

**St. Croix AGRRA Expedition – Fishes
Summary Report to the USVI National Park**

**Submitted by:
The Reef Environmental Education Foundation
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In response to the wide-spread deterioration of reef health in the Caribbean basin, the Atlantic and Gulf Reef Rapid Assessment (AGRRA) initiative is a three-year project that aims to provide a regional perspective of coral condition using a standardized methodology. The rapid assessment protocol focuses on three main factors as signals of decline - corals, fish, and algae. As part of this initiative, the Reef Environmental Education Foundation and the University of the Virgin Islands collaborated on an assessment of the reefs around St. Croix in October 1999.

Four reef sites were assessed. The AGRRA survey protocol included a benthic component and a fish component conducted simultaneously at each site. The AGRRA protocol is fully described on the Website (<http://coral.aoml.noaa.gov/agra>), and a brief overview of the fish component is given here. To assess the fishes at each site, a team of three divers conducted belt transects and Roving Diver Technique (RDT) surveys. All surveys were done during daylight hours. Field identifications were based on Stokes (1980), Robins et al. (1986), and Humann and DeLoach (1994).

Using the transects as replicates, the average density (#/100 m²) and size (cm) of each species and family was calculated for each site and for the island (all four sites combined). The size distributions of herbivores (parrotfish, surgeonfish, and yellowtail damselfish) and of carnivores (grouper and snapper) were also calculated.

The RDT survey data from the four sites were combined, and provided a species list, frequency of occurrence, and relative abundance data. Percent sighting frequency (%SF) for each species was the percentage of all dives in which the species was recorded. An estimate of abundance was calculated as:

$$\text{abundance score} = D \times \%SF,$$

where the density score (D) for each species was a weighted average index based on the frequency of observations in different abundance categories. Density score was calculated as:

$$D = ((n_S \times 1) + (n_F \times 2) + (n_M \times 3) + (n_A \times 4)) / (n_S + n_F + n_M + n_A),$$

where n_S , n_F , n_M , and n_A represented the number of times each abundance category was assigned for a given species.

It is important to note that the RDT data presented here only represents the data collected by the AGRRA team. To date, the database maintained by the Reef Environmental Education Foundation contains approximately 400 surveys from 22 sites around St. Croix.

Results and Discussion

A total of 60 fish transects and 14 RDT surveys were conducted at four sites around St. Croix (Figure 1; Table 1). At three of the sites, 12 transects (the average effort called for by the AGRRA protocol) were conducted. However, at Barracuda Reef, two survey dives were conducted and therefore, 24 transects were conducted.

The average density of fish per transect was 44.4 ± 6.8 . The average density per transect at Scotch Bank was 45.8, at Cane Bay was 43.9, at Blue Hole was 52.2, and at Barracuda Reef was 35.8. The average density by family, at all sites combined and for

each site, are shown in Figures 2a and 2b. Density values for most families were similar among sites. However, density of grunts at Cane Bay was double that recorded at the other sites, parrotfish were considerably greater at Blue Hole than at the other sites, and the density of surgeonfish was considerably less at Cane Bay.

The size frequency distributions of carnivores (grouper and snapper) and of herbivores (parrotfish, surgeonfish, and yellowtail damselfish) are shown in Figures 3a and 3b. Almost all carnivores were between 10 and 30 cm, with no individuals greater than 40 cm recorded. The average size of herbivores was 16 cm. Very few juvenile (<5cm) surgeonfish were recorded.

During the RDT surveys, 131 species were recorded. The 25 most frequently sighted species are listed in Table 2 and the complete list of species documented is given in the Summary Report in the Appendix. In addition to providing a more comprehensive species list for the area and documenting rare and cryptic species such as the leopard goby (*Gobiosoma saucrum*), the RDT data are valuable for providing a better abundance estimate of large groupers (*Epinephelus* and *Mycteroperca* species). As has been the case in other AGRRA project, the presence of these large grouper species was greatly underestimated by the transect data. The sighting frequency (%SF) of tiger grouper (*M. tigris*) during RDT surveys on the four sites was 21% and was 14% for the yellowfin grouper (*M. venenosa*) (Appendix). Neither of these species were recorded during the transect surveys.

Literature Cited

- Humann, P. and N. DeLoach. 1994. Reef Fish Identification. (2nd ed.). New World Publications, Inc., Jacksonville, FL. 267 pp.
- Robins, C. R., G. C. Ray, and J. Douglass. 1986. Peterson Field Guides-Atlantic Coast Fishes. Houghton Mifflin, New York, NY. 354 pp.
- Stokes, F. J. 1980. Handguide to the Coral Reef Fishes of the Caribbean and Adjacent Tropical Waters Including Florida, Bermuda, and the Bahamas. Lippincott and Crowell, Publishers, New York, NY. 160 pp.

St. Croix AGRRA Survey Locations

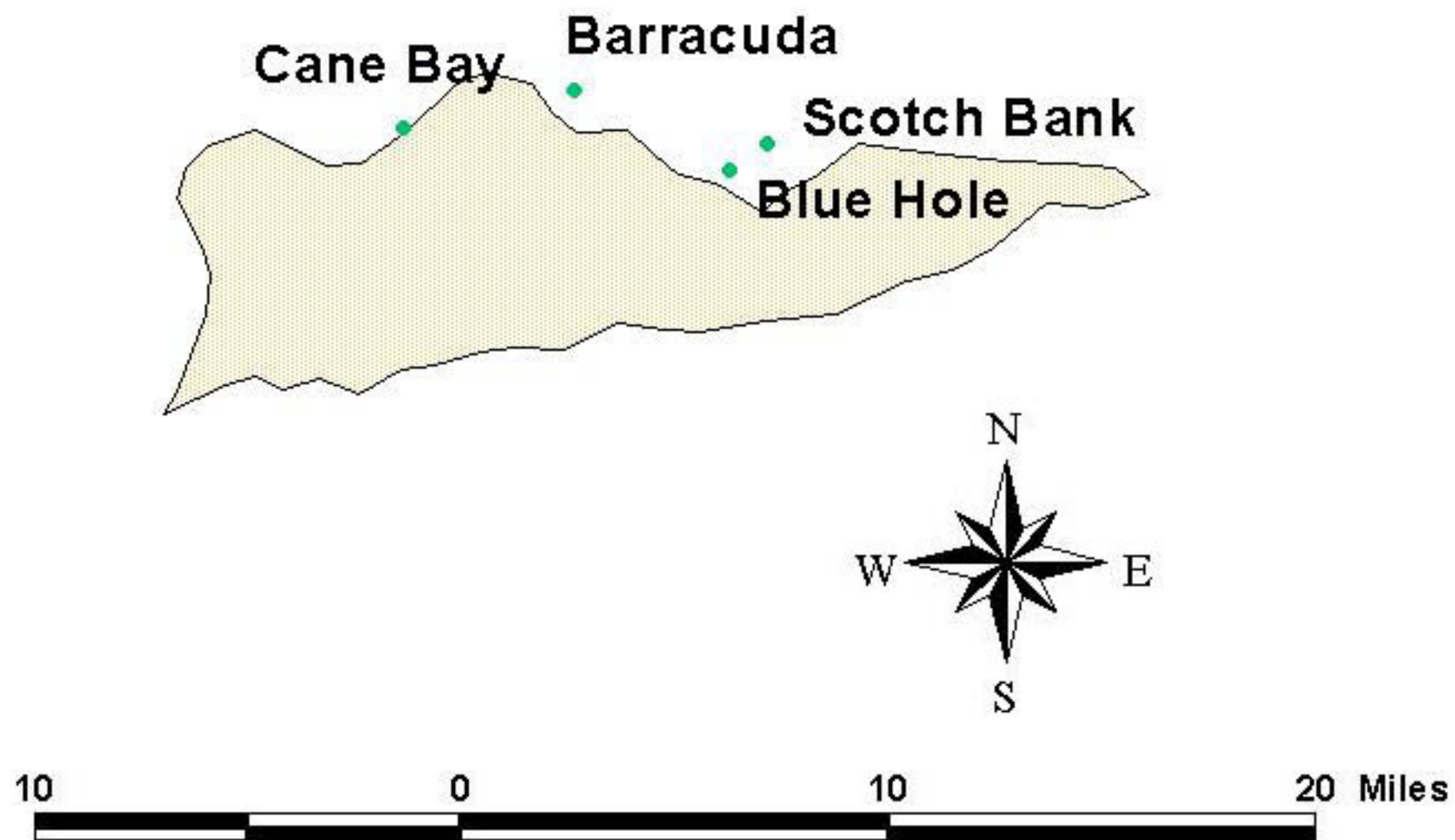


Figure 1. Map of Study Area

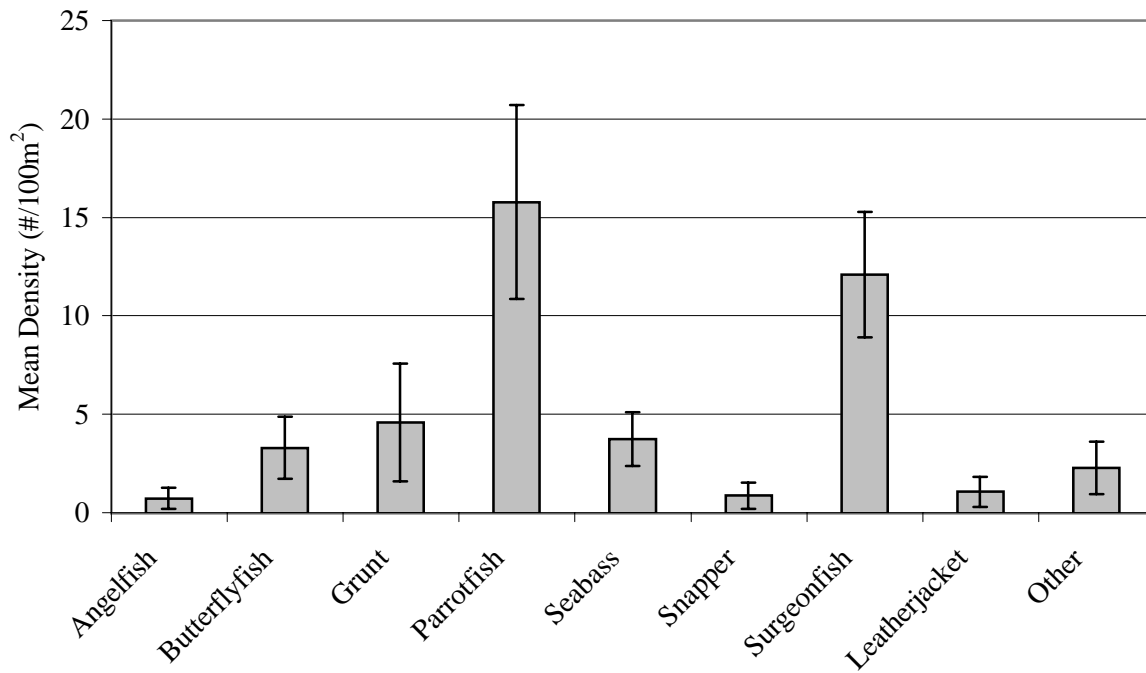


Figure 2a. Fish Species Composition. Mean density and SE shown for each family, based on combined transect data from four sites in St. Croix.

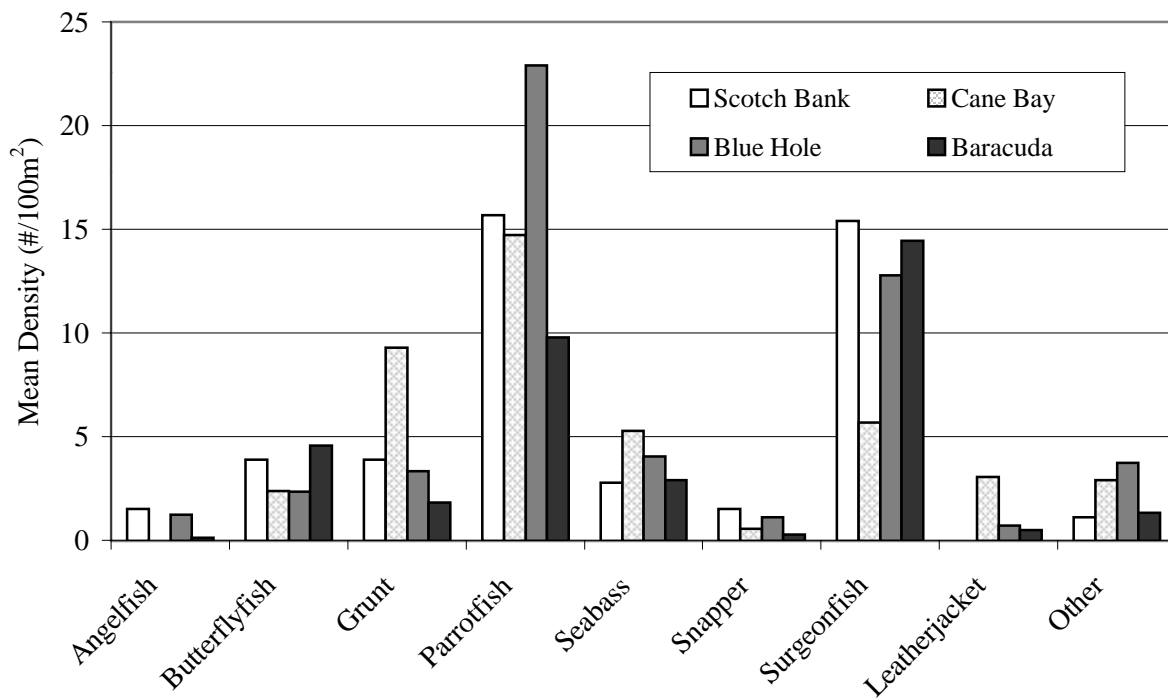


Figure 2b. Fish Species Composition by Site. Mean density shown for each family, based on transect data from four sites in St. Croix.

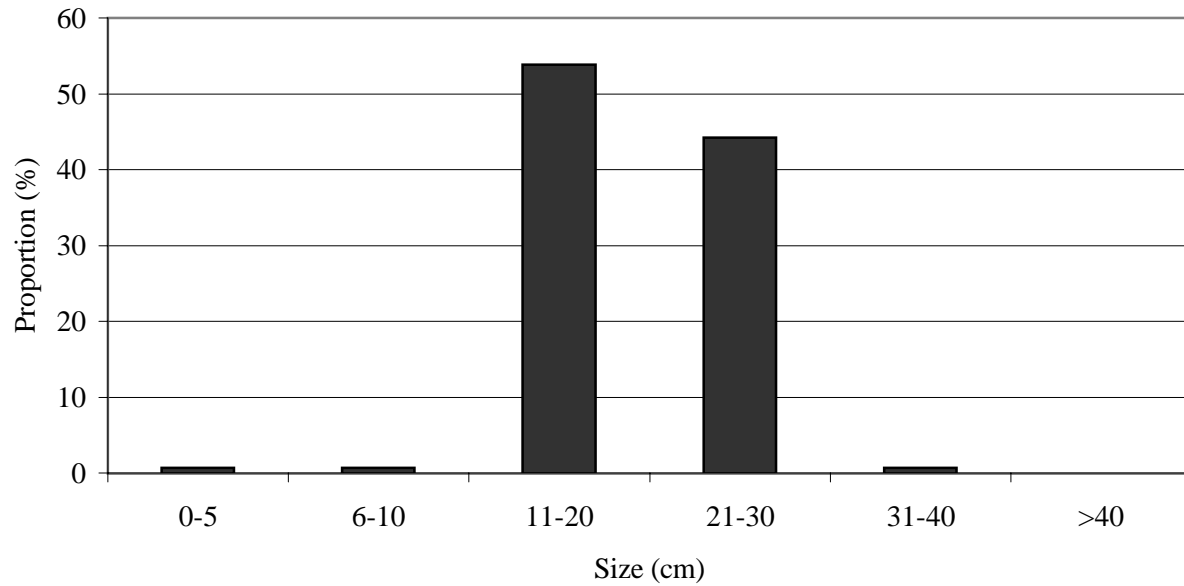


Figure 3a. Carnivore Size Frequency Distribution. Includes grouper and snapper species data from St. Croix transect surveys.

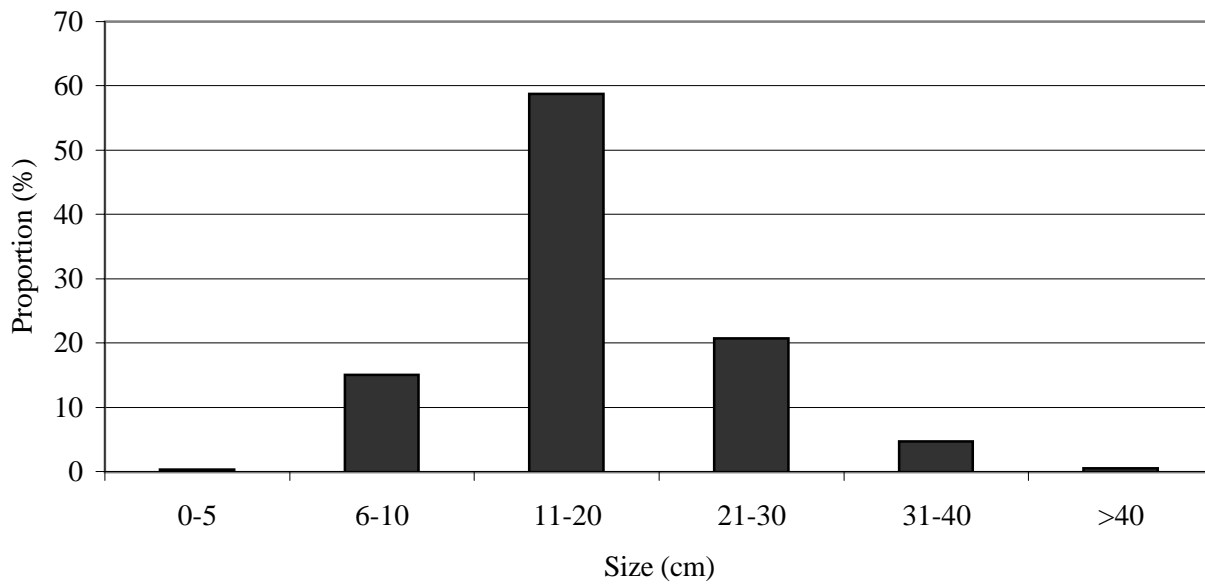


Figure 3b. Herbivore Size Frequency Distribution. Includes parrotfish, surgeonfish, and yellowtail damselfish data from St. Croix transect surveys.

Table 1. Survey Sites and Effort.

Site	Latitude	Longitude	Survey date	Depth (m)	n (transect)	n (RDT)
Scotch Bank						
(Long Reef)	17 46.04	64 41.31	13-Oct-99	11.2	12	2
Oh The Wall						
(Cane Bay)	17 46.23	64 48.53	14-Oct-99	8.2	12	3
Blue Hole						
(Long Reef)	17 45.31	64 42.15	13-Oct-99	10.6	12	3
Barracuda Reef						
(SRC)	17 47.09	64 45.26	13-Oct-99	10.0	24	6

Table 2. Twenty-five Most Common Fish Species. Data are calculated from RDT surveys.

Common Name	Scientific Name	Sighting	
		Frequency (%)	Den
Foureye Butterflyfish	<i>Chaetodon capistratus</i>	100%	2.8
Blue Chromis	<i>Chromis cyanea</i>	100%	3.0
Bicolor Damselfish	<i>Stegastes partitus</i>	100%	3.6
Coney	<i>Epinephelus fulvus</i>	100%	2.9
Graysby	<i>Epinephelus cruentatus</i>	100%	2.2
French Grunt	<i>Haemulon flavolineatum</i>	100%	2.6
Spanish Hogfish	<i>Bodianus rufus</i>	100%	1.8
Princess Parrotfish	<i>Scarus taeniopterus</i>	100%	2.6
Redband Parrotfish	<i>Sparisoma aurofrenatum</i>	100%	2.9
Stoplight Parrotfish	<i>Sparisoma viride</i>	100%	2.4
Sharpnose Puffer	<i>Canthigaster rostrata</i>	100%	2.0
Harlequin Bass	<i>Serranus tigrinus</i>	100%	2.4
Blue Tang	<i>Acanthurus coeruleus</i>	100%	2.6
Bluehead	<i>Thalassoma bifasciatum</i>	100%	3.4
Fairy Basslet	<i>Gramma loreto</i>	93%	2.9
Sergeant Major	<i>Abudefduf saxatilis</i>	93%	2.8
Spotted Goatfish	<i>Pseudupeneus maculatus</i>	93%	2.0
Yellow Goatfish	<i>Mulloidichthys martinicus</i>	93%	2.2
Bridled Goby	<i>Coryphopterus glaucofraenum</i>	93%	2.4
Striped Parrotfish	<i>Scarus croicensis</i>	93%	2.5
Blackbar Soldierfish	<i>Myripristis jacobus</i>	93%	3.0
Ocean Surgeonfish	<i>Acanthurus bahianus</i>	93%	3.3
Black Durgon	<i>Melichthys niger</i>	93%	3.0
Yellowhead Wrasse	<i>Halichoeres garnoti</i>	93%	2.7
Trumpetfish	<i>Aulostomus maculatus</i>	93%	1.8

Appendix

REEF AGRRA at the USVI Summary Report –

Available online at

http://www.reef.org/cgi-bin/batchrep.pl?region=TWA&file_name=agsc9910.dat