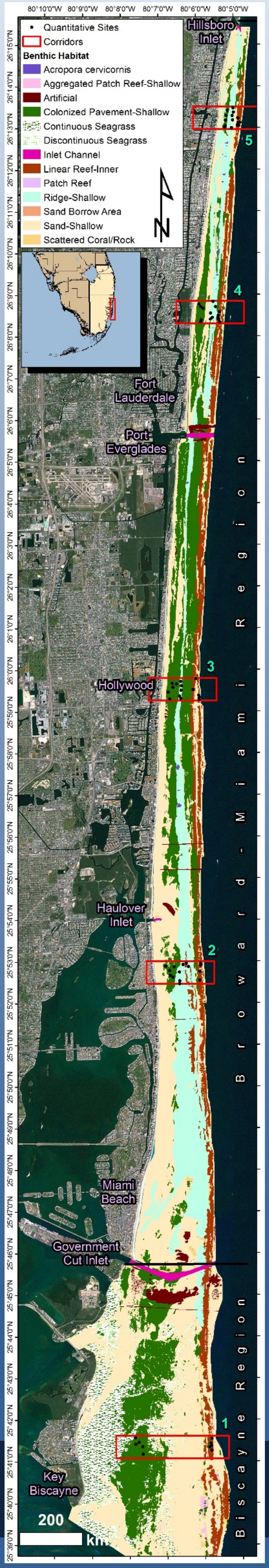
Southeast Florida shallow-water habitat mapping & coral reef community characterization



INTRODUCTION

The southeast Florida coast contains significant, valuable coral reef communities existing in shallow water between 2m and 10m depths along the shoreline from Key Biscayne north to Hillsboro Inlet. These habitats house many significant coral reef resources, including octocorals, sponges, and threatened and endangered coral species. Many individual assessments and monitoring projects have been conducted in the region over the years, but most had much smaller, focused study areas and none were designed for assessment at a regional scale. Baseline mapping and quantitative assessment data are required prior to future permitted or un-permitted impacts in order to determine the pre-existing state of the benthic resources, therefore, it is imperative that these data be collected on the ecologically sensitive and economically valuable shallow-water coral reef habitats in southeast Florida.

HABITAT AREAS

MAP ACCURACY 97.9%

SE FL Nearshore Benthic Habitats - Total Mapped Area (173km²)

Habitat	Type	Modifier	Modifier Area (km²)	Habitat Area (km²)
Coral Reef and Colonized Hardbottom	Acropora cervicornis		0.16 ; 0.09%	81.30 ; 47.07%
	Colonized Pavement	Shallow	38.36 ; 22.21%	
	Ridge	Shallow	25.52 ; 14.77%	
	Linear Reef	Inner	14.99 ; 8.68%	
	Aggregated Patch Reef	Shallow	0.64 ; 0.37%	
	Patch Reef	Shallow	0.013 ; 0.008%	
	Scattered Coral/Rock in Sand	Shallow	1.62 ; 0.94%	
Unconsolidated Sediment	Sand	Shallow	71.40 ; 41.34%	71.40 ; 41.34%
Seagrass	Seagrass	Continuous	11.89 ; 6.88%	16.14 ; 9.35%
		Discontinuous	4.25 ; 2.46%	
Other Delineations	Artificial		2.59 ; 1.50%	3.88 ; 2.25%
	Inlet Channel		1.17 ; 0.67%	
	Sand Borrow Area		0.13 ; 0.07%	

PROJECT OBJECTIVES:

- Increase map resolution
- Quantitative community information
- Investigate latitudinal differences

METHODS

Detailed aerial photographs were collected in March 2013. Habitat mapping of the imagery and recent lidar was accomplished by visual interpretation at a 1:1000 scale with a minimum mapping unit of 0.1ha.

Maps were initially groundtruthed by a combination of underwater drop camera video and snorkeling. Accuracy was assessed by collecting video at 494 random drop camera sites. Main habitats were assessed to determine the benthic community composition and current condition, as well as how communities vary across shelf and with latitude.

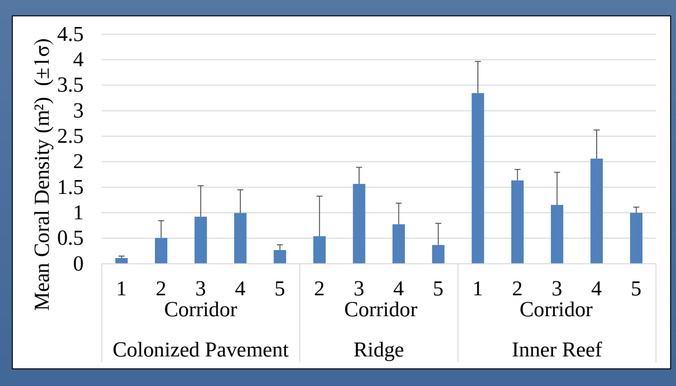
KEY FINDINGS - NEWLY DISCOVERED DENSE ACROPORA & LARGE RESILIENT CORALS

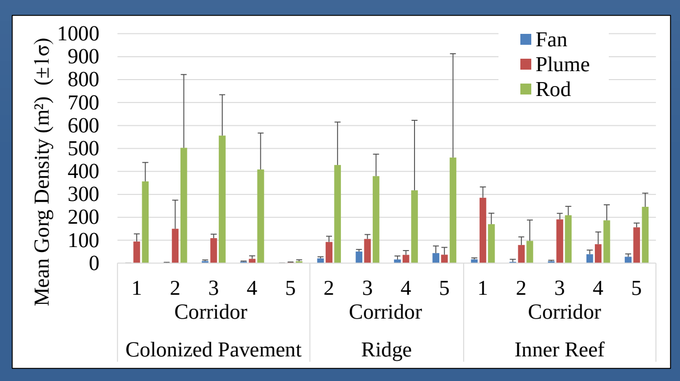
Thirty-five locations of dense *A. cervicornis* were found, only seven of which were previously reported. These are the largest dense patches in the continental United States. Using aerial photography delineation estimates, their area exceeds 156,000 m².

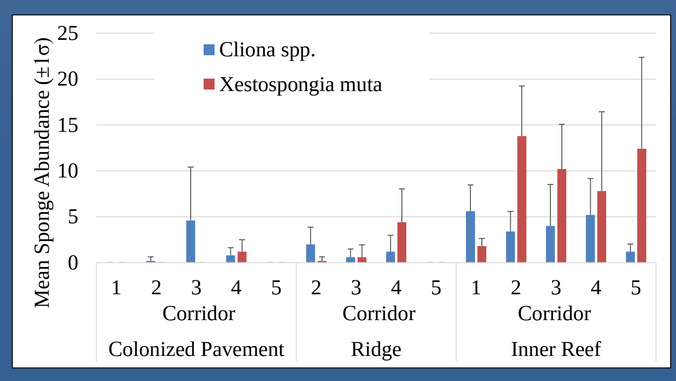
Of the 187 potential 2m-5m wide corals, 53 were visited and 23 were live. These corals are hundreds of years old and have survived conditions that have caused many to perish.

Total Stony Coral Species Abundance		
Species	**Abundance**	**Percent**
Porites astreoides	1356	29.68%
Siderastrea siderea	801	17.54%
Acropora cervicornis	471	10.31%
Porites porites	411	9.00%
Stephanocoenia intersepta	352	7.71%
Montastraea cavernosa	282	6.17%
Agaricia agaricites	233	5.10%
Dichocoenia stokesii	209	4.58%
Solenastrea bournoni	191	4.18%
Meandrina meandrites	101	2.21%
Pseudodiploria strigosa	39	0.85%
Orbicella faveolata	33	0.72%
Pseudodiploria clivosa	28	0.61%
Agaricia fragilis	26	0.57%
Colpophyllia natans	12	0.26%
Orbicella annularis	6	0.13%
Pseudodiploria labyrinthiformis	5	0.11%
Eusmilia fastigiata	4	0.09%
Mycetophyllia aliciae	3	0.07%
Madracis decactis	3	0.07%
Solenastrea Hyades	1	0.02%
Agaricia lamarcki	1	0.02%
Total	**4568**	**100%**

Differences were measured in stony coral, gorgonian, and sponge densities across habitats and latitudes indicating the habitats were distinct from one another and not homogenous throughout the region. However, these distinctions were not present in all data.







Dr. Brian K. Walker
Nova Southeastern University Oceanographic Center
8000 N Ocean Drive, Dania Beach, FL
walkerb@nova.edu

This project was funded as an extension of NOAA Award# **NA11N0S4820003**, a Coastal Zone Management grant from the National Oceanic and Atmospheric Administration through a contract (RM118) executed June 27, 2012 with the Office of Coastal and Aquatic Managed Areas of the Florida Department of Environmental Protection.