Mission Report

NOAA/NOS/NCCOS/CCMA/Biogeography Team

April 10 – April 21, 2006

Characterization and monitoring of reef fish populations within and around Buck Island Reef National Monument, USVI:
A cooperative investigation between NOAA, the National Park Service, and the Virgin Islands Department of Planning and Natural Resources

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National Ocean Service
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Mission Purpose:

The intent of this field mission was to continue ongoing efforts: (1) to spatially characterize the distribution, abundance and size of both reef fishes and conch within and around the waters of Buck Island Reef National Monument (BUIS) and the East End Marine Park (EEMP) of St. Croix, (2) to correlate this information to *in-situ* data collected on associated habitat parameters, (3) to use this information to establish the knowledge base necessary for enacting management decisions in a spatial setting and to establish the efficacy of those management decisions.

Information collected thus far is being extensively utilized by NOAA, NPS, DPNR and others. Examples include NPS' use of NOAA-produced habitat maps in monitoring efforts; The Ocean Conservancy's use of maps and fish data in efforts to assist EEMP with zonation designations within the Park; USGS/University of Miami's and NOVA Southeastern University's use of habitat maps for cryptic fish inventories. Information is also used to develop protocols for NPS, detailing how, where, and when to monitor nearshore fish assemblages, and by NOAA Coral Reef Watch to characterize and monitor the spatial extent of coral bleaching and recovery within U.S. Caribbean coral reef ecosystems. The data collected will aid NPS managers in understanding and making informed decisions regarding the resources of the South Florida / Caribbean Network.

Operational Accomplishments:

- 120 sites were surveyed within the study area (Figure 1), and information on fish distribution, abundance and size (Table 1), benthic habitat composition (Table 2), bleaching, and conch abundance and distribution was collected. The project team consisted of 5 NPS and 4 NOAA scientific divers. NPS and NOAA dive logs were maintained.
- Two NPS boats were used each day of the mission.
- Air and Nitrox (32 %) tanks were used at approximately 70 and 50 dive sites respectively.

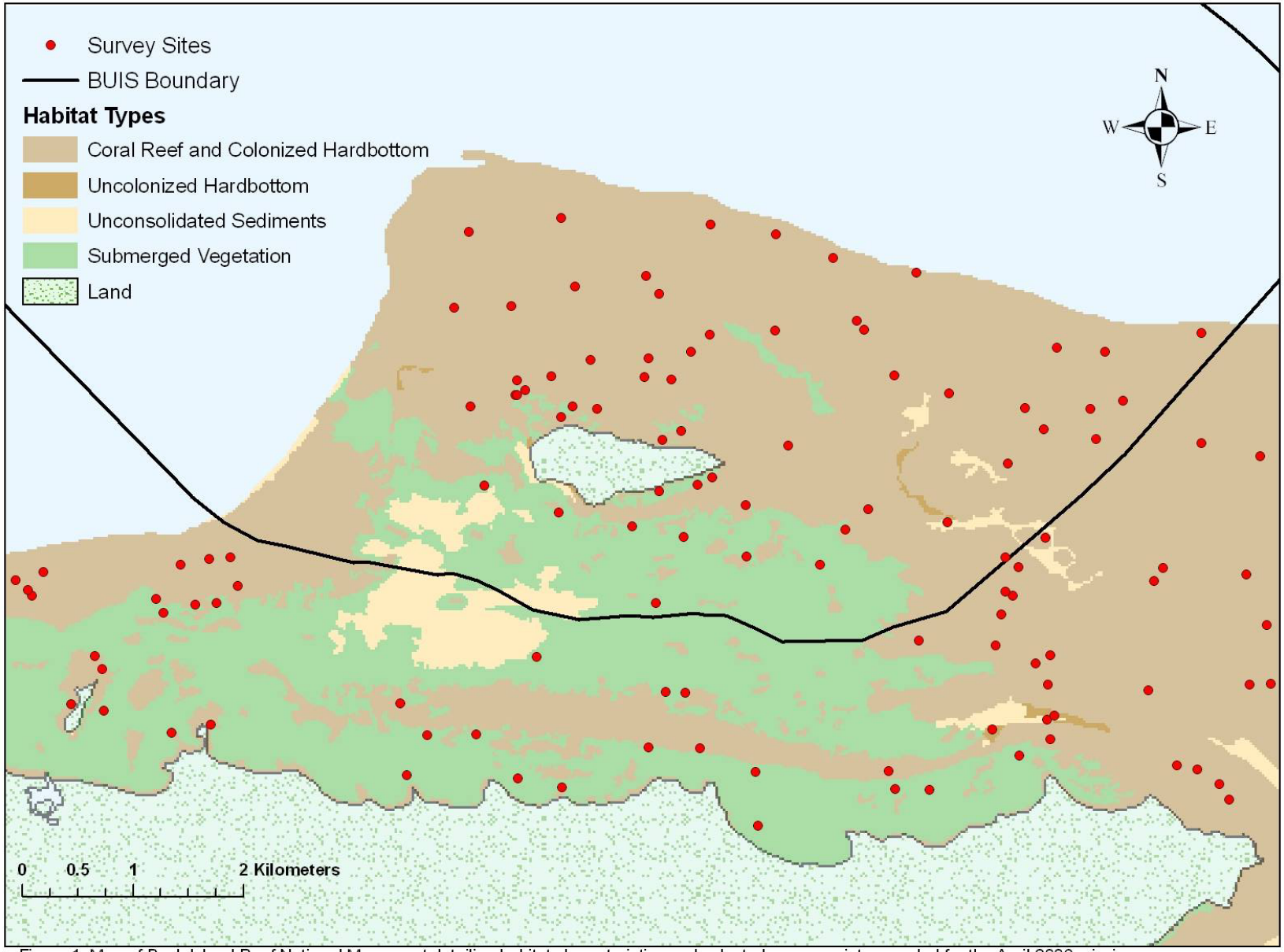


Figure 1. Map of Buck Island Reef National Monument detailing habitat characteristics and selected survey points sampled for the April 2006 mission.

Summary of Surveys:

Fish

- Fish species abundance, size and distribution were characterized using the belt transect survey method (http://biogeo.nos.noaa.gov/projects/reef_fish/protocols.shtml) at 120 sites. The data are summarized in table 1.

Table 1. Fish abundance, richness and biomass (all per 100m^2) inside and outside BUIS. Data are from the April 2006 St. Croix mission.

Location	Habitat Type	Number of Surveys	# indiv / 100m^2		biomass (g) /100m^2		# species / 100m^2		Mean Diversity*	
			Mean	(± SE)	Mean	(± SE)	Mean	(± SE)	Mean	(± SE)
Inside	Hard	48	129.23	11.01	8551.98	1496.20	16.2	0.7	2.12	0.06
	Soft	10	7.10	1.37	439.06	308.50	2.8	0.4	0.77	0.15
	OVERALL	**58**	**101.08**	**6.59**	**6682.07**	**902.36**	**13.09**	**0.42**	**1.81**	**0.04**
Outside	Hard	41	143.37	11.89	4243.04	873.96	17.0	0.9	1.99	0.06
	Soft	21	61.10	13.54	5400.92	2303.65	5.9	0.7	1.09	0.12
	OVERALL	**62**	**104.66**	**7.76**	**4787.84**	**639.90**	**11.79**	**0.55**	**1.56**	**0.04**
Both	Hard	89	135.36	5.77	6684.01	644.39	16.54	0.38	2.06	0.06
	Soft	31	44.59	6.65	3883.72	1139.10	4.96	0.38	0.99	0.13
	OVERALL	**120**	**102.96**	**3.41**	**5684.65**	**469.21**	**12.40**	**0.21**	**1.68**	**0.03**

*Shannon Diversity Index

Habitat

- Benthic composition data were collected at 120 sites for characterization. Detailed methodology can be found at http://biogeo.nos.noaa.gov/projects/reef_fish/protocols.shtml. Hardbottom benthic composition data are summarized in table 2.

Table 2. Average percent cover of habitat types for 89 hardbottom sites inside and outside BUIS for April 2006 St. Croix mission.

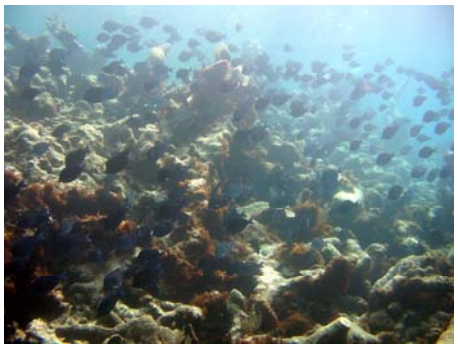
Location	Number of Surveys	% Coral / 100m^2		% Macroalgae / 100m^2		% Turf-crustose/100m^2		% Gorgonian / 100m^2		% Sponge / 100m^2	
		Mean	(± SE)	Mean	(± SE)	Mean	(± SE)	Mean	(± SE)	Mean	(± SE)
Inside	48	5.62	0.99	8.76	1.01	58.28	3.63	1.89	0.34	1.87	0.47
Outside	41	1.96	0.55	4.62	0.80	61.20	5.17	0.71	0.30	1.69	0.40
Both	**89**	**4.04**	**0.42**	**6.96**	**0.47**	**59.54**	**2.14**	**1.38**	**0.17**	**1.79**	**0.22**

Conch

- A total of 184 conch, *Strombus gigas*, were observed during soft-site transects on this mission. Of the 184 conch observed, 114 immature and 26 mature conch were recorded inside BUIS. Outside BUIS, 26 immature and 18 mature conch were recorded.

Events of Note:

- Two juvenile Nassau groupers were spotted nearshore in seagrasses using an abandoned fish trap for shelter
- Some bleaching in coral was observed. These bleached corals may have been bleached during the October 2005 Caribbean-wide even and have not recovered.
- Divers recorded a large amount of turf algae at many sites inside and outside BUIS. This may be a result from the bleaching event that took place during the October 2005 bleaching event.
- There were several animals recorded in transects for the first time during the April 2006 mission:
    - Greenbanded Goby, *Elacatinus multifaciatus*
    - Green Moray, *Gymnothorax funebris*
    - Sailors Choice, *Haemulon para*
    - Striped Grunt, *Haemulon striatum*
    - Seminole Goby, *Microgobius carri*

Logistics of Note:

- Three NPS staff divers were trained in fish and benthic composition data collection and protocols. Future plans are in place to train VIDPNR staff biologists in the NOAA protocols. This technology transfer will provide the capability for the local management agencies to take a lead role in monitoring their resources. This will also continue to strengthen the close working relationship between NPS, USGS, the VI territorial government, and NOAA.