

# **Mission Report**

**NOAA/NOS/NCCOS/CCMA/Biogeography Team**

**March 20 – April 01, 2005**

## **Characterization and monitoring of reef fish populations within 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 Team  
Silver Spring, MD 20910

**June 2005**



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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 (BIRNM) 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's 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, and USGS/University of Miami's and NOVA Southeastern University's use of habitat maps for cryptic fish inventories.

A highlight of the successes of this mission was the integration of the Virgin Islands Department of Planning and Natural Resources as an active partner. This partnership is essential to the success of effective management of the EEMP and BIRNM ecosystem.

## **Operational Accomplishments:**

- ◆ 129 sites were surveyed (Figure 1), and information on fish distribution, abundance and size (Table 2), benthic habitat composition (Table 1) and conch abundance and distribution was collected. The project team consisted of 3 NPS and 5 NOAA scientific divers. NPS and NOAA dive logs were maintained.
- ◆ Two NPS boats were used each day of the mission.
- ◆ A scientist from the EEMP was able to join the mission for one day to observe survey techniques and discuss future collaborative efforts.
- ◆ Air and Nitrox (32 %) tanks were used for 75 dives and 54 dives, respectively.

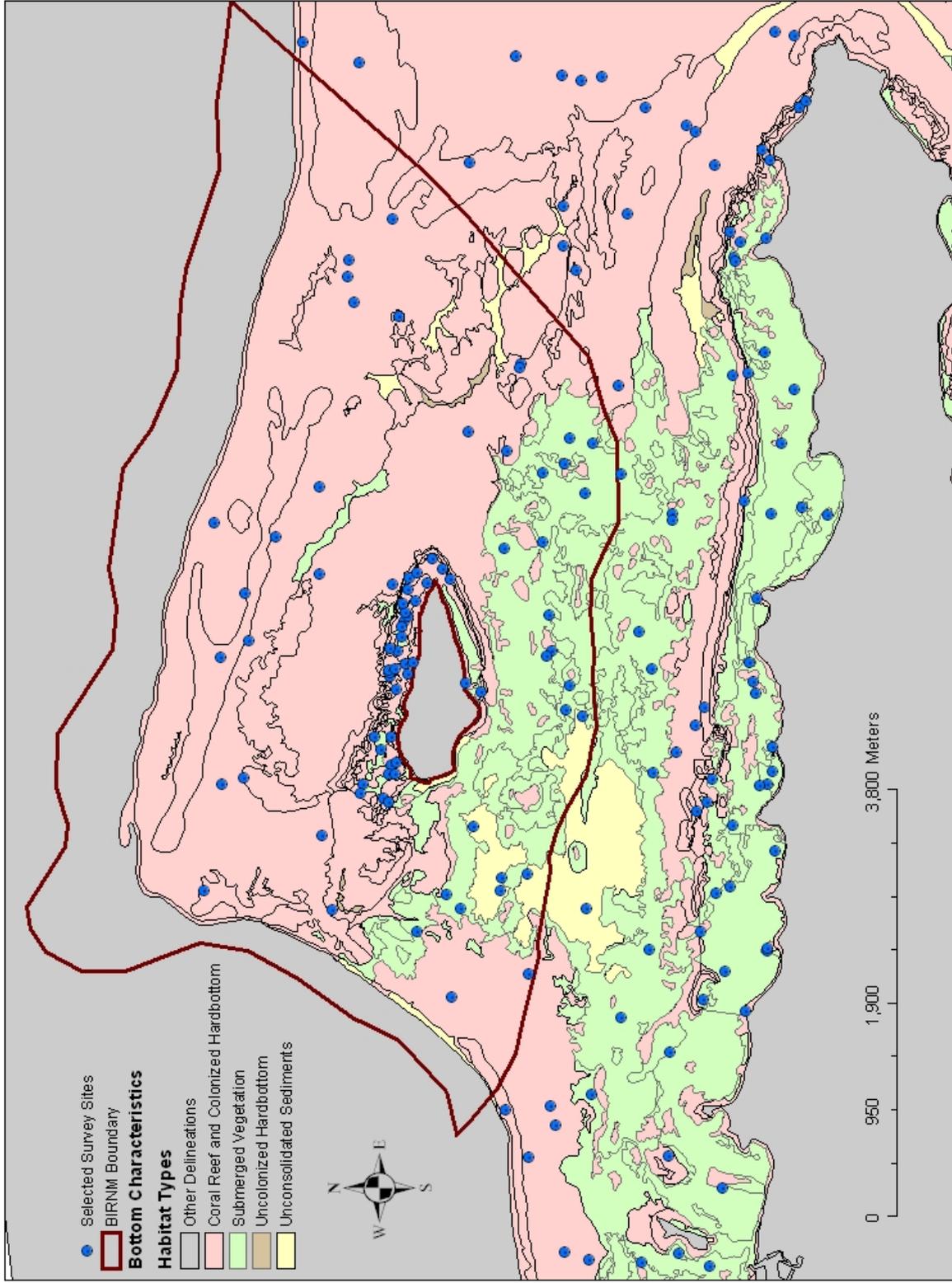


Figure 1. Map of Buck Island Reef National Monument detailing habitat characteristics and survey points for March 2005 mission.

## 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](http://biogeo.nos.noaa.gov/projects/reef_fish/protocols.shtml)) at 127 sites. The data are summarized in table 1. Values are weighted based on area sampled.

Table 1. Fish abundance, richness and biomass (all per 100m<sup>2</sup>). Data are from the March 2005 St. Croix mission.

Location	Habitat Type	Number of Surveys	# indiv / 100m <sup>2</sup>		biomass (g) / 100m <sup>2</sup>		# species / 100m <sup>2</sup>		Mean Diversity*	
			Mean	( ± SE)	Mean	( ± SE)	Mean	( ± SE)	Mean	( ± SE)
Inside	Hard	38	140.08	11.55	6013.93	804.21	18.2	0.8	2.10	0.06
	Soft	24	40.50	10.43	1016.57	321.07	5.4	0.8	0.95	0.15
	<b>OVERALL</b>	<b>62</b>	<b>117.13</b>	<b>7.40</b>	<b>4862.11</b>	<b>493.27</b>	<b>15.22</b>	<b>0.50</b>	<b>1.84</b>	<b>0.04</b>
Outside	Hard	36	122.78	9.23	3727.83	562.73	17.7	1.0	2.14	0.07
	Soft	29	20.10	2.76	1423.63	434.13	4.8	0.3	1.15	0.08
	<b>OVERALL</b>	<b>65</b>	<b>74.47</b>	<b>5.61</b>	<b>2643.66</b>	<b>356.29</b>	<b>11.62</b>	<b>0.59</b>	<b>1.67</b>	<b>0.05</b>
Both	Hard	74	132.58	5.44	5022.88	363.83	17.96	0.43	2.12	0.07
	Soft	53	26.34	2.30	1299.16	239.25	4.98	0.22	1.09	0.10
	<b>OVERALL</b>	<b>127</b>	<b>94.66</b>	<b>1.92</b>	<b>3693.97</b>	<b>154.55</b>	<b>13.33</b>	<b>0.17</b>	<b>1.75</b>	<b>0.02</b>

\*Shannon Diversity Index

### Habitat

- ◆ Data were collected at 127 sites for habitat characterization. Detailed methodology can be found at [http://biogeo.nos.noaa.gov/projects/reef\\_fish/protocols.shtml](http://biogeo.nos.noaa.gov/projects/reef_fish/protocols.shtml). Hard bottom benthic composition characterization data are summarized in table 2. Values are weighted based on area sampled.

Table 1. Average percent cover of habitat types for 94 hard bottom sites for March 2005 St. Croix mission.

Location	Number of Surveys	%Coral / 100m <sup>2</sup>		% Macroalgae / 100m <sup>2</sup>		%Turf / 100m <sup>2</sup>		% Gorgonians / 100m <sup>2</sup>		% Sponges / 100m <sup>2</sup>	
		Mean	( ± SE)	Mean	( ± SE)	Mean	( ± SE)	Mean	( ± SE)	Mean	( ± SE)
Inside	38	4.29	0.74	9.80	1.72	51.08	4.40	1.26	0.30	1.52	0.58
Outside	36	2.93	0.93	14.10	1.65	28.74	3.35	0.55	0.19	1.71	0.30
<b>Both</b>	<b>74</b>	<b>3.70</b>	<b>0.41</b>	<b>11.66</b>	<b>0.86</b>	<b>41.40</b>	<b>2.04</b>	<b>0.95</b>	<b>0.13</b>	<b>1.60</b>	<b>0.24</b>

## Conch

- ◆ A total of 153 conch, *Strombus gigas*, (60 inside, 93 outside) were observed during soft-site transects on this mission.

## Events of Note:

- ◆ Divers witnessed a magnificent urchin (*Astropyga magnifica*) migration near the south-east sand flats inside BIRNM at a depth of approximately 35 feet. Urchins covered a very large area and were clumped in pairs or singly. The urchins appeared to graze on sparse macro algae and move in a uniform direction. Only cleared substrate remained behind. Juvenile *Apogon* were observed recruited in the spines of the urchins.
- ◆ Although not recorded during a transect, two rainbow parrotfish, *Scarus guacamaia*, were seen on the northwest side of BIRNM in the shallow lagoon. The fish were >1m in size and were swimming slowly around a patch reef with a maximum depth of 15 feet.
- ◆ There were several fish recorded on transects for the first time during the March 2005 mission:
  - Barred Cardinalfish, *Apogon biotatus*
  - Flamefish, *Apogon maculatus*
  - Nassau Grouper, *Epinephelus striatus*
  - Spinyhead Blenny, *Acanthemblemaria spinosa*
  - Tarpon, *Megalops atlanticus*
  - Yellowfin Grouper, *Mycteroperca venenosa*



Figure 2. Tarpon, *Megalops atlanticus*, at BIRNM. This mission was the first time tarpon were observed during the course of this cooperative investigation in St. Croix.

### **Logistics of Note:**

- ◆ NOAA chooses an ecosystem approach to data collection and realizes the value of this information. However on this mission, due to a shortage of staff, environmental parameters including water quality (temperature, salinity, turbidity, conductivity and chlorophyll) were not collected.
- ◆ The air compressor at the dive shop where NPS and NOAA usually have tanks filled required maintenance for two days. During those days, tanks were filled at another dive shop, resulting in crews starting later than usual. Tank fills were paid by NOAA.
- ◆ Two NOAA divers were sick during this mission. One diver was unable to dive for one day due to mild stomach flu, while another diver was able to dive for only one day due to a serious case of bronchitis. This diver left the mission early and returned home.
- ◆ Due to the seasonal nature of tourism on St. Croix, many of the hotels were at full capacity for this March trip. The only option for the NOAA divers was to stay at a poor quality hotel whose pool was full of stagnant, mosquito larvae-infested water. One diver drank the tap water and was ill for three days. In efforts to avoid staying in this or another equally undesirable hotel, reservations should be made well in advance.