Summary of 1998 research conducted aboard the *NOAA Ship Ferrel* in Gray's Reef National Marine Sanctuary under permit #GRNMS-02-98

PROJECT TITLE: **Identification and Species Diversity of Sessile Invertebrate Fauna Indigenous to the Natural Rock Formations of Gray's Reef National Marine Sanctuary.**

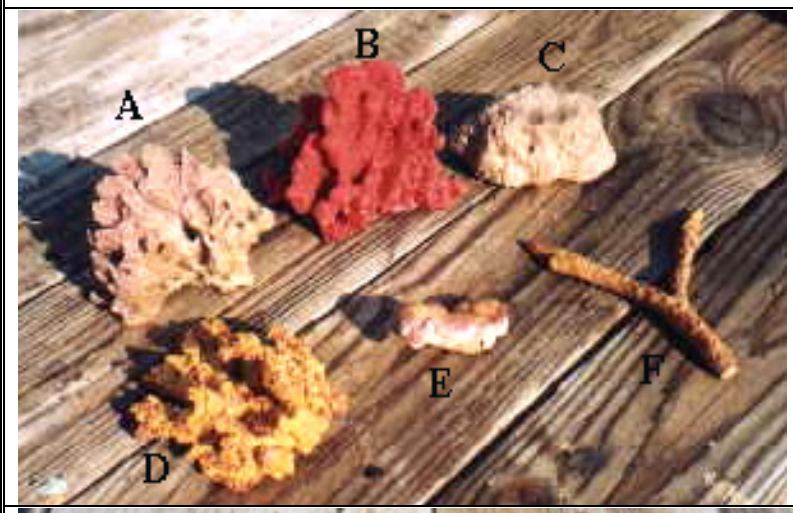
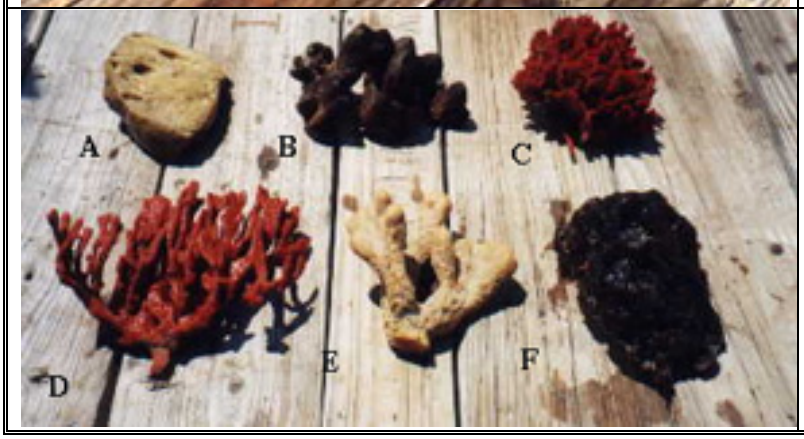
PERIOD OF PERFORMANCE: 06-09 April 1998
SITE/AREA: Gray's Reef National Marine Sanctuary (N 31023.792, W 80053.421)
PRINCIPAL INVESTIGATORS: Mr. Greg McFall / Ms. Elizabeth LaRoche
INSTITUTION: University of North Carolina at Wilmington / Phytera Inc.

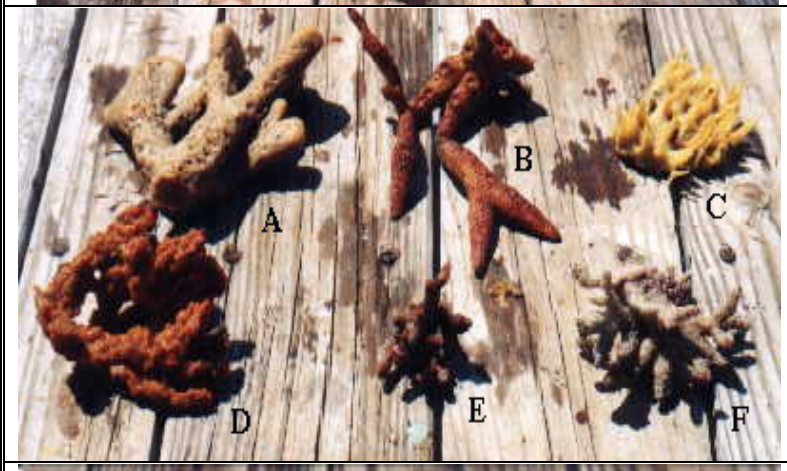
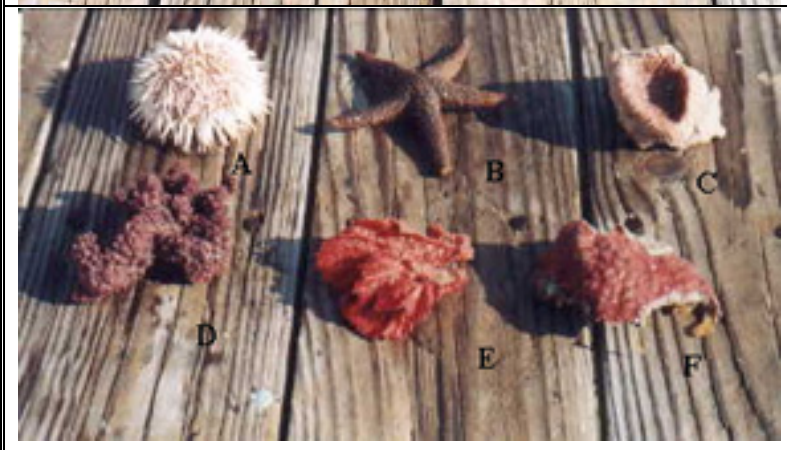
Gray's Reef National Marine Sanctuary may be a northern limit to several species of, what are generally considered to be "tropical" organisms, as evidenced by the absence of these species on North Carolina hardbottom reefs. I was most surprised by the presence of the sponges *H. Eaten, A. fulva, T. morchellum. D. etheria, G. gibberosa, A. varians, S. vesparium, E. formosus,* and *S. obliqua*, and the scleractinian coral *Eusmilia fastigiata*.

Considering the size of some of the "tropical" sponge colonies, it is apparent that they are able to survive as year-round residents of the hard bottom reef ecosystem; this would lead me to surmise that many of these "tropical" species are eurythermal, and not as temperature intolerant as was previously thought. Judging by the size of several sponge colonies, and compared to the growth rates we've witnessed in the Caribbean, I'd say that there are several sponges in Gray's Reef NMS that are over 7 years old. The contiguity of GRNMS to the Gulf Stream, with its episodic oceanographic events, undoubtedly accounts for the source of invertebrate larval recruits as well as the warmer water masses necessary to maintain the established fauna. The fact that these warm-water species are present and thriving suggests that the physical oceanographic parameters necessary to maintain these invertebrates are fairly constant from year to year.

Another anomaly that I witnessed on the reef was the presence of sponges that have only been reported in tropical mangrove ecosystems. Two sponges, *G. gibbersoa* and *D. etheria*, were not only represented in the fauna, but were some of the more abundant species present. In more tropical climes, these two sponges are thought to thrive in the mangrove environment due to the absence of spongivorous fishes (angelfishes, filefishes and parrotfishes.). In past experiments we've shown that when these two mangrove sponges are transplanted to the reef, they are consumed within 24 hours by spongivores. These results, coupled with the absence of spongivorous fishes in the mangroves, have led us to conclude that tropical sponge environments are largely controlled by predation. Although there are angelfishes present in GRNMS (*Holacanthus bermudensis* - Blue angelfish and *H. ciliaris* - Queen angel) they don't appear to be abundant enough to control the plethora of sponges present on the hardbottom reefs of the sanctuary.

Table 1: Specimens collected for Gray's Reef NMS voucher collection.

	**Red Beard Sponge** (*Microciona prolifera*) From left: the right finger morph, blade morph, and brown morph. Temperate
	A. **Stinker Sponge** (*Ircinia felix*)- Lombate morph - Temperate / Tropical B. **Red Beard Sponge** (*Microciona prolifera*) - Brown morph - Temperate C. **Sea Liver Tunicate** (*Eudistoma hepaticum*)- Temperate / Tropical
	A. **Sponge*** (*Dysidea etheria*) - Tropical B. **Strawberry Sponge** (*Aplysills roceacea*) - Tropical C. **Lambs Wool Sponge** (*Hippospongia lachne*) - Tropical D. **Red / Orange Branching Sponge** (*Ptilocaulis walpersi*) with zooanthids- Tropical E. **Chicken-liver Sponge** (*Chondrilla nucula*) - Temperate/Tropical F**. Scattered-pore Rope Sponge** (*Aplysina fulva*) - Tropical
	A. **Loggerhead Sponge** (*Spheciospongia vesparium*) - Tropical B. **Sponge*** (*Vergongula sp.*) - Tropical C. **Sponge*** (*Teichaxinella morchellum*) - Tropical D**. Red Beard Sponge** (*Microciona prolifera*) - Temperate E. **Orange Branching Sponge** (*unid*) - Temperate F. **Sponge*** (*Vergongula sp.*) - Tropical

	A. **Brown Variable Sponge** (*Anthosigmella varinas*) – Tropical B**. Brain Sponge** (*Geodia gibbersosa*) – Tropical C. **Sea Pork Tunicate** (*Aplydium stellatum*)- Tropical
	A. **Orange Branching Sponge** (*unid*) - Temperate B. **Scattered-Pore Rope Sponge** (*Aplysina fulva*)- Tropical C. **Sun Sponge** (Hymeniacidon heliophila)- Temperate D**. Red / Orange Branching Sponge*** (*Ptilocaulis walpersi*) with zooanthids - Tropical E. **Tubular-horn Bryozoan** (*Schizoporella violacea*) – Temperate / Tropical F. **Temperate-reef Coral** (*Oculina arbuscula*) Temperate
	A. **Short Spined Sea Urchin** (*Lytechinus variegatus*) - Temperate/ Tropical B. **Brown Spiny Sea star -** (*Echinaster spinulosus*) Temperate C. **Stinking Vase Sponge** - (*Ircinia campana*) - Temperate / Tropical D. **Stinker Sponge** (*Ircinia felix*)- Temperate/Tropical E. **Sponge*** (*Teichaxinella morchellum*)-Tropical F. **Encrusting Bryozoan** (*Schizoporella unicornis*) – Temperate/Tropical

* Sponges with no known common name.

Table 2: Organisms identified and present on Gray's Reef but not collected as voucher samples.

Identification	Common Name	Distribution
Aplysilla longispina	Sulfur Sponge	Temperate
Zoobotryon verticillatum	Common Moss Bryozoan	Temperate
Parazoanthus puertoricense	Maroon Sponge Zooanthid	Tropical
Echinaster spinulosus	Brown Spiny Sea star	Temperate
Trematooecia aviculifera	Bleeding-tooth Bryozoan	Temperate / Tropical
Bugul a neritina	Common Buglua Bryozoan	Temperate
Tridemnum solidum	Overgrowing Mat Tunicate	Temperate / Tropical
Distaplia bermudensis	Mottled Encrusting Tunicate	Tropical
Erylus formosus	None Known (sponge)	Tropical
Eudistoma olivaceum	Olive Gelatinous Tunicate	Tropical
Spongia obliqua	Commercial Bath Sponge	Tropical
Spirastrella sp.	Red Encrusting Sponge	Tropical
Halichondria melanodocia	None Known (sponge)	Tropical
Anoplodacylus lentus	Sea Spider	Temperate / Tropical
Polycera chilluna	Harelequin Nudibranch	Temperate
Ptilocaulis spiculifera	Red Branching Sponge	Tropical
Mycale americana	Flabby Sponge	Temperate
Leptogorgia virgulata	Golden Sea Whip	Temperate
Eusmilia fastigiata	Smooth Flower Coral	Tropical
Luidia clathrata	Gray Sea Star	Temperate / Tropical
Sclerodactyla briareus	Hairy Sea Cucumber	Temperate
Thyonella gemmata	Striped Sea Cucumber	Temperate
Lytechinus variegatus	Short-spined Sea Urchin	Temperate / Tropical
Arbacia punctula	Brown Rock Urchin	Temperate / Tropical
Mellita quinquiesperforata	Common Sand Dollar	Temperate
Astrophyton muricatum	Basket Star	Tropical
Astropecten articulatus	Margined Sea Star	Temperate / Tropical
Aplysina cauliformis	Golden Rope Sponge	Tropical