

Mission Report

NOAA/NOS/NCCOS/CCMA/Biogeography Branch

October 7 – October 21, 2007

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

NOAA
National Ocean Service
National Centers for Coastal Ocean Science
Center for Coastal Monitoring and Assessment
Biogeography Branch
Silver Spring, MD 20910

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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.

During this mission, people from NOAA's Video Studio were down to film footage and interviews for the NPS Buck Island/ NOAA Biogeography Branch educational video currently being produced.

Operational Accomplishments:

- ◆ 122 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, conch abundance and distribution (Table 3), and marine debris (Table 4) was collected. The project team consisted of 1 NPS and 7 NOAA scientific divers. NPS and NOAA dive logs were maintained.
- ◆ A charter boat and the NPS Ranger boat were used for the majority of the mission. The NPS policy of live-boating was also implemented to avoid any potential damage to resources from anchor drops and allows the divers to work more efficiently. Coupling live-boating with the expertise of captains Hank Tonnemacher and Miles Sperber, we were able to efficiently and safely complete all sites a day early, utilizing the extra time to collect video footage.
- ◆ NPS and Anchor Dive Center air and Nitrox (32%) tanks were used during this mission. All tanks were filled at Anchor Dive Center.



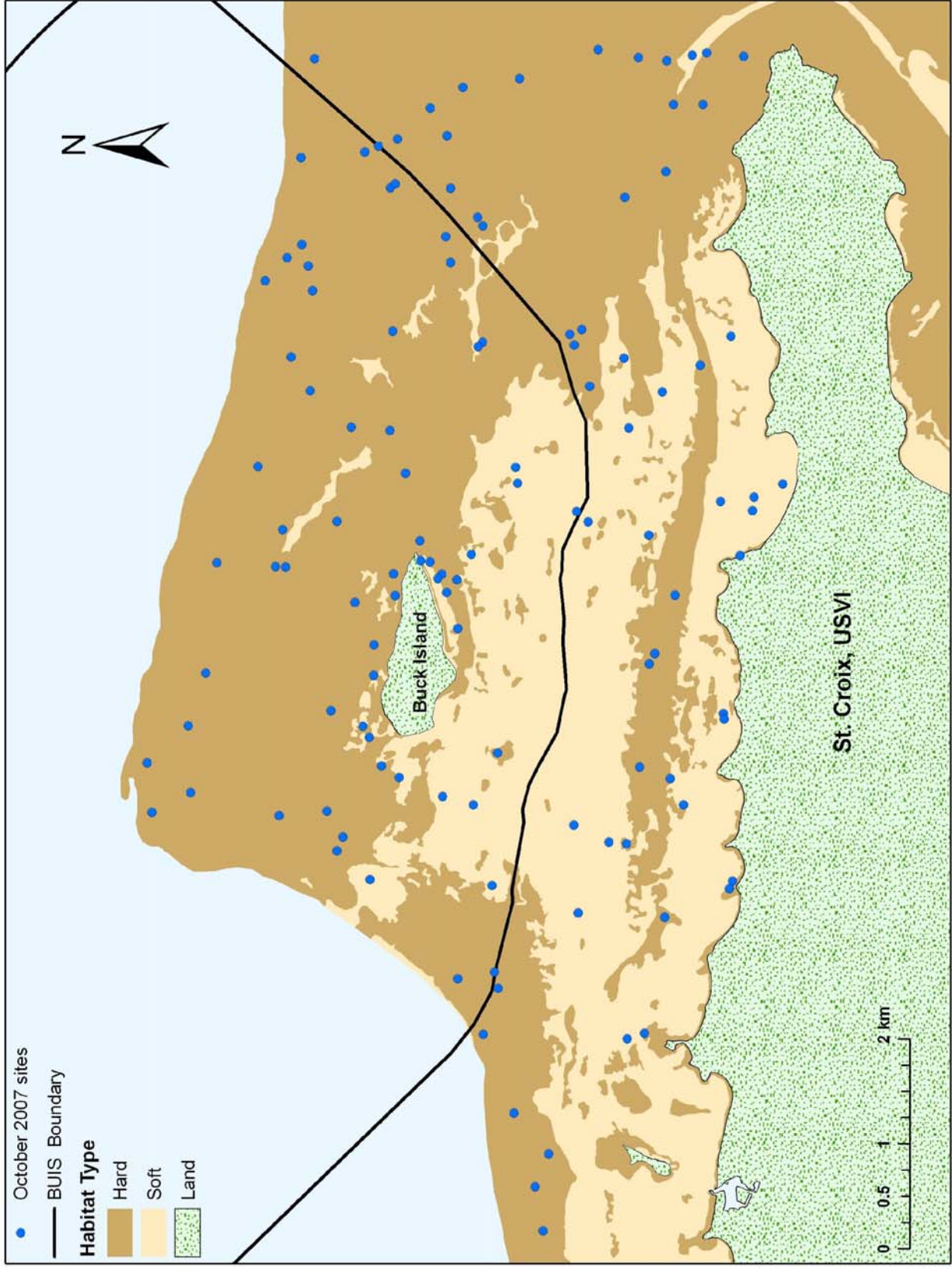


Figure 1. Map of Buck Island Reef National Monument detailing the benthic composition and selected survey points sampled during the October 2007 mission.

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 122 sites. The data are summarized in Table 1. **NOTE: The abundance and biomass values for Clupeidae UNK (n=15,000; 720.3g) were removed from one HARD OUTSIDE site.**

Table 1. Fish abundance, richness and biomass (all per 100m²). Data are from the October 2007 St. Croix mission.

Location	Habitat Type	# of Surveys	# indiv / 100m ²		Biomass (g) / 100m ²		# species /100m ²		Mean Diversity*	
			Mean	(± SE)	Mean	(± SE)	Mean	(± SE)	Mean	(± SE)
Inside	Hard	50	193.2	10.4	5284.23	687.11	19.4	0.7	2.08	0.05
	Soft	13	59.2	12.8	276.18	115.94	5.8	1.0	1.06	0.12
	OVERALL	63	162.3	6.8	4129.95	413.03	16.26	0.47	1.85	0.04
Outside	Hard	40	198.5	18.0	4559.61	579.95	19.4	0.7	2.14	0.08
	Soft	19	83.4	11.6	941.25	312.56	7.4	0.6	1.26	0.10
	OVERALL	59	144.3	11.3	2857.10	360.02	13.71	0.48	1.72	0.05
Both	Hard	90	195.5	6.7	4970.10	329.49	19.37	0.37	2.11	0.06
	Soft	32	76.0	6.8	737.89	161.48	6.90	0.40	1.20	0.11
	OVERALL	122	152.9	3.7	3459.72	130.12	14.92	0.20	1.78	0.02

*Shannon Diversity Index



Bar jacks (*Caranx ruber*)



Blue tangs (*Acanthurus coeruleus*)



Yellowface pikeblenny (*Chaenopsis lumbaughii*)



Dusky squirrelfish (*Sargocentron vexillarium*)

Habitat

- ◆ Benthic composition data were collected at 122 sites for characterization. Detailed methodology can be found at http://biogeo.nos.noaa.gov/projects/reef_fish/protocols.shtml. Hard bottom benthic composition data are summarized in Table 2. Data for only hard bottom sites are provided.

Table 2. Average percent cover of habitat types for 90 hardbottom sites for October 2007 St. Croix mission.

Location	# of Surveys	% Coral		% Algae- seagrass		% Turf- crustose		% Gorgonian		% Sponge	
		Mean	(\pm SE)	Mean	(\pm SE)	Mean	(\pm SE)	Mean	(\pm SE)	Mean	(\pm SE)
Inside	50	0.39	0.07	27.28	4.65	1.82	0.66	3.08	0.51	0.93	0.22
Outside	40	0.19	0.04	39.92	5.21	0.99	0.40	0.42	0.06	0.46	0.08
Both	90	0.30	0.03	32.76	2.47	1.46	0.29	1.93	0.18	0.72	0.08



A healthy *Montastraea annularis* species complex colony



Seagrass bed of *Thalassia testudinum*, *Syringodium filiforme*, and *Udotea* spp.

Conch

- ◆ The number of Queen conch (*Strombus gigas*) observed within transects are summarized by location and benthic composition type in Table 3.

Table 3. The abundance of conch collected during the October 2007 mission. *NOTE: One soft site in BUIS recorded 170 immature conch within the transect.

Location	Habitat	# of surveys	Immature	Mature	Total
Inside	Hard	20	14	6	20
	Soft	10	184*	11	195
	Both	30	198	17	215
Outside	Hard	5	3	3	6
	Soft	7	24	11	35
	Both	12	27	14	41
Both	Hard	25	17	9	26
	Soft	17	208	22	230
	Both	42	225	31	256

Marine Debris

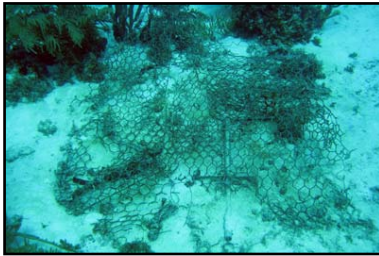
- ◆ Marine debris data were recorded for the first time in St. Croix during this mission. The marine debris observed within transects are summarized in Table 4.

Table 4. The type and area of debris, area affected by the debris, and what the debris was colonized by during the October 2007 mission.

Debris Type	Debris Area (cm ²)	Colonized By	Area Affected (cm ²)
2 cylindrical pipes	25	Sponges and algae	25
Old fish pot mesh and sticks	100,000	Fire coral and algae	100,000
Old fish pot wire with sticks	150,000	Sponges and algae	-
Glass bottle	110	Turf algae	- (sand area)



Artificial reef encounter on transect in Teague Bay



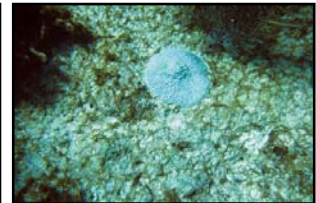
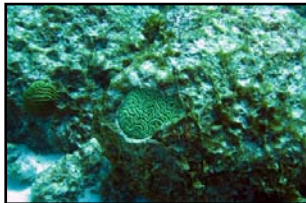
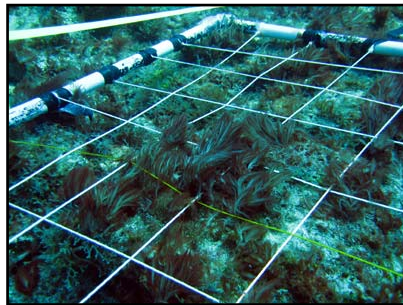
Fish pot mesh seen on transect



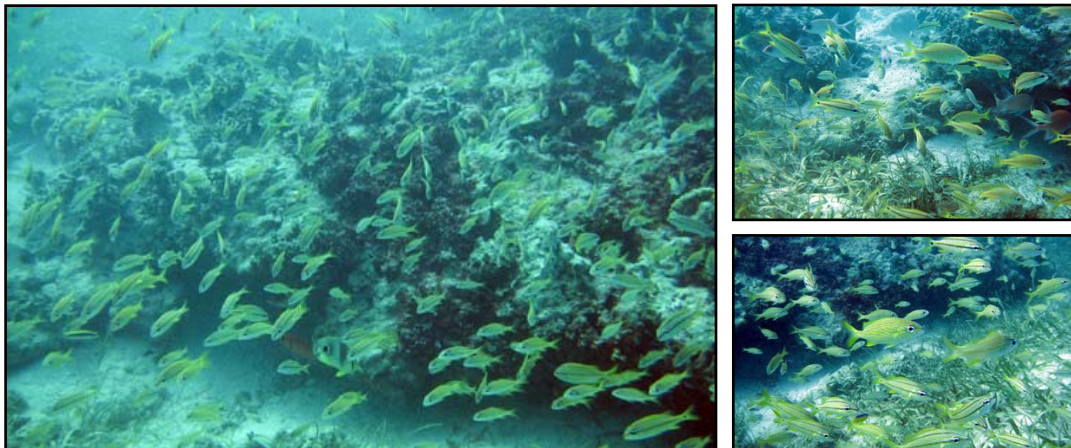
Abandoned fish pot

Events of Note:

- ◆ Divers observed a high prevalence of recently dead coral and a thick coating of some type of algae (cyanobacteria suggested) over most of the algae and turf algae in Buck Lagoon and elsewhere.



- ◆ Near a survey site in Teague Bay, divers observed a patch reef with thousands of juvenile grunts.



- ◆ As with the previous missions, dolphins swam around divers at several sites. At one site, the dolphin watched a diver tickle the tentacles of a lobster and then appeared to mimic the diver, playing with the lobster's tentacles with its mouth.



Logistics of Note:

- ◆ The required number of sites was completed with the help of calm and cooperative weather.
- ◆ Two divers participated in the full two weeks of the mission, while the rest participated for one week.
- ◆ During this mission, we were joined by the NOAA Video Studio folks Marc Kagan and Bob Schwartz. Marc videotaped interviews and took footage topside from the boats while Bob recorded underwater video. The footage is for our educational DVD, which will showcase the successful and productive on-going collaboration of NPS/BUIS and NOAA/CCMA Biogeography Branch. The video will hopefully be in draft stages early next year and ready for release by March.

Mission Participants:

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