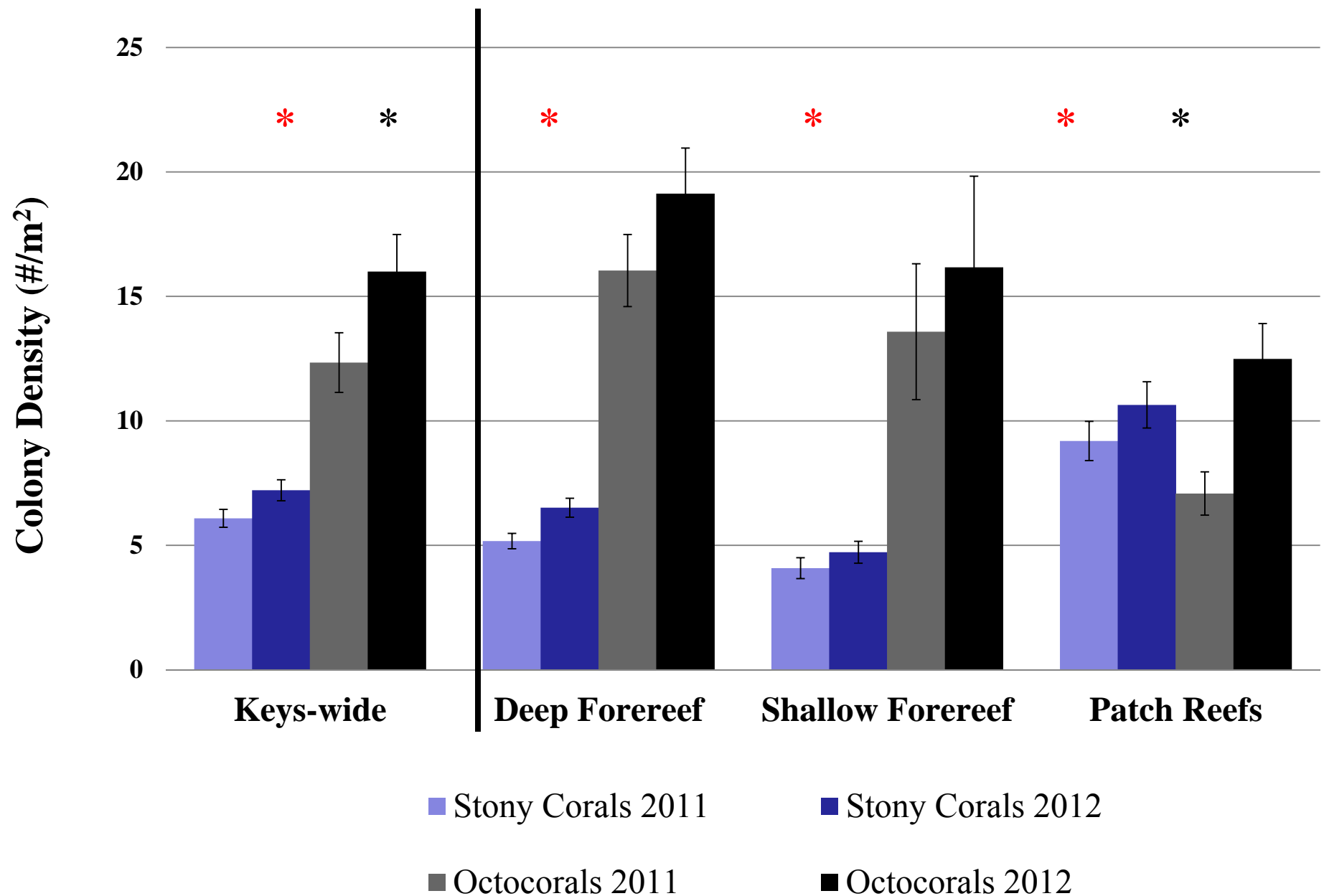
Long Term Trends in Benthic Cover – Coral Species



Stony Coral & Octocoral Population Surveys

- Recommendation in Battelle Report
- 10 x 1 meter belt transect on existing CREMP stations
- All stony coral species ≥ 4 cm in max diameter
 - max diameter and height
 - visual estimates of partial mortality
 - prevalence and diseases and/or deleterious conditions
- Total abundance (all octocorals) and six of the most common/recognizable species (no minimum size cutoff)
 - *Gorgonia ventalina*, *Pseudopterogorgia americana*,
Pseudoplexaura porosa, *Eunicia flexuosa*, *Eunicia calycullata*,
Pseudopterogorgia bipinnata
 - Max height and width (*G. ventalina* only)
 - Prevalence and severity of diseases/conditions

Stony Coral and Octocoral Colony Densities

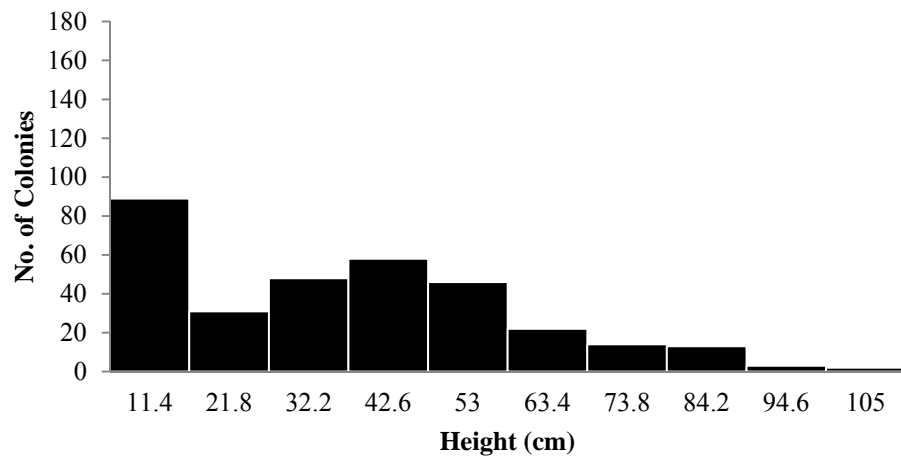


Demographic Results – Stony Corals

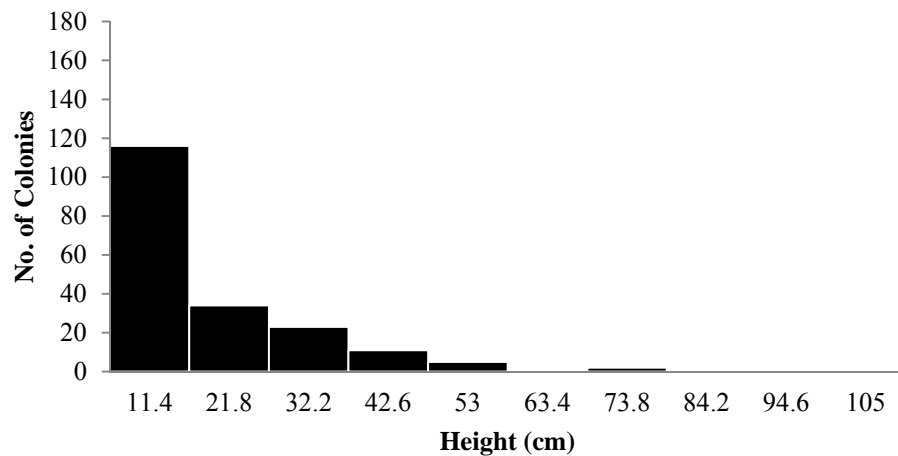
- 1546 more colonies counted in 2012 than in 2011 (8261 in 2011, 9807 in 2012)
 - 76% < 10cm in diameter, and 87% <15cm in diameter
 - 82% were from 4 species (*S. siderea*, *P. astreoides*, *S. michellini*, *A. agaricites*); 4 species collectively account for 74% of total observations
 - 80% were from the offshore deep and patch reef habitats
 - Increase in density may correlate with small in increase in cover but macroalgae significantly decrease between years

Demographic Results – Octocorals

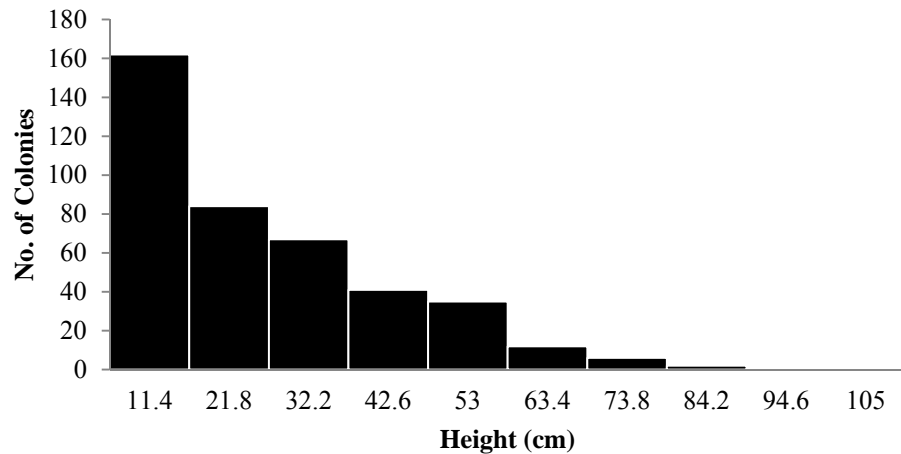
Patch Reefs



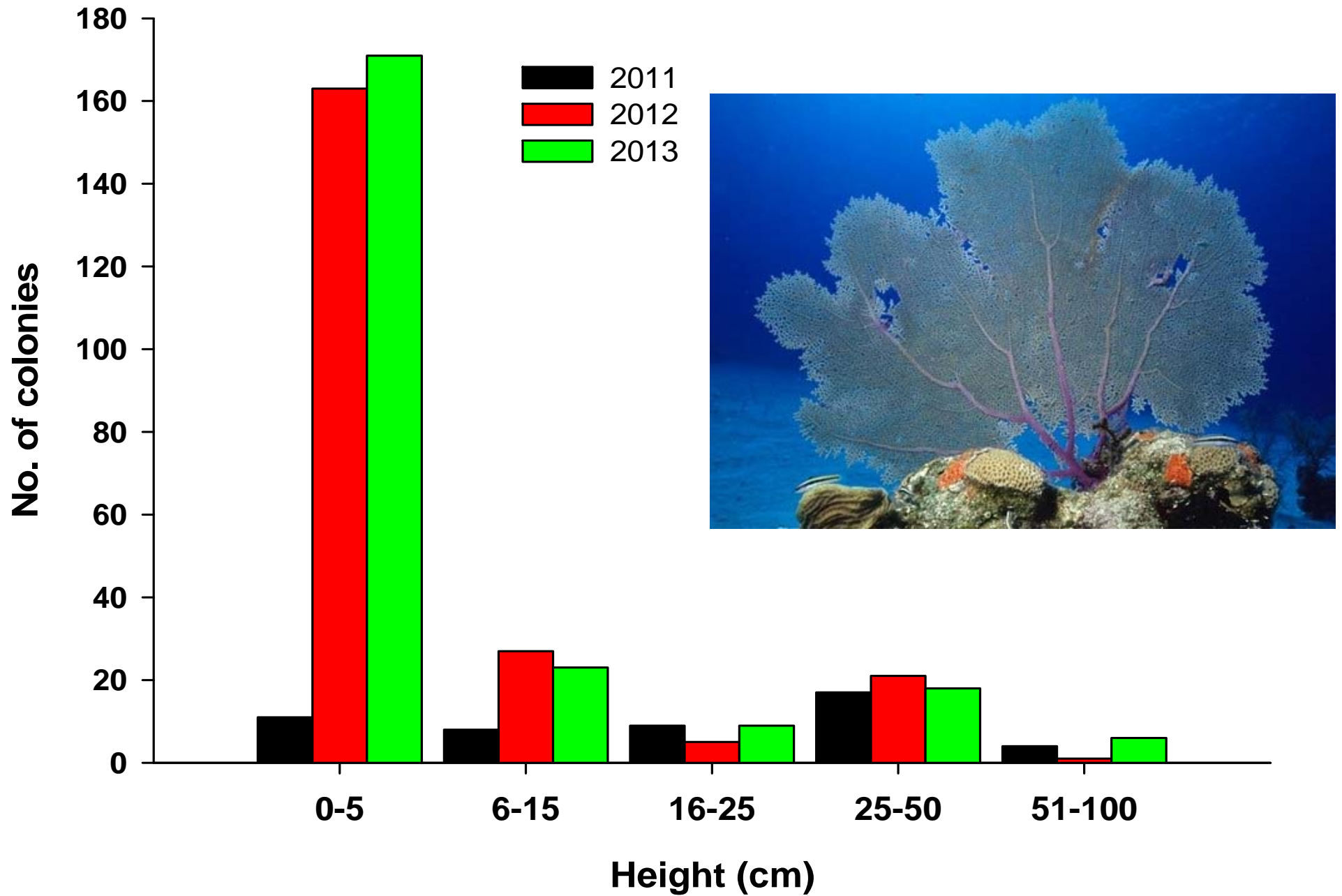
Deep Forereef



Shallow Forereef

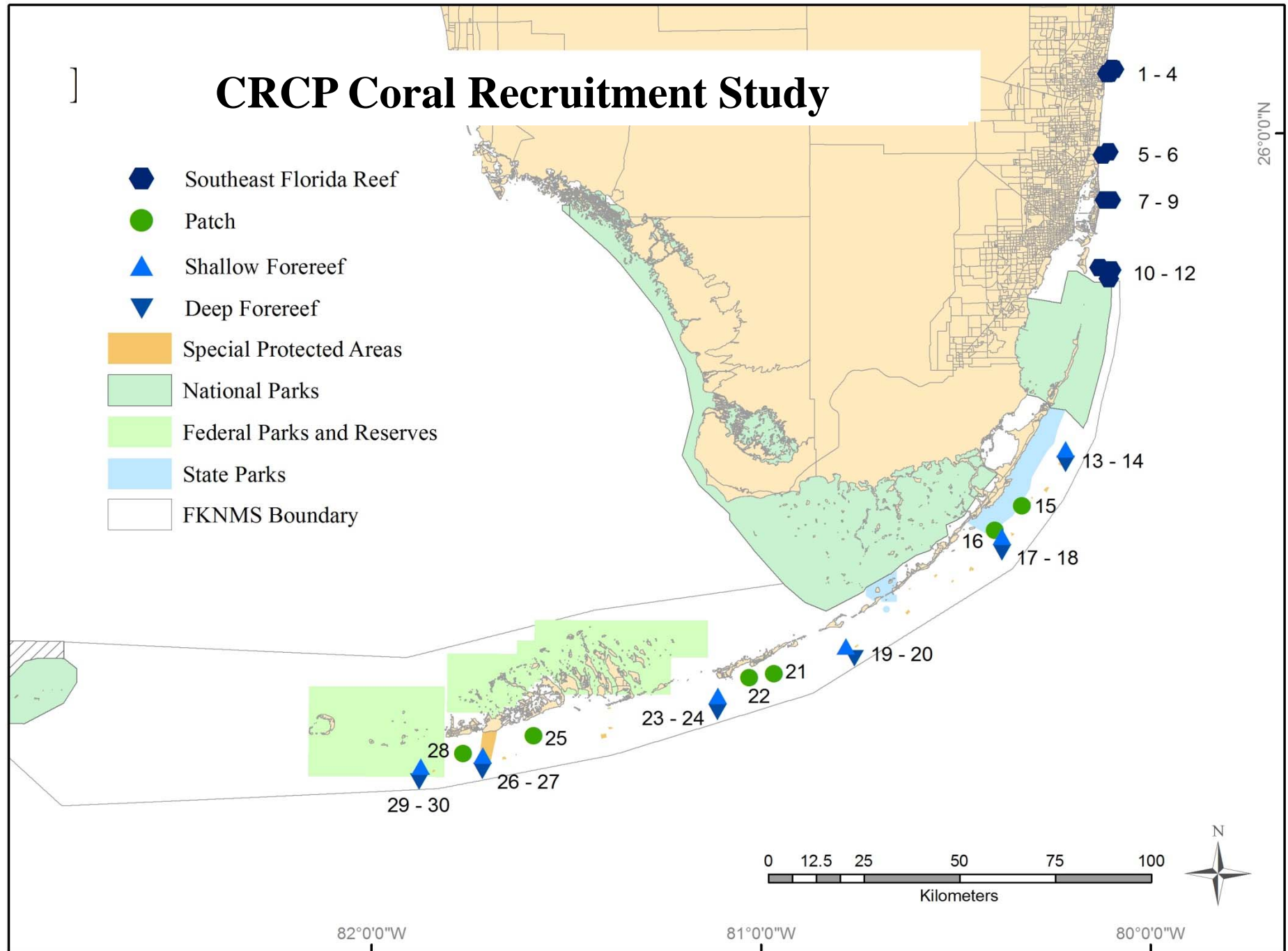


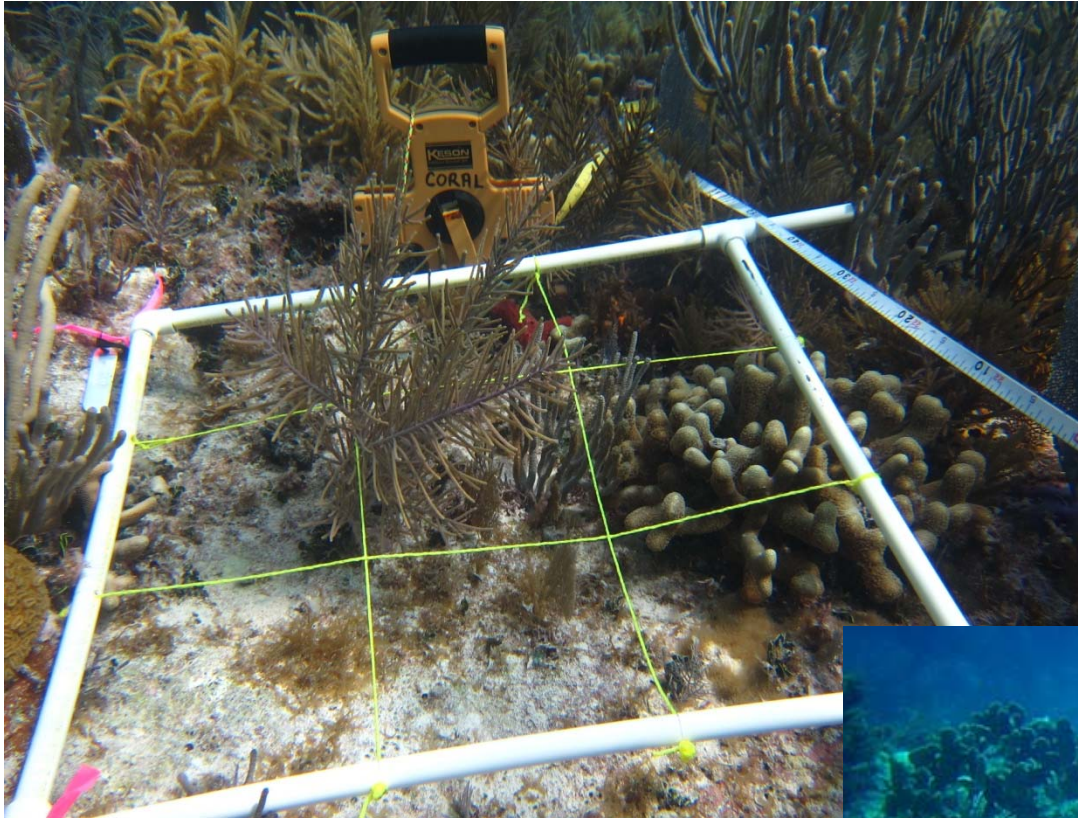
Demographic Results – Octocorals



CRCP Coral Recruitment Study

- ◆ Southeast Florida Reef
- Patch
- ▲ Shallow Forereef
- ▼ Deep Forereef
- Special Protected Areas
- National Parks
- Federal Parks and Reserves
- State Parks
- FKNMS Boundary





Juvenile Census and Survivorship

Settlement on tiles



CRCP Coral Recruitment Study

- Three Year Study
 - First tile deployment in 2015
 - Focuses on both stony and octocorals
- Goals:
 - Create an annual index of recruitment success across a broad spatial scale
 - Identify recruitment hotspots in FL
 - Determine if early life history processes are limiting recovery (e.g., larval settlement, juvenile survivorship)



CREMP Collaborative Research Projects on ESA Corals



Acropora palmata – Currently ESA threatened

Results from a three year study funded by NOAA Species Conservation Grant to States)

- Growth and survival are highly variable across the FL reef tract
- Site-specific responses - populations in close proximity to one another have had drastically different responses
 - differences in genetic diversity and/or localized conditions/stressors
- Overall trend: net loss in the population in FL; less survival than growth
 - Counterparts in the study (PR and USVI) are seeing an overall trend of growth (disease and breakage occurs in summer, but does not appear to affect mortality)
- Major causes of mortality:
 - Disease
 - Predation by Coralliophila (Allee effects)

Dendrogyra cylindrus –ESA candidate; State listed

Targeted study (funded by State Wildlife Grant) principal goals:

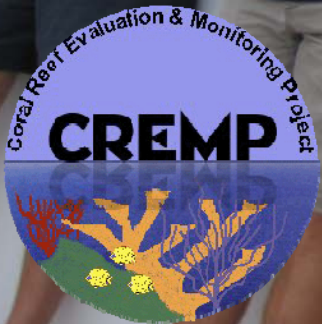
- Groundtruth FL's population across the FRT
 - (Send any GPS coordinates of observed colonies to Kate Lunz: Kate.Lunz@myfwc.com)
- Monitor a subset thrice-annually to document status and trends
 - Identify major stressors
- Collect genetic samples from a subset of the population
 - Determine genetic diversity
 - Ratio of males to females (SE FL)
 - Zooxanthellae diversity

Summary

1. Recap of annual comparisons (2011 vs. 2012)
 - Overall coral cover was similar in both years. Small increase at patch reefs
 - Significant decline in macroalgal cover
 - Observed increase in coral density in 2012. Mostly due to a greater abundance of smaller, diminutive corals species
 - Appears to be a steady supply of octocoral recruits

2. CREMP has adapted monitoring protocols to become more comprehensive
 - A variety of research projects are directly leveraged because of CREMP (e.g. Acropora, recruitment studies)
 - Program can now address current threats and evaluate future responses
 - If previous funding levels could be wholly or partially restored this would allow for:
 - Recruitment studies in the Dry Tortugas
 - A return to monitoring nearshore hardbottom communities
 - Balanced sampling effort at all sites (e.g. “new patch reefs” installed in 2009 only have 2 stations, expansion of octocoral survey)

**CREMP is funded by US EPA Water Quality Protection Program
Federal Award No. X7-95447709**



**CREMP Publications and Reports available at
<http://research.myfwc.com/>**