

NOAA CIOERT Cruise Report
South Atlantic MPAs and Oculina HAPC:
Characterization of Benthic Habitat and Biota

NOAA Ship *Pisces* Cruise 17-02
UNCW *Mohawk* ROV
June 20- July 5, 2017

Funding: NOAA Coral Reef Conservation Program (CRCP)
South Atlantic Fishery Management Council (SAFMC)
NOAA CRCP-Fishery Management Council Coral Reef Conservation
Cooperative Agreements

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Stacey Harter, Principal Investigator
NMFS/Southeast Fisheries Science Center (SEFSC), Panama City, FL
Email: stacey.harter@noaa.gov

John Reed (Co-PI) and Stephanie Farrington
Cooperative Institute of Ocean Research, Exploration and Technology
Harbor Branch Oceanographic Institute, Florida Atlantic University
Fort Pierce, FL

Andrew David, Co-Principal Investigator
NMFS/Southeast Fisheries Science Center (SEFSC)

Felicia Drummond
NMFS/Southeast Fisheries Science Center (SEFSC)



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We thank the NOAA Cooperative Institute for Ocean Exploration, Research, and Technology (CIOERT) at Harbor Branch Oceanographic Institute, Florida Atlantic University (HBOI-FAU). The crews of the NOAA Ship *Pisces* and the *Mohawk* ROV (owned by Flower Gardens Bank National Marine Sanctuary [FGBNMS], operated by Lance Horne and Jason White, UNCW Undersea Vehicle Program) are especially thanked for their support and efforts which made this cruise a success.

DELIVERABLES AND DATA MANAGEMENT

This Cruise Report and SEADESC Level II Report are the deliverables for this NOAA CRCP/SAFMC grant. To date, all data have been archived as required; these data include shipboard data, CTD, ROV navigation data, ROV video and digital images, ROV dive annotations, and HBOI Microsoft Access at-Sea Database (Table 1). A complete set of original data are archived by the Principal Investigators at NOAA Fisheries, Panama City (Stacey Harter) and HBOI-FAU (John Reed).

Table 1. NOAA Ship *Pisces* cruise (June 20- July 5, 2017) data archives (Principal Investigators- Stacey Harter, Andrew David, NOAA NMFS, Panama Lab; John Reed, HBOI-FAU).

Source	Description	Format
Ship	CTD	CSV
ROV	ROV video- digital copies of all ROV dives	External hard drives, DVD
ROV	ROV digital still images	JPEG; External hard drives, DVD
ROV	Event log	CSV
Science	ROV dive track polygons	ArcGIS shapefile
Science	Cruise database	Access MDB

CIOERT/NOAA COLLABORATION

The primary focus of this research cruise is to advance NOAA OER goals while complementing the management objectives of NOAA CRCP, NOAA DSCRTP, NOAA Mesophotic Reef Ecosystem Program, NOAA CIOERT, and the South Atlantic Fishery Management Council. For this cruise, collaborators included NOAA NMFS at Panama City (Andrew David, Stacey Harter, Heather Moe), NOAA CIOERT at HBOI-FAU (John Reed, Stephanie Farrington), and UNCW (Lance Horn, Jason White).

SCIENTIFIC PARTICIPANTS

Stacey Harter	PI/FPC	NMFS/PC Lab
Andrew David	PI	NMFS/PC Lab
LTJG Felicia Drummond	Biologist	NMFS/PC Lab
Lance Horn	ROV Pilot	UNCW
Jason White	ROV Pilot	UNCW
Eric Glidden	ROV	UNCW
John Reed	PI	HBOI/FAU
Stephanie Farrington	Biologist	HBOI/FAU
Matthew Platt	Biologist	College of Charleston
Mallory McCormack	Biologist	College of Charleston

AREA OF OPERATION

The primary operational areas were six shelf-edge Marine Protected Areas (MPAs) and the Oculina Experimental Closed Area (OECA) off the east coasts of Florida, Georgia, South Carolina and North Carolina between 27° 30' N, 79° 57' W and 33° 28' N, 76° 59' W at depths of 44 to 197 m.

OBJECTIVES

The primary objectives of the cruise were to gather additional data on habitat and fish assemblages within and adjacent to six of the South Atlantic Grouper/Tilefish MPAs and inside the OECA as part of a long term sampling program to document changes in these areas before and after implementation of fishing restrictions. Efficacy testing of this management tool will aid fishery managers in future use of area restrictions for the protection of valuable habitat and fishery resources. Specific objectives included:

- Conduct remote operated vehicle (ROV) transect surveys of habitat and fish assemblages
- Conduct total water column CTD profiles for each location
- Conduct multibeam mapping with *Pisces*' ME-70 system inside and outside existing MPAs to locate potential ROV survey sites as well as to continue assembly of a comprehensive bathymetric map of the entire outer continental shelf margin of the southeastern US.

METHODS

ROV Operations

The FGBNMS *Mohawk* ROV (operated by UNCW Undersea Vehicle Program) was used. ROV transect locations were selected by four methods:

- analysis of the limited multibeam bathymetric and acoustic backscatter maps produced within the preceding decade
- reef locations provided by colleagues
- sites found during previous years of this survey
- analysis of areas mapped on the current cruise.

The ROV was equipped with a high-definition digital video camera (using fiber optic cable) mounted on tilt bar, a fixed digital still camera, and a temperature/depth recorder. The ROV was not outfitted with a manipulator and no samples were collected.

ROV Video Camera

Video was recorded continuously throughout each dive from surface to surface with a high-definition video camera (Insite Pacific Mini Zeus CMOS color zoom camera with 2,000,000 effective pixels). The camera was typically angled down ~30° to view both near and far to the horizon for fish aggregations and habitat, and had 10-cm parallel lasers for scale. High-definition video was recorded to external hard drives and used as the primary data source for viewing by the science team and quantitative analysis of the fish populations. A second standard definition copy was also recorded to a hard drive as well as to DVD for backup and easy viewing on any computer's DVD drive. The standard definition format had an On-Screen Display (OSD) video overlay which recorded time, date, ROV heading, and ROV depth, and was used as the "pilot" view. A microphone was used for continuous audio annotations by the PIs describing events, habitat, and biota which were recorded onto the video recordings and transcribed into a Microsoft Access 2010 database.

ROV Digital Still Camera

Still images were taken to document habitat and benthic macrobiota with a Kongsberg OE14-408 (Canon G11) high-definition digital still camera (10 megapixels). For quantitative photo transects the camera was pointed 90° down from horizontal and used two 10-cm parallel lasers for scale. Still images were captured every 2 minutes throughout the dive at a height of ~1.3 m to provide relatively consistent area for each image. Each photo filename was coded with corresponding EDST time and date code (using Stamp 2.8 by Tempest Solutions[©]) which was imported into MS Access and linked to the ROV navigation data for site specific data of coordinates and depth and then imported into ArcGIStm 10.0.

ROV Navigation

The *Mohawk* ROV used an integrated navigation system consisting of Hypack Max 2014 software on a 64-bit, 3.4 GHz, rack-mounted computer running Windows 7. Additionally, data from an ORE Offshore 4410C Trackpoint II USBL Acoustic Tracking System, Northstar 951XD differential GPS, and Azimuth 1000 digital compass, along with the *Mohawk* ROV data fed to this computer. The Trackpoint II system communicates acoustically to an ORE Offshore 4377A transponder with depth telemetry on the ROV to provide slant range, bearing, and depth from the support vessel. This system allows the ROV to assign latitude and longitude while in operation. The integrated navigation system provides real time tracking and orientation of the ROV and the ship to the ROV pilot and the ship's bridge for navigation. Geo-referenced TIFF files obtained with multibeam sonar were entered into Hypack as background files to display target sites and features of interest to aid in ROV and ship navigation. Hypack can also export ROV position data in real time as a NMEA data string. Ship and ROV positions in addition to the ROV depth, heading and altimeter data, are logged and processed after each dive day and provided to the scientist in an Excel spreadsheet file. All data documentation (digital images, HD video, dive annotations, and specimen collections) are geo-referenced to ROV position by matching the time and date to the ROV navigation files.

ROV Survey Protocol

The primary objectives of each dive were to document benthic habitat, benthic macrobiota, and fish populations, and to conduct photo/video transects which were used for quantitative analyses of the habitat and biota. The general protocol included:

1. Video transects were used for analysis of fish populations. Video transects kept the ROV as close to the bottom as possible (<1/2 m) with a speed over ground of ~1/4 knot.
2. Digital still images perpendicular to the bottom were captured every 2 minutes throughout the dive during which the ROV hovered at a height of ~1.3 m off the bottom to provide similar field of view area for each image (~1.5 m²).
3. Still images captured from the photo transects were analyzed using CPCe[®] software to determine relative percent cover of benthic biota and habitat types. Non-transect photos, such as to record a specific species, were not included in the quantitative analyses. Poor and unusable photos (blurred, black, off bottom) or overlapping photos were removed from the quantitative analyses.
4. Underwater video was viewed in real time on the support vessel by PIs familiar with the local deep-water fauna; audio annotations describing habitat, benthic biota, and fish were recorded onto the video and transcribed into a Microsoft Access database.
5. Field notes and video images were reviewed and summarized to identify habitats and biota. These summaries were compiled in ArcGIS format and used to produce habitat maps.

CTD Operations

Temperature and depth (pressure) profiles were collected with a Sea-Bird 39 Temperature Recorder attached to the ROV for each dive. Shipboard CTD casts were made with a Sea-Bird 19 which recorded depth, conductivity, pressure, salinity, sound velocity, density, oxygen saturation, and nitrogen saturation. These were made in conjunction with the multibeam sonar surveys.

Multibeam Sonar Surveys

Multibeam sonar surveys were conducted with the ME-70 multibeam mapping system on the ship.

Fish Analyses

Each dive was divided into transects based on benthic habitat characterization (see Protocol for Benthic Habitat Characterization below) so that each transect consisted of only a single habitat type. All fish were identified for each transect down to the lowest taxonomic level and counted. Transect area was calculated as transect length * transect width where transect length was calculated from the ROV tracking and transect width was measured using paired lasers on the ROV. Fish density (# individuals/1000 m²) was then calculated as (# of individuals/ transect area) *1000.

Benthic Analyses

Percent cover of substrate type and benthic macrobiota was determined by analyzing the quantitative transect images with Coral Point Count with Excel extensions (CPCe 4.1[®], Kohler

and Gill 2006), and following protocols established in part by Vinick et al. (2012) for offshore, deepwater surveys in this region. Random points overlaid on each image were identified as substrate type and benthic taxa. Substrate categories included: soft bottom (unconsolidated sand, mud) and hard bottom which was subdivided into rock (pavement, boulder, ledge), rock rubble/cobble (generally, 5-20 cm), and framework coral (standing coral colonies). All macro-benthic biota (usually >3 cm) were identified to the lowest taxa level possible.

For this report we used the following terminology: hard bottom is sometimes referred to as live bottom due to the amount of living organisms attached to these substrates (SAFMC 1998). Hard bottom provides anchorage for sessile or semi-sessile organisms (e.g., corals, octocorals, anemones, hydroids). Coral is defined as hard corals (*Scleractinia*), hydrocorals (*Stylasteridae*), as well as octocorals (*Alcyonacea*- “*gorgonacea*”), and black corals (*Antipatharia*) (Lumsden et al. 2007).

RESULTS

Study Areas

Thirty four ROV dives were completed at areas both inside and outside six MPAs. Station locations for the ROV dives are displayed in Figure 1 and listed in Table 1. The breakdown of dives was as follows: six associated with the North Florida MPA; three associated with the Georgia MPA; two associated with the Charleston Deep Artificial Reef MPA; six associated with the Edisto MPA; six associated with the Snowy Wreck MPA; seven associated with the Northern South Carolina MPA; and four associated with the Devil’s Hole SMZ.

Total number of digital still photos was 4421, total number of screen grabs was 4513, total number of hours spent on bottom with the ROV was approximately 59 hours, and the total distance covered with the ROV was 26.8 km.

Multibeam Mapping

Multibeam mapping was conducted in the following areas: OECA, North Florida MPA, Georgia MPA, Edisto MPA, Snowy Wreck MPA, and Northern South Carolina MPA. A total area of 148.33 km² was mapped.

Benthic Macrobiota and Habitat

Appendix 1 lists all of the benthic macro-invertebrates and algae that were identified from the quantitative photo transects at each dive site and their percent cover based on CPCE Point Count of the photo images. These analyses are also presented for each dive site in Appendix 3.

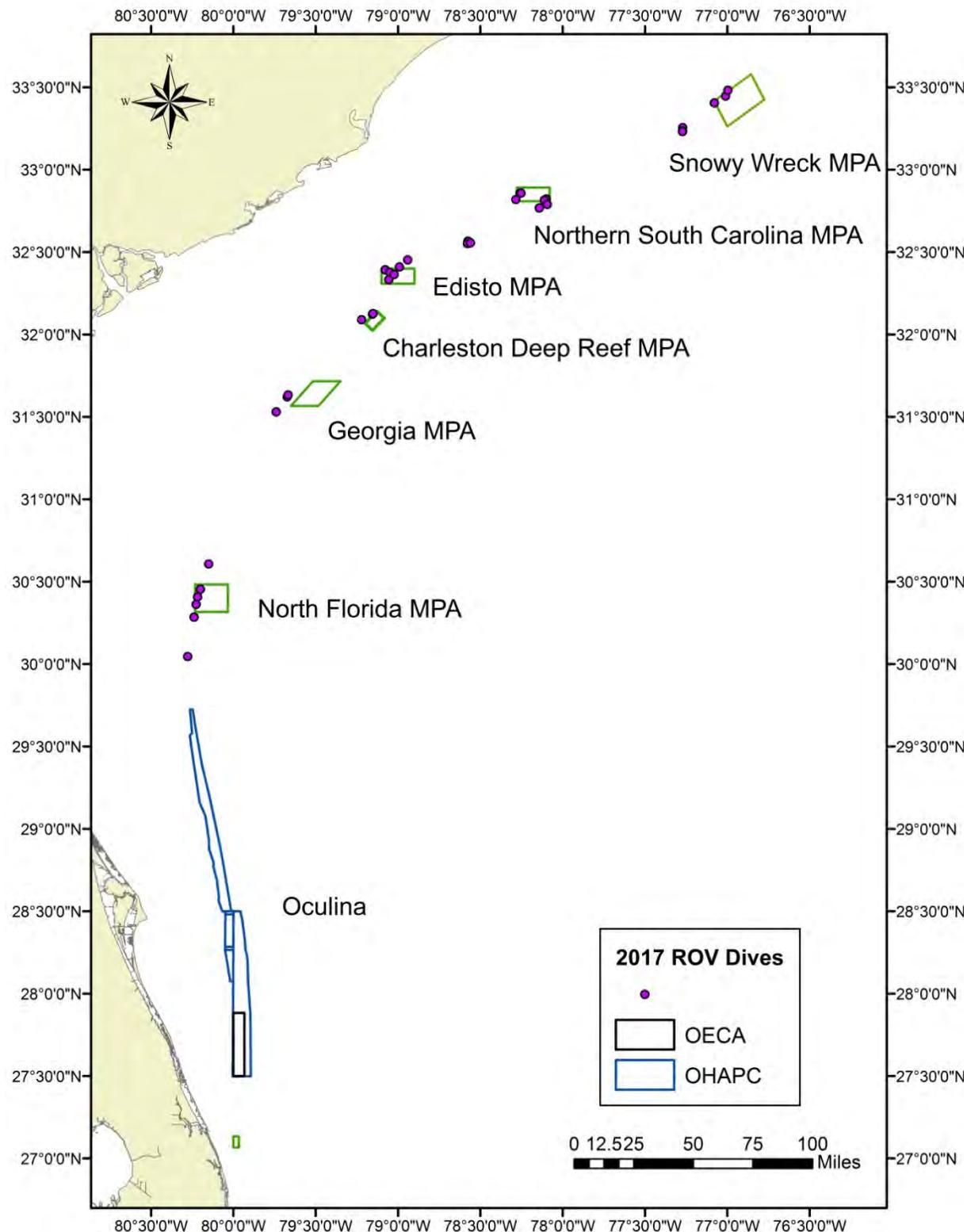


Figure 1. Locations of *Mohawk* ROV dive sites in South Atlantic Bight during the 2017 NOAA Ship Pisces cruise, June 20- July, 2017.

Table 1. Locations of *Mohawk* ROV dive sites in South Atlantic Bight during the 2017 NOAA Ship Pisces cruise, June 20- July, 2017.

Dive	Date	Start Latitude	Start Longitude	End Latitude	End Longitude	Average Depth (m)	Closest MPA
1	6/23/2017	30.0449	-80.2774	30.0572	-80.2771	62	North Florida
2	6/23/2017	30.4536	-80.1997	30.4644	-80.1986	58	North Florida
3	6/23/2017	30.4070	-80.2168	30.4095	-80.2144	57	North Florida
4	6/24/2017	30.3610	-80.2255	30.3700	-80.2198	64	North Florida
5	6/24/2017	30.2845	-80.2386	30.2902	-80.2383	60	North Florida
6	6/24/2017	30.6066	-80.1494	30.6135	-80.1454	53	North Florida
7	6/25/2017	31.5303	-79.7394	31.5446	-79.7300	68	Georgia
8	6/25/2017	31.6205	-79.6719	31.6208	-79.6637	70	Georgia
9	6/25/2017	31.6332	-79.6666	31.6384	-79.6584	69	Georgia
10	6/26/2017	32.3917	-79.0770	32.3926	-79.0733	47	Edisto
11	6/26/2017	32.3317	-79.0559	32.3395	-79.0501	56	Edisto
12	6/26/2017	32.1222	-79.1549	32.1245	-79.1526	101	Charleston Deep Reef
13	6/26/2017	32.0886	-79.2208	32.0897	-79.2183	85	Charleston Deep Reef
14	6/27/2017	33.4049	-77.0784	33.4195	-77.0659	89	Snowy Wreck
15	6/27/2017	33.4459	-77.0099	33.4469	-77.0085	92	Snowy Wreck
16	6/27/2017	33.4820	-76.9959	33.4802	-76.9966	68	Snowy Wreck
17	6/28/2017	33.2546	-77.2706	33.2489	-77.2698	78	Snowy Wreck
18	6/28/2017	33.2352	-77.2715	33.2372	-77.2635	87	Snowy Wreck
19	6/28/2017	33.2315	-77.2719	33.2275	-77.2660	89	Snowy Wreck
20	6/29/2017	32.8219	-78.0991	32.8282	-78.0885	162	Northern South Carolina
21	6/29/2017	32.8145	-78.1106	32.8132	-78.0977	164	Northern South Carolina
22	6/29/2017	32.7880	-78.0937	32.7859	-78.0876	184	Northern South Carolina
23	6/29/2017	32.7678	-78.1414	32.7678	-78.1376	172	Northern South Carolina
24	6/30/2017	32.3771	-79.0499	32.3864	-79.0427	50	Edisto
25	6/30/2017	32.3639	-79.0229	32.3698	-79.0169	64	Edisto
26	7/1/2017	32.4092	-78.9906	32.4150	-78.9831	53	Edisto
27	7/1/2017	32.4523	-78.9409	32.4611	-78.9291	53	Edisto
28	7/2/2017	32.8569	-78.2575	32.8641	-78.2539	51	Northern South Carolina
29	7/2/2017	32.8583	-78.2515	32.8703	-78.2493	53	Northern South Carolina
30	7/2/2017	32.8187	-78.2839	32.8237	-78.2793	54	Northern South Carolina
31	7/3/2017	32.5662	-78.5748	32.5708	-78.5749	75	Devil's Hole SMZ
32	7/3/2017	32.5518	-78.5778	32.5543	-78.5730	98	Devil's Hole SMZ
33	7/4/2017	32.5554	-78.5592	32.5582	-78.5601	125	Devil's Hole SMZ
34	7/4/2017	32.1264	-79.1516	32.1246	-79.1532	101	Charleston Deep Reef

Fish Surveys

Appendix 2 lists all of the fish that were identified from the video transects at each dive site and their densities (#/ 1000 m²). These analyses are also presented for each dive site in Appendix 3. Four of the seven targeted reef fish species were observed during the mission including snowy

grouper (*Hyporthodus niveatus*), yellowedge grouper (*Hyporthodus flavolimbatus*), warsaw grouper (*Hyporthodus nigritus*), and blueline tilefish (*Caulolatius microps*). Lionfish were observed on 27 of the 34 dives. They were not observed on the four deeper dives completed at the Northern South Carolina MPA (depths of 160 – 200m), one dive in the Edisto MPA that was all sand, one dive in the Snowy Wreck MPA that was aborted early because the ship could not navigate in the direction we needed it to for the habitat feature, and one dive in the Devil’s Hole SMZ that was at a depth of 110-140 m.

SEADESC II Report: Characterization of Benthic Habitat and Benthic Macrobiota

A SEADESC Level II Report (Southeastern United States Deep-Sea Corals) is presented in Appendix 3. This provides the following data for each dive site: cruise and ROV dive metadata, figures showing each ROV dive track and habitat zones overlaid on multibeam sonar maps, dive track data (start and end latitude, longitude, depth), objectives, CTD plots, general description of the habitat and biota, and images of the biota and habitat that characterize the dive site. In addition, this SEADESC Level II Report provides quantitative analyses of each dive site including: 1) CPCe 4.1[©] analysis of percent cover of benthic macrobiota and substrate types, and 2) densities of fish populations.

FUTURE WORK AND CONCLUSIONS

This cruise and research has resulted in a rich set of new data discovering and characterizing deepwater MPA and OHAPC sites and fish populations off the southeastern United States within the jurisdiction of the South Atlantic Fishery Management Council. These data will be important for managers and scientists with NOAA Fisheries, the South Atlantic Fishery Management Council, NOAA DSCRTP, NOAA CRCP, and NOAA Mesophotic Reef Ecosystem Program. These data may then be compared to previous and future research cruises and to areas adjacent to the protected areas to better understand the long-term health and status of these important deepwater coral/sponge ecosystems.

APPENDIX 1

Species List and Percent Cover of Benthic Macrobiota

Species list of the benthic macro-invertebrates and algae that were identified from quantitative photo transects for each ROV dive during the 2017 NOAA Ship *Pisces* 17-02 cruise to the South Atlantic MPAs. Still images captured from the photo transects were analyzed using CPCe[®] software to determine relative percent cover of benthic biota and habitat types. (Best viewed in PDF format in order to zoom view)

APPENDIX 2

Species List and Density of Fish Populations

Species list all of fish that were identified and counted from the quantitative video transects for each ROV dive during the 2017 NOAA Ship *Pisces* 17-02 cruise to the South Atlantic MPAs. Fish density (# individuals/1000 m²) was calculated as (# of individuals/ transect area) *1000. Transect length was calculated from the ROV tracking. Transect width was measured using the paired lasers. Fish densities were not included for the Artificial Reef sites (Dive 17-12, 17-13).

Class/Scientific Name- Common Name	17-01	17-02	17-03	17-04	17-05	17-06	17-07	17-08	17-09	17-11	17-14	17-17	17-18	17-19	17-20	17-21	17-22	17-23	17-24	17-25	17-26	17-27	17-28	17-29	17-30	17-31	17-32	17-33		
Balistidae- Filefish																					0.1290									
Balistidae- Filefish/Triggerfish																					0.2581									
<i>Cantherhines macrocerus</i> (Holland, 1853)- Whitespotted Filefish																														
<i>Canthigaster</i> sp.- Puffer	7.2593	5.3659	5.0704	8.9419	9.3220	19.7984	13.9844	1.2626	5.2896	6.3142	3.8187	12.0710	5.9013	8.9600						51.4469	15.2918	29.9355	34.5619	28.8306	9.4667	13.4310	13.3811	2.4578	2.7397	
<i>Chilomycterus antillarum</i> Jordan & Rutter, 1897- Web Burrfish																				0.1600										
<i>Chilomycterus</i> sp.- Burrfish																				0.1600										
<i>Diodon hystrix</i> Linnaeus, 1758- Porcupinefish																				0.1454										
<i>Diodon</i> sp.- Puffer																				0.1341										
Diodontidae- Spiny Puffer																														
<i>Lactophrys</i> sp.- Cowfish								0.0976													0.4287									
<i>Lactophrys trigonus</i> (Linnaeus, 1758)- Trunkfish																														
Ostraciidae- Cowfish								0.5634																						
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer																				1.5406	0.5051	0.4927	0.4363	0.1341	0.8574	0.2012	0.6452	0.8459	0.2442	
Tetraodontidae- Puffer																				0.9481									0.4287	
Xanthichthys ringens (Linnaeus, 1758)- Sargassum Triggerfish																				1.5998										
Elasmobranchii																														
Carcharhiniformes																					0.1600									
<i>Carcarhinus plumbeus</i> (Nardo, 1827)- Sandbar Shark																														
Mylabatiformes																														
<i>Dasyatis centroura</i> (Mitchill, 1815)- Roughtail Stingray																				0.1833									0.4032	
<i>Dasyatis</i> sp.- Stingray																													0.2442	
<i>Mobula birostris</i> (Walbaum, 1792)- Manta Ray																													0.9132	
UNKNOWN	3.2593	0.7805	1.9718	1.4903	1.0169	6.9661	3.7924		0.5290	1.0279	1.9709	4.5084	1.4753	0.3200	1.2928	0.7123	0.3241			3.0011	4.2254	5.4194	1.0876	2.0161	3.8667	0.2442		0.6144		

APPENDIX 3

SEADESC II REPORT

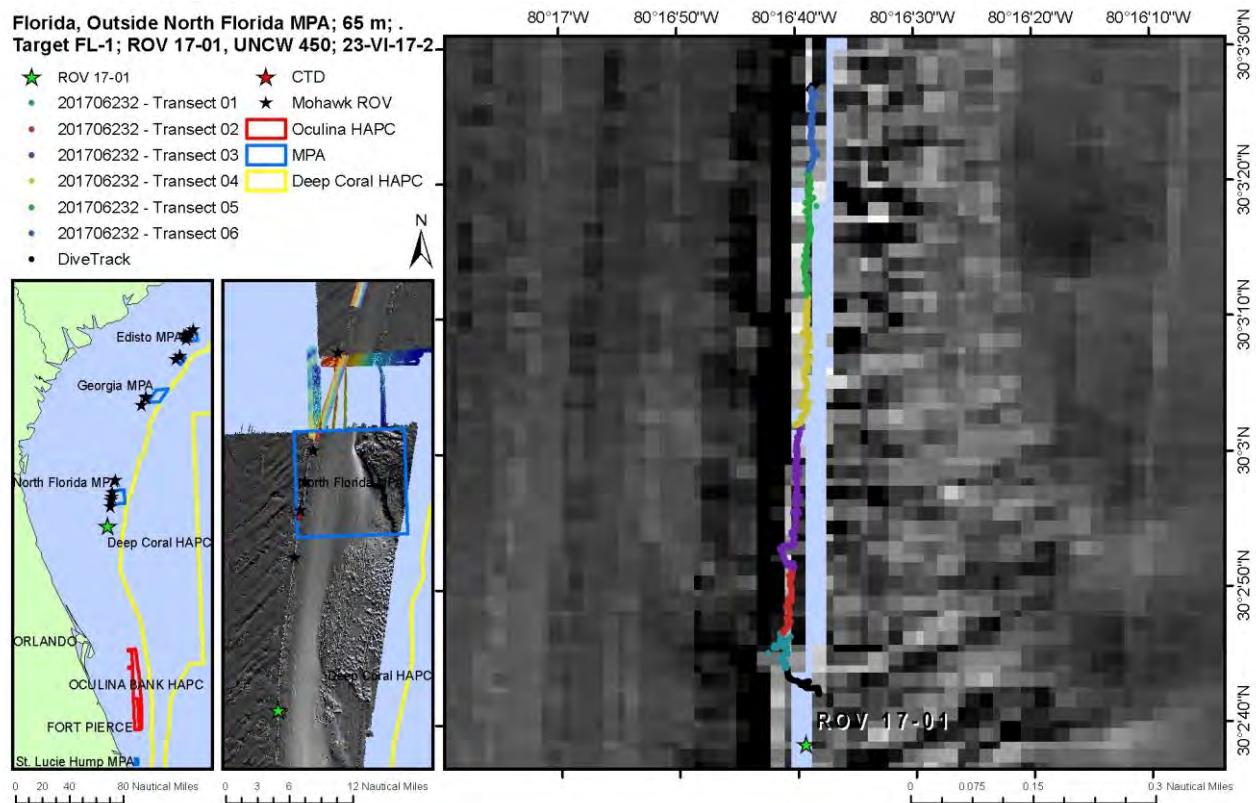
Characterizations and Quantitative Analyses of Habitat, Benthic Biota, and Fish Populations

Provides the following data for each dive site during the 2017 NOAA Ship *Pisces* 17-02 cruise to the South Atlantic MPAs:

- cruise and ROV dive metadata and objectives
- figures showing each ROV dive track and habitat zones overlaid on multibeam sonar maps
- ROV dive track data (start and end coordinates, time, and depth)
- CTD plots from shipboard casts and temperature profiles for each ROV dive
- images characterizing the habitat and biota for each dive site
- characterization of habitat, benthic biota, and fish populations for each dive site
- quantitative analyses of photo transects for each dive site including CPCe 4.1[®] Coral Point Count analysis of percent cover of benthic biota and substrate types
- quantitative analyses of video transects for each dive site of fish densities by species

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Navy_2011_CONFIDENTIAL_USWTR_Tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/23/2017
Specimens:	0
Digital Photos:	187
No. DVD:	2
Hard Drive No.:	1

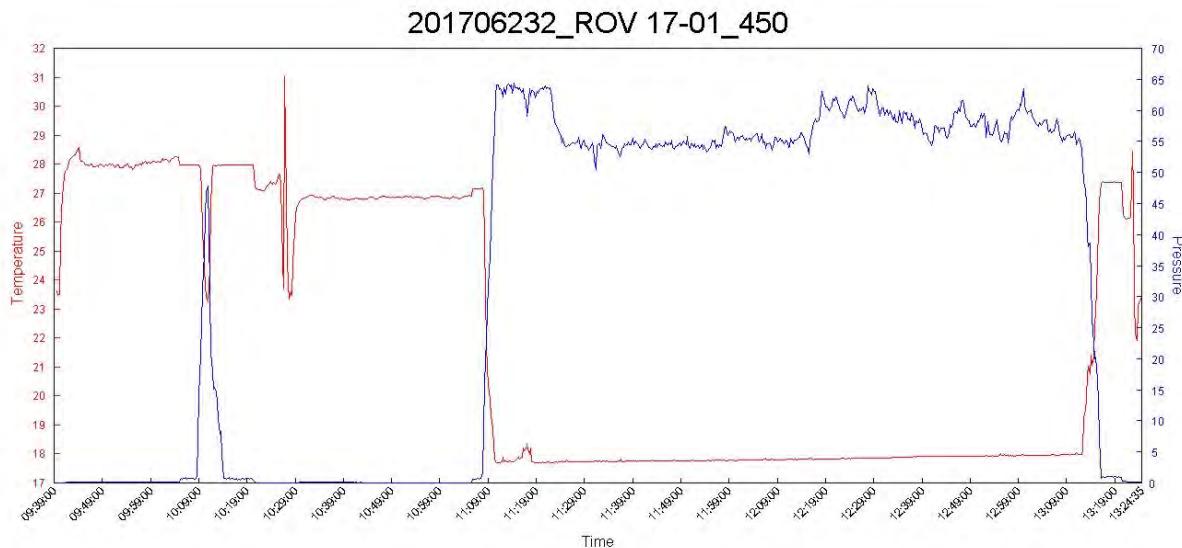
Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	55	Total Transect Length (km):	1.545
Maximum Bottom Depth (m):	65.4	Surface Current (kn):	0.7
On Bottom (Time- EDST):	8:26	On Bottom (Lat/Long):	30.0449°N; -80.2774°W
Off Bottom (Time- EDST):	10:27	Off Bottom (Lat/Long):	30.0572°N; -80.2771°W
Physical (bottom); Temp (°C):	17.8	Salinity:	N/A
		Visibility (m):	15
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-01 are as follows: Depth Maximum: 64.4 m, Temperature: 17.7-18.3 °C

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

Dive Imagery:



Figure 1: -56.2 m

Large colony of *Oculina varicosa* (or *Madracis*) on rock escarpment.



Figure 2: -59.8 m

Rock ledges and slabs, with spiny lobster.

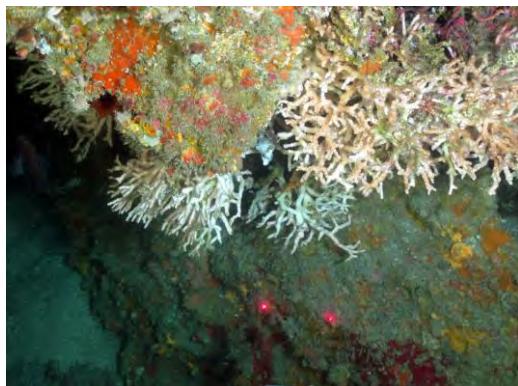


Figure 3: -58.9 m

Live, white *Oculina varicosa* coral on rock ledges.



Figure 4: -56.2 m

Bushy *Tanacetipathes* black coral, *Stichopathes* wire coral, *Muricea* gorgonian.



Figure 5: -55 m

Top of ridge with rock pavement, black corals, and sponges.



Figure 6: -55.2 m

Black corals on top of ridge.

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 23-VI-17-2; ROV 17-01, UNCW Dive 450; Florida, outside North Florida MPA, 16 nmi SW of MPA, 65 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

All data (ROV navigation, video, photos, dive notes) were recorded in ESDT. Dive Notes were recorded by Farrington/Reed (HBOI) directly into Access database. Fish data were recorded by Stacey Harter, Andy David, and Felicia Drummond (NOAA Fisheries) in separate Access database which was compiled with the benthic database. SBE 39 temperature recorder on ROV.

Digital still images were shot in Program Mode, Auto ISO, White Balance- fluorescent light symbol/fish symbol, auto focus, strobe on. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; photos were taken every 2 minutes. Non-quantitative photos for habitat and species identifications were logged separately as 'Non-XS Photo'. Screen grabs were made from High-Def video with time/date stamp as filenames and also logged as 'Non-XS Photo- screen grab'. Fish counts used the video camera pointed forward and down ~20° to view from the horizon to close up. Both cameras had 10-cm parallel lasers for scale (green- Still; red- Video). Direction of transects were generally along the geological feature, but generally headed N, depending on the ship's maneuverability with the wind and current.

ROV GPS offset is incorrect relative to accurate MB positions. ROV position at SC barge site was offset 43 m north of the MB position. The second barge site dive found 3 different offsets during dive- first debris field, 20 to N; barge SW corner, 15 m to west; SE corner, 7 m to W. Deeper dive off North Carolina Snowy Wreck MPA showed depth offset: on bottom- ROV depth 74 m, MB showed 84 m. Not able to correct; not sure what is wrong other than offset settings between ship GPS and ROV are incorrect. All ROV Dive Tracks were fixed by UNCW-USVP post-cruise and entered into the database corrected.

Site Description/Habitat/Biota:

Depth range: 55-65 m

MB map shows N-S linear ridge SW of MPA. Transect along ridge, 16 nmi southwest of MPA, heading N.

08:21- Launch

08:26- On bottom; depth- 65 m, visibility- 15 m, current- 0.5 kn from W. Flat sediment, low relief hard bottom; coarse sediment, rubble, hard bottom <1/4 m relief, low rugosity. *Stichopathes*, 10 cm gorgonacea, *Tanacetipathes*, hydroids, Didemnidae, *Filograna*, demosponges- orange encrusting, *Halymenia*, *Diogorgia*, *Swiftia exserta*,

08:37- 63 m, few boulders < ¼ m. Fairly dense biota cover. Ledge 0.5 m, dense bushy *Tanacetipathes*.

08:39- top of ridge 57 m; high relief, 1-2 m relief, high rugosity, east face of ridge; rock is fractured square blocks 1-2 m diameter. *Ircinia campana*. Lots of AJ, gray trigger, reef fish. Transect heading N along top edge of ridge. Ridge top, west of the ledge is flat, low relief rock pavement and sediment. Aplysina finger sponge, Axinellidae, dense 30 cm *Tanacetipathes* bushy, dense *Stichopathes*, Spirastrellidae.

08:53- 56 m, top of east drop off, high rugosity, 1-2 m relief, schools of tomate and vermilion snapper along ledge, yellow tail reef fish, reef butterfly, queen angel, bank butterfly. 30 cm purple *Muricea*, *Antipathes*

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

atlantica, *Antipathes furcata*.

09:02- 56 m, top edge of ledge, fractured, square boulders. Vertical drop off, 3 m relief, eroded rock surfaces, undercut ledges.

Madracis myriaster- 10-20 cm colonies on vertical face of ledge, *Oculina varicosa* on face of rock, 30 cm. 09:30- 65 m, base of ledge. 10 m relief, top to bottom. Slope 30 dg, jumble of square boulders, on slope, over 10 m width. *Oculina/Madracis* common. No fleshy algae apparent on the rocks; purple CCA. Biota still dominated by *Tanacetipathes*, *Stichopathes*, Spirastrellidae, *Ircinia campana*, Didemnidae, *Filograna*.

09:48- 59 m, pile of longline along wall.

10:00- 58 m, continue along east face and top of ridge; same habitat and biota. *Oculina* common (10-20 cm).

Panularis argus, *Dictyota* (rare), *Geodia*.

10:26- 56 m, top edge of ridge. End dive.

Dominant Benthic Macrobiota:

Scleractinia coral- *Oculina varicosa* (10-30 cm, common), *Madracis myriaster* (10-30 cm)

Antipatharia coral- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant)

Gorgonina coral- *Diodogorgia*, *Muricea*, *Nicella*, *Swiftia exserta* (uncommon)

Porifera- *Ircinia campana*, Spirastrellidae, *Aplysina*

Asciidiacea- Didemnidae (abundant)

Annelida- *Filograna* (abundant)

Algae- *Dictyota*? (rare), purple CCA

Dominant Fish:

Lionfish- 34

Hogfish (1), tomtate, vermillion snapper, bank butterfly, reef butterfly, blue angel, yellow tail reef, squirrel fish, greater amberjack, almaco jack, cubbyu

Human Debris:

Longline.

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

CPCe Percent Cover Analysis:

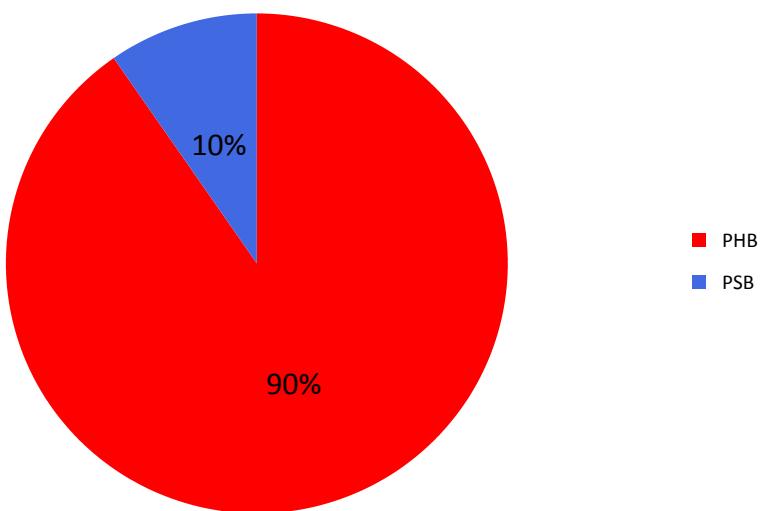
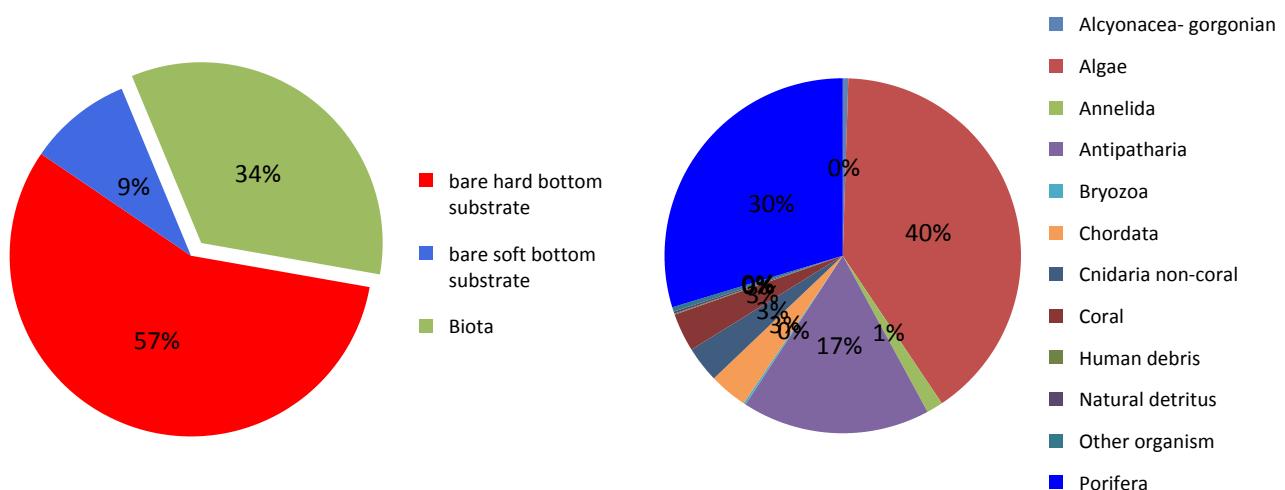


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-01. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-01.

A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-01.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-01 dive notes
Biota	33.99%	X
Algae	13.65%	X
Chlorophyta	0.10%	
Ochrophyta	0.03%	X
Dictyota sp.		X
Ochrophyta	0.03%	
Rhodophyta	13.51%	X
Corallinales	11.76%	X
Rhodophyta	1.76%	
<i>Halymenia</i> sp.		X
Porifera	10.10%	X
Demospongiae	10.07%	X
<i>Agelas</i> sp.	0.03%	
<i>Aiolochroia crassa</i> (Hyatt, 1875)	0.10%	
<i>Aplysina</i> sp.		X
Axinellidae		X
Chondrillida	0.64%	
Demospongiae- orange encrusting porous		X
Demospongiae unid. sp.	4.12%	X
Dictyoceratida	0.03%	
<i>Erylus</i> sp.	0.14%	
<i>Geodia</i> sp.		X
<i>Halisarca</i> sp.	0.03%	
<i>Ircinia campana</i> (Lamarck, 1814)	0.03%	X
<i>Ircinia</i> sp.	0.14%	X
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.24%	
Microcionidae		X
Spirastrellidae	4.56%	X
<i>Xestospongia</i> sp.		X
Porifera	0.03%	
Cnidaria	8.28%	X
Alcyonacea - gorgonian	0.17%	X
Alcyonacea- gorgonian		X
<i>Diodogorgia</i> sp.	0.07%	X

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

<i>Muricea</i> sp.	0.10%	X
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Anthozoa - Non Coral	0.07%	
Actiniaria	0.03%	
Corallimorpharia	0.03%	
Antipatharia	5.81%	X
<i>Antipathes atlantica</i> Gray, 1857		X
<i>Antipathes furcata</i> Gray, 1857		X
Antipathidae	0.10%	
<i>Stichopathes lutkeni</i> Brook, 1889	2.33%	X
<i>Tanacetipathes</i> sp.	3.38%	X
Hydrozoa	1.05%	X
Hydroidolina	1.05%	X
Scleractinia	1.18%	X
<i>Madracis myriaster</i> (Milne Edwards & Haime, 1850)		X
<i>Oculina varicosa</i> Lesueur, 1821	0.98%	X
Scleractinia- unid cup	0.20%	
Annelida	0.51%	X
Polychaeta	0.51%	X
<i>Filograna</i> sp.	0.51%	X
Arthropoda		X
Decapoda		X
<i>Panulirus argus</i> (Latreille, 1804)		X
Bryozoa	0.07%	
Bryozoa	0.07%	
<i>Schizoporella</i> sp.	0.07%	
Echinodermata		X
Holothuroidea		X
Chordata - Invertebrate	0.61%	X
Tunicata	0.61%	X
Asciidiacea	0.03%	
Didemnidae	0.57%	X
Chordata - Vertebrate	0.57%	
Chordata	0.57%	
Actinopterygii	0.57%	
Non-Fauna	0.07%	
Detritus	0.07%	
Natural Detritus	0.07%	
UNKNOWN	0.14%	
Human Debris	0.03%	X
Non-Fauna	0.03%	X
Human debris	0.03%	X

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

Human debris- fish line/gear	0.03%	X
Bare Substrate	65.98%	
Non-Fauna	65.98%	
Habitat	65.98%	
Bare rock, pavement, boulder, ledge	56.11%	
Bare rubble/cobble	0.61%	
Bare soft bottom	9.22%	
dead standing Scleractinia	0.03%	
Grand Total	100.00%	

Density of Fish:Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-01.

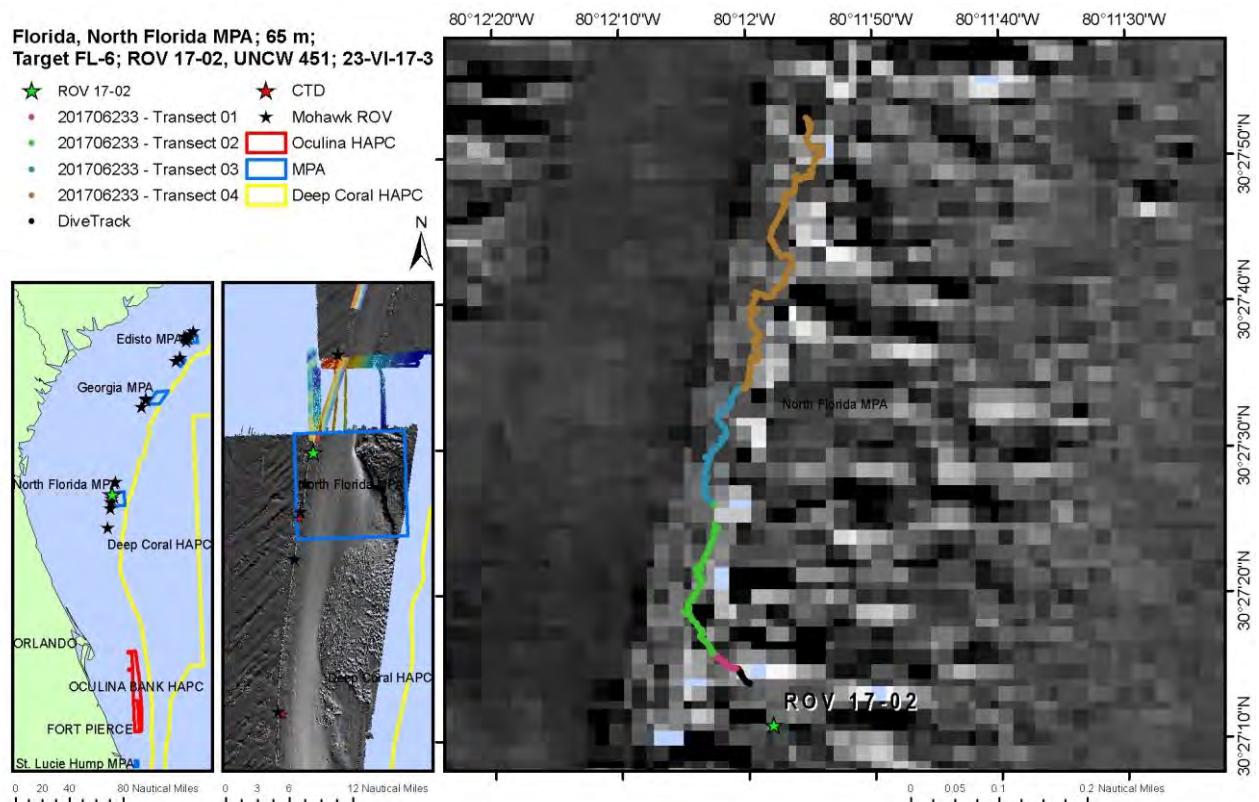
Class/Scientific Name- Common Name	17-01
Actinopterygii	
Anguilliformes	
Muraenidae- Moray Eel	0.1481
Beryciformes	
Holocentridae- Squirrelfish	1.4815
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	6.6667
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	0.4444
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	0.1481
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.1481
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	11.2593
<i>Calamus</i> sp.- Porgy	0.1481
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	1.1852
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	10.0741
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	9.6296
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	1.4815
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	5.1852
<i>Chromis</i> sp.- Damselfish	2.5185
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	319.2593
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	0.2963
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	0.7407
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.2963
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.7407
<i>Halichoeres</i> sp.- Wrasse	3.2593
<i>Holacanthus</i> sp.- Angelfish	15.8519
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.9259
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	0.4444
<i>Lutjanus</i> sp.- Snapper	0.1481
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.7407
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	1.6296
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	4.7407
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	0.1481
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	350.3704
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.4444
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.4444
<i>Seriola</i> sp.- Amberjack	0.2963
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.2963
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.8889
Sparidae- Porgy	0.1481

Dive Site: Florida, Outside North Florida MPA; 65 m; Target FL-1; ROV 17-01, UNCW 450; 23-VI-17-2

<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.1481
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	6.5185
Scorpaenidae- Scorpionfish	0.1481
Syngnathiformes	
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.1481
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1481
<i>Canthigaster</i> sp.- Puffer	7.2593
UNKNOWN	3.2593

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Navy_2011_CONFIDENTIAL_USWTR_Tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/23/2017
Specimens:	0
Digital Photos:	131
No. DVD:	2
Hard Drive No.:	1

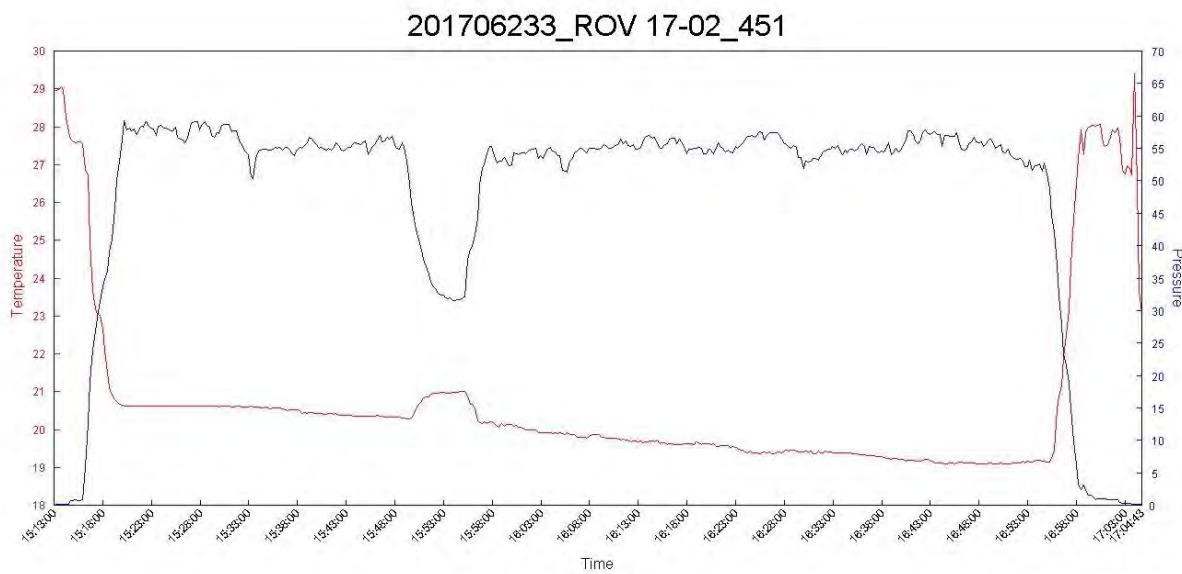
Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	56	Total Transect Length (km):	1.366
Maximum Bottom Depth (m):	61	Surface Current (kn):	0.5
On Bottom (Time- EDST):	15:20	On Bottom (Lat/Long):	30.4536°N; -80.1997°W
Off Bottom (Time- EDST):	16:50	Off Bottom (Lat/Long):	30.4644°N; -80.1986°W
Physical (bottom); Temp (°C):	20.6	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	N/A

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-02 are as follows: Depth Maximum: 59.2 m, Temperature: 19.1-21 °C

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Dive Imagery:



Figure 1: -57.1 m

Top edge of ridge with scamp grouper (*Mycteroperca phenax*) in Cat's Paw color phase.



Figure 2: -55.3 m

Large bushy *Tanacetipathes* black coral.



Figure 3: -56.1 m

Vase sponge- *Ircinia campana* and greater soapfish (*Rypticus saponaceus*).



Figure 4: -59.7 m

Tanacetipathes with *Filograna* white tube worms (Annelida).



Figure 5: -55.8 m

Rock slabs at edge of ridge.



Figure 6: -57.4 m

Hogfish (*Lachnolaimus maximus*) at reef edge.

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 23-VI-17-3; ROV 17-02, UNCW Dive 451; Florida, North Florida MPA, west ridge, 56 m.

[Repeat previous dive number since did not make bottom]

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red laser for rest of cruise. Green laser only on for down photos.

Site Description/Habitat/Biota:

Depth range: 56-61m

MB map shows N-S linear ridge along west side of MPA. Transect along ridge heading N. Visual observation does not match the MB very well. No definitive west facing ridge as the MB shows. MB is low resolution Navy tiff image, not xyz, made in 2011, and ledges may have filled in with sediment since then.

15:14- Launch; sunny, seas 1-2 ft from SE, current 0.5 kn to 314 dg. Ship oceanographic data log not working.

15:20 - on bottom, 61 m, visibility-10 m, current- 0.25 kn from E.

15:20- 60 m, top of ridge; flat, sediment with low relief rock pavement, sediment veneer, low rugosity, 20% hard bottom; 260 m east of west escarpment of ridge. Biota: *Stichopathes*, *Filograna*, Lionfish, purple *Nicella* fan, *Ircinia campana*, *Nidalia occidentalis*, *Chlorophyta*, *Tanacetipathes* bushes 30 cm, hydroids, *Titanideum frauenfeldii*, sand tile burrow.

15:32- 56 m, crest of west ridge, fractured square rock blocks, 3-4 m diameter, 1-2 m relief; West face- single ledge, 1-2 m relief.

Biota- dense biota, 90% cover; *Stichopathes*, *Tanacetipathes*, *Didemnidae*, *Filograna*, *Shizoporella*, thin encrusting sponges- *Spirastrellidae*, *Ircinia campana*, *Aplysina*, *Axinellidae*, *Dictyoceratida*, yellow *Cinachyrella*.

15:46- 57 m, ridge crest, 1-2 m fractured blocks; same biota.

15:48- lost video, lost DVD feed.

15:55- continue transect.

15:57- 56 m, west edge of ridge on MB. Does not match the MB. Low relief, rock pavement, sediment veneer. Can't find ridge escarpment. Fractured blocks, <1m relief. Biota- sponges- yellow hemispherical demosponge, *I. campana*, hemispherical DMST sponge.

16:10- 57 m, 1-2 m blocks, rugose, dense tomtate, 1 scamp, purple 30 cm *Muricea*, gag, triggers. Fishing line. No macroalgae, no CCA; *Antipathes furcata*, *Ircinia strobilina*, 50 cm *Tanacetipathes*, schools of grey triggerfish.

16:26- 59 m, low relief rock pavement, sediment veneer, < ½ m relief. Following MB west ridge. Rugose areas of fractured blocks, come and go.

16:41- 57 m, same low relief habitat. Rhodophyta- thin blade.

16:51- 56 m, low relief pavement, sediment veneer, mostly soft bottom, some rock blocks < ½ m relief, low rugosity. On MB shows same distinct N-S ridge. End dive.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant)

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Gorgonacea- *Diodogorgia, Muricea, Nicella*

Porifera- *Ircinia campana, Spirastrellidae, Aplysina*

Asciidiacea- Didemnidae (abundant)

Algae- Rhodophyta thin blade (uncommon)

Annelida- *Filograna* (abundant)

Dominant Fish:

Lionfish- 22

Reef butterfly, blue angel, yellowtail reef fish, tattler, sharpnose puffer, tomtate, grey trigger, yellow head wrasse; 4 scamp, 1 gag, 1 graysby, 2 hogfish, amberjack.

Human Debris:

Fishing line.

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

CPCe Percent Cover Analysis:

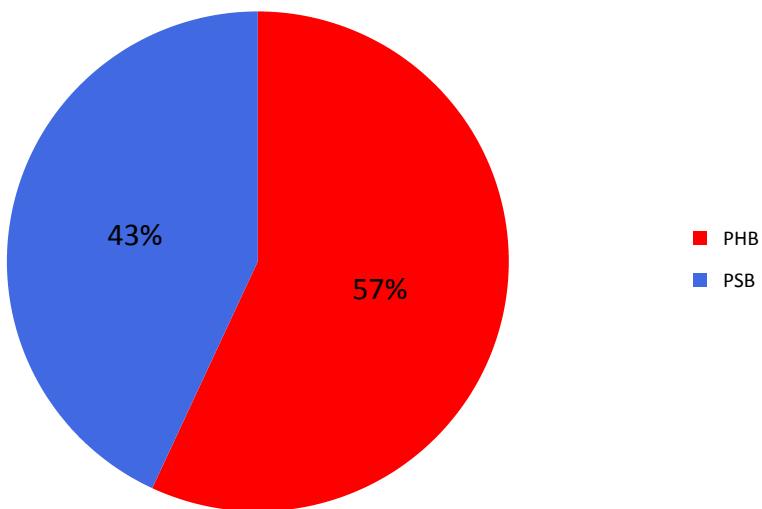
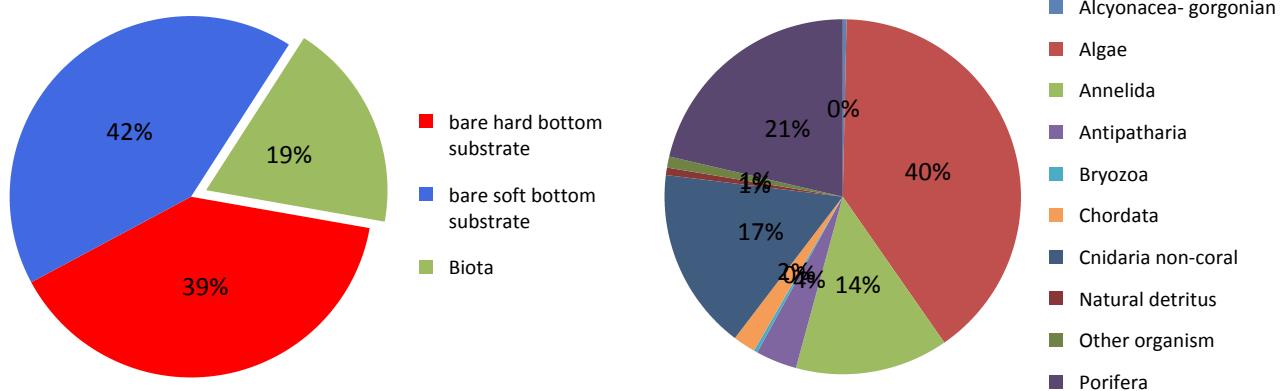


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-02. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-02.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site 17-02.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-02 dive notes
Biota	18.71%	X
Algae	7.48%	X
Cyanobacteria	0.44%	
Chlorophyta		X
Ochrophyta	0.32%	
Ochrophyta	0.32%	
Rhodophyta	6.72%	X
Corallinales	5.58%	
Rhodophyta	1.14%	X
Porifera	3.99%	X
Demospongiae	3.99%	X
<i>Aplysina</i> sp.		X
Axinellidae		X
<i>Cinachyrella</i> sp.		X
<i>Clathria</i> sp.	0.13%	
Demospongiae- tan starlet thick encrusting	0.51%	X
Demospongiae unid. sp.	1.78%	X
Dictyoceratida	0.06%	X
<i>Ircinia campana</i> (Lamarck, 1814)	0.32%	X
<i>Ircinia</i> sp.	0.38%	
<i>Ircinia strobilina</i> (Lamarck, 1816)		X
Microcionidae		X
Poecilosclerida	0.06%	
Spirastrellidae	0.76%	X
Cnidaria	3.87%	X
Alcyonacea - Alcyoniina		X
<i>Nidalia occidentalis</i> Gray, 1835		X
Alcyonacea - gorgonian	0.06%	X
<i>Diodogorgia</i> sp.	0.06%	X
<i>Muricea</i> sp.		X
<i>Nicella</i> sp.		X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Antipatharia	0.70%	X
<i>Antipathes furcata</i> Gray, 1857		X

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

<i>Stichopathes lutkeni</i> Brook, 1889	0.51%	X
<i>Tanacetipathes</i> sp.	0.19%	X
Hydrozoa	3.11%	X
Hydroidolina	3.11%	X
Annelida	2.60%	X
Polychaeta	2.60%	X
<i>Filograna</i> sp.	2.60%	X
Arthropoda		X
Decapoda		X
<i>Panulirus argus</i> (Latreille, 1804)		X
Bryozoa	0.06%	X
Bryozoa	0.06%	X
Bryozoa	0.06%	
<i>Schizoporella</i> sp.		X
Chordata - Invertebrate		X
Tunicata		X
Didemnidae		X
Chordata - Vertebrate	0.38%	
Chordata	0.38%	
Actinopterygii	0.38%	
Non-Fauna	0.13%	
Detritus	0.13%	
Natural Detritus	0.13%	
UNKNOWN	0.19%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Human debris- anchor line		X
Bare Substrate	81.29%	X
Non-Fauna	81.29%	X
Habitat	81.29%	X
Bare rock, pavement, boulder, ledge	38.30%	
Bare rubble/cobble	1.08%	
Bare soft bottom	41.92%	
Sand Tilefish burrow		X
Grand Total	100.00%	

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-02.

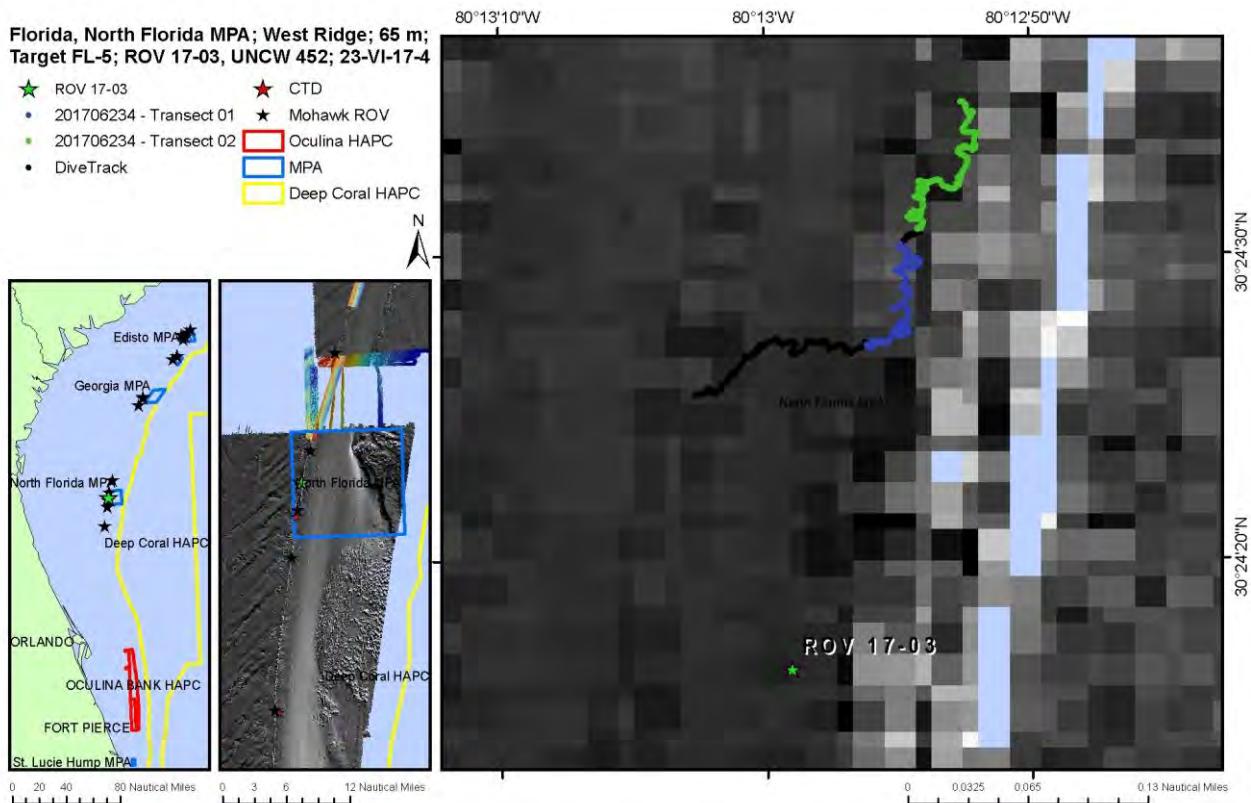
Class/Scientific Name- Common Name	17-02
Actinopterygii	
Beryciformes	
<i>Holocentridae</i> - Squirrelfish	0.0013
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	0.0038
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	0.0041
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.0003
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	0.0038
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.0002
<i>Cephalopholis fulva</i> (Linnaeus, 1758)- Coney	0.0001
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.0008
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	0.0090
<i>Chaetodon</i> sp.- Butterflyfish	0.0003
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	0.0104
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	0.0048
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	0.0032
<i>Chromis</i> sp.- Damselfish	0.0028
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	0.0001
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	0.1043
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	0.0001
<i>Haemulon</i> sp.- Grunt	0.0029
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.0006
<i>Halichoeres cyancephalus</i> (Bloch, 1791)- Yellowcheek Wrasse	0.0001
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.0058
<i>Halichoeres</i> sp.- Wrasse	0.0140
<i>Holacanthus</i> sp.- Angelfish	0.0035
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.0001
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.0001
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.0005
<i>Lutjanus</i> sp.- Snapper	0.0001
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.0003
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.0005
<i>Mycteroperca</i> sp.- Grouper	0.0001
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.0007
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	0.0002
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	0.0061
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.0001
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.0001

Dive Site: Florida, North Florida MPA; West Ridge; 56 m; Target FL-6; ROV 17-02, UNCW 451; 23-VI-17-3

<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.0006
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.0001
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	0.0717
<i>Rypticus maculatus</i> Holbrook, 1855- Whitespotted Soapfish	0.0001
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.0002
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.0001
<i>Seriola</i> sp.- Amberjack	0.0001
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.0007
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.0002
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.0028
<i>Serranus</i> sp.- Sea Bass	0.0003
<i>Serranus tigrinus</i> (Bloch, 1790)- Harlequin Bass	0.0001
Scorpaeniformes	
<i>Dactylopterus volitans</i> (Linnaeus, 1758)- Flying Gurnard	0.0002
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	0.0020
Tetraodontiformes	
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.0028
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.0002
<i>Canthigaster</i> sp.- Puffer	0.0054
<i>Lactophrys</i> sp.- Cowfish	0.0001
UNKNOWN	0.0008

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Navy_2011_CONFIDENTIAL_USWTR_Tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/23/2017
Specimens:	0
Digital Photos:	97
No. DVD:	1
Hard Drive No.:	1

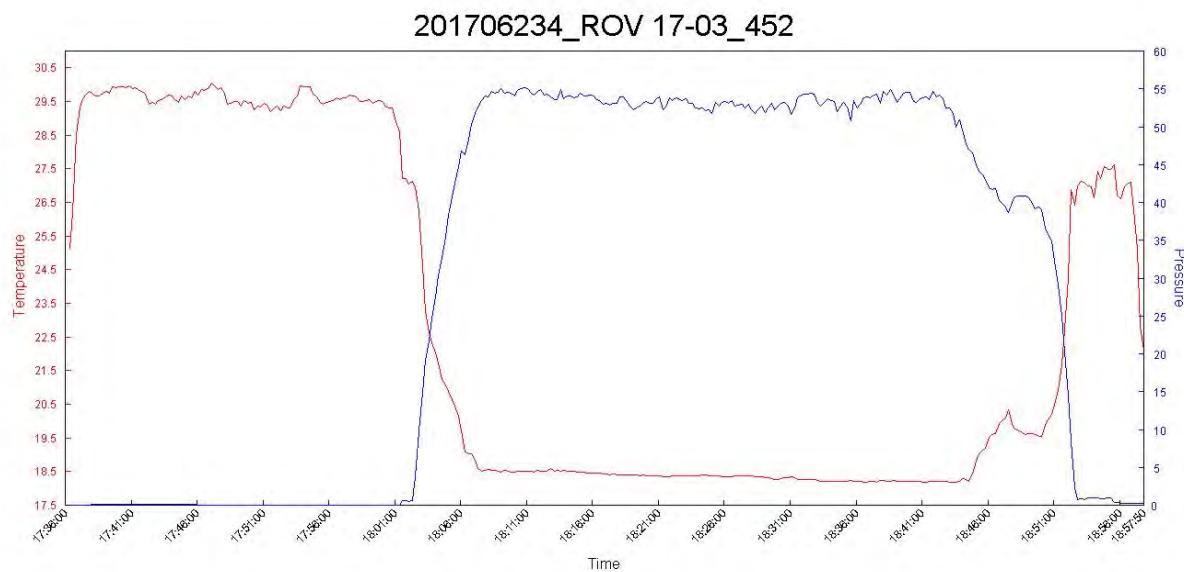
Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	54	Total Transect Length (km):	0.507
Maximum Bottom Depth (m):	57.1	Surface Current (kn):	1.3
On Bottom (Time- EDST):	18:05	On Bottom (Lat/Long):	30.407°N; -80.2168°W
Off Bottom (Time- EDST):	18:42	Off Bottom (Lat/Long):	30.4094°N; -80.2144°W
Physical (bottom); Temp (°C):	20.2	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.7

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-03 are as follows: Depth Maximum: 55.1 m, Temperature: 18.2-20.2 °C

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Dive Imagery:



Figure 1: -54.3 m
School of greater amberjack (*Seriola dumerili*) and almaco jack (*Seriola rivoliana*).



Figure 2: -54.1 m
Gag grouper (*Mycteroperca microlepis*).



Figure 3: -55.1 m
Close up of *Iciligorgia schrammi*.



Figure 4: -54 m
Reef edge with schools of tomate (*Haemulon aurolineatum*) and vermillion snapper (*Rhombochlites aurorubens*).



Figure 5: -54.6 m
Fields of the gorgonian *Iciligorgia schrammi* were common here.



Figure 6: -55 m
Gorgonians on reef.

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 23-VI-17-4; ROV 17-03, UNCW Dive 452; Florida, North Florida MPA, west ridge, Site 5, 57 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 54-57 m

MB map shows N-S linear ridge along west side of MPA. Transect along ridge heading N; south of ROV 02. Visual observation does not match the MB very well. No definitive west facing ridge as the MB shows. MB is low resolution Navy tiff image, not xyz, made in 2011, and ledges may have filled in with sediment since then.

17:59- Launch; seas 1-2 ft from SE, current- 1.3 kn to 300 dg. Ship oceanographic data log not working.

18:05- On bottom; depth- 57 m , visibility- 5 m, current- 0.7, kn from 135 dg.

18:42- End dive.

18:06- 57 m, flat sand, 150 m west of MB ridge, fine grain sand, no bioturbation.

18:13- 56 m, west base of ridge; sediment, low relief rock, <50 cm; *Diadogorgia*, lionfish.

55m, flat sand, <1/2 m boulders, 50% hard bottom. Biota: *Stichopathes*, *Diadogorgia*, *Filograna*, hydroids, *Ircinia campana*. Anchor line. 30 cm bushy *Tanacetipathes*, gag, red snapper.

18:18- scattered boulders, ½ m relief, 2-3 m diameter; flat bottom. Areas of flat rock pavement, with sediment veneer. No definite ridge. Biota: dense cover of biota, sponges- I. campana, *Aplysina* fingers; *Tanacetipathes*, *Cirripathes*; *Nicella* purple fans, Didemnidae, *Filograna*, dense AJ.

18:23- 55 m, west edge of ridge; top 54 m, base 56 m. Jumble of fractured square rock, 1 m relief, rugose.

Dense fish- scamp, tomate; *Muricea*, yellow *Cinachyrella*, Axinellidae, lionfish, 50 cm *Iciligorgia schrammi*, trigger fish nests (25 cm pits in sand), *Swiftia exserta*, field of *Iciligorgia* (most are partly encrusted and dead), 18:42- 56 m, west ridge. End of dive. HD video cutting in and out.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia coral- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant)

Gorgonian coral- *Diadogorgia*, *Muricea*, *Nicella*

Porifera- *Ircinia campana*, Spirastrellidae, *Aplysina*

Asciidiacea- Didemnidae (abundant)

Algae- Rhodophyta thin blade (uncommon)

Annelida- *Filograna* (abundant)

Dominant Fish:

Lionfish- 11

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Reef butterfly, blue angel, yellowtail reef fish, tattler, tomate, grey trigger; red snapper, 1 scamp, 5 gag, amberjack (abundant), grey trigger fish with sand pit nests

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

CPCe Percent Cover Analysis:

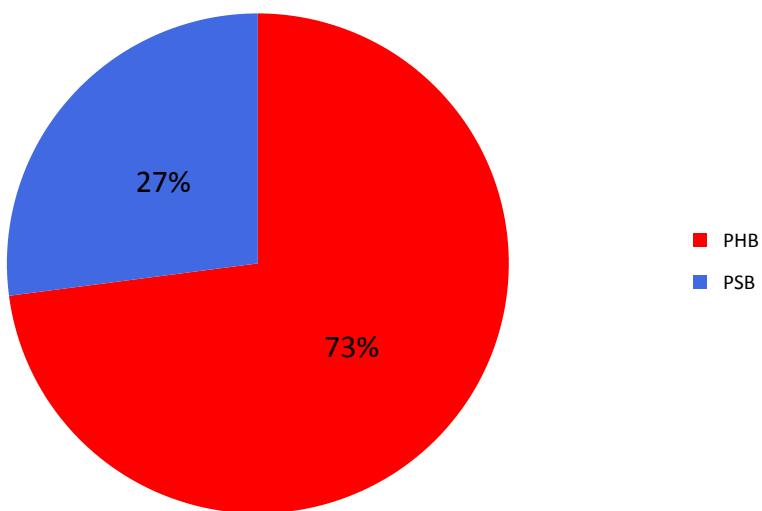


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-03. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

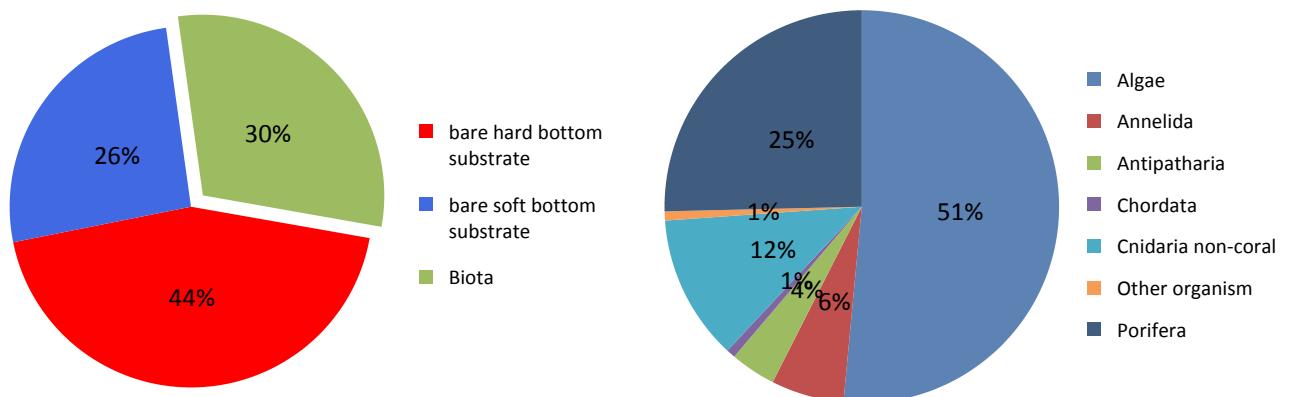


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-03.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-03.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	29.98%	X
Algae	15.44%	
Cyanobacteria	0.22%	
Rhodophyta	15.21%	
Corallinales	14.54%	
Rhodophyta	0.67%	
Porifera	7.61%	X
Demospongiae	7.61%	X
<i>Aiolochroia crassa</i> (Hyatt, 1875)	0.22%	
<i>Aplysina</i> sp.		X
Axinellidae		X
<i>Cinachyrella</i> sp.		X
Demospongiae- tan starlet thick encrusting	0.22%	
Demospongiae unid. sp.	1.79%	X
<i>Geodia</i> sp.	0.22%	
<i>Ircinia campana</i> (Lamarck, 1814)	3.36%	X
<i>Ircinia</i> sp.	0.89%	
Microcionidae		X
Spirastrellidae	0.89%	
Cnidaria	4.70%	X
Alcyonacea - gorgonian		X
<i>Diodogorgia</i> sp.		X
<i>Iciligorgia schrammi</i> Duchassaing, 1870		X
<i>Muricea</i> sp.		X
<i>Nicella</i> sp.		X
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Antipatharia	1.12%	X
Antipathidae	0.89%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.22%	X
<i>Tanacetipathes</i> sp.		X
Hydrozoa	3.58%	X
Hydroidolina	3.58%	X
Annelida	1.79%	X
Polychaeta	1.79%	X

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

<i>Filograna</i> sp.	1.79%	X
Chordata - Invertebrate		X
Tunicata		X
Didemnidae		X
Chordata - Vertebrate	0.22%	
Chordata	0.22%	
Actinopterygii	0.22%	
UNKNOWN	0.22%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- anchor line		X
Bare Substrate	70.02%	X
Non-Fauna	70.02%	X
Habitat	70.02%	X
Bare rock, pavement, boulder, ledge	42.28%	
Bare rubble/cobble	1.79%	
Bare soft bottom	25.95%	
Sand Tilefish burrow		X
Grand Total	100.00%	

Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-03.

Class/Scientific Name- Common Name	17-03
Actinopterygii	
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.2817
Beryciformes	
Holocentridae- Squirrelfish	0.5634
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	2.5352
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	3.9437
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.5634
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	5.6338
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.8451
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	8.7324
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	7.3239
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	3.3803
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.2535
<i>Chromis</i> sp.- Damselfish	3.6620
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	129.8592
<i>Haemulon</i> sp.- Grunt	28.1690
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.8451
<i>Halichoeres</i> sp.- Wrasse	2.2535
<i>Holacanthus</i> sp.- Angelfish	4.7887
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.2817
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	1.1268
<i>Lutjanus</i> sp.- Snapper	0.5634
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	1.6901
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.5634
<i>Pomacanthus arcuatus</i> (Linnaeus, 1758)- Gray Angelfish	0.2817
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.8451
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	30.9859
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.1268
<i>Seriola</i> sp.- Amberjack	5.9155
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.2817
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.8451
<i>Serranus</i> sp.- Sea Bass	0.8451
<i>Serranus tigrinus</i> (Bloch, 1790)- Harlequin Bass	0.2817
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	2.8169
Scorpaenidae- Scorpionfish	0.2817

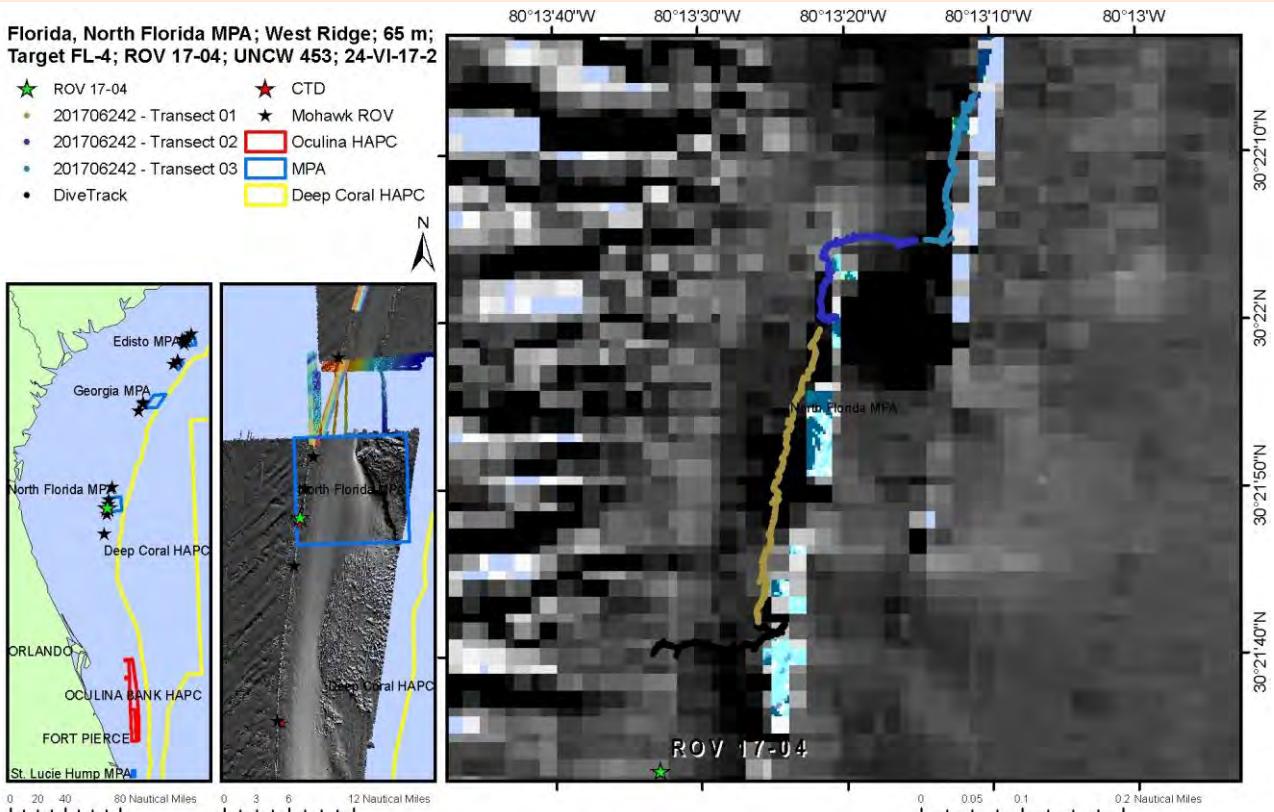
Dive Site: Florida, North Florida MPA; West Ridge; 55 m; Target FL-5; ROV 17-03, UNCW 452; 23-VI-17-4

Tetraodontiformes

<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	3.9437
<i>Canthigaster</i> sp.- Puffer	5.0704
Ostraciidae- Cowfish	0.5634
UNKNOWN	1.9718

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Navy_2011_CONFIDENTIAL_USWTR_Tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/24/2017
Specimens:	0
Digital Photos:	442
No. DVD:	3
Hard Drive No.:	1

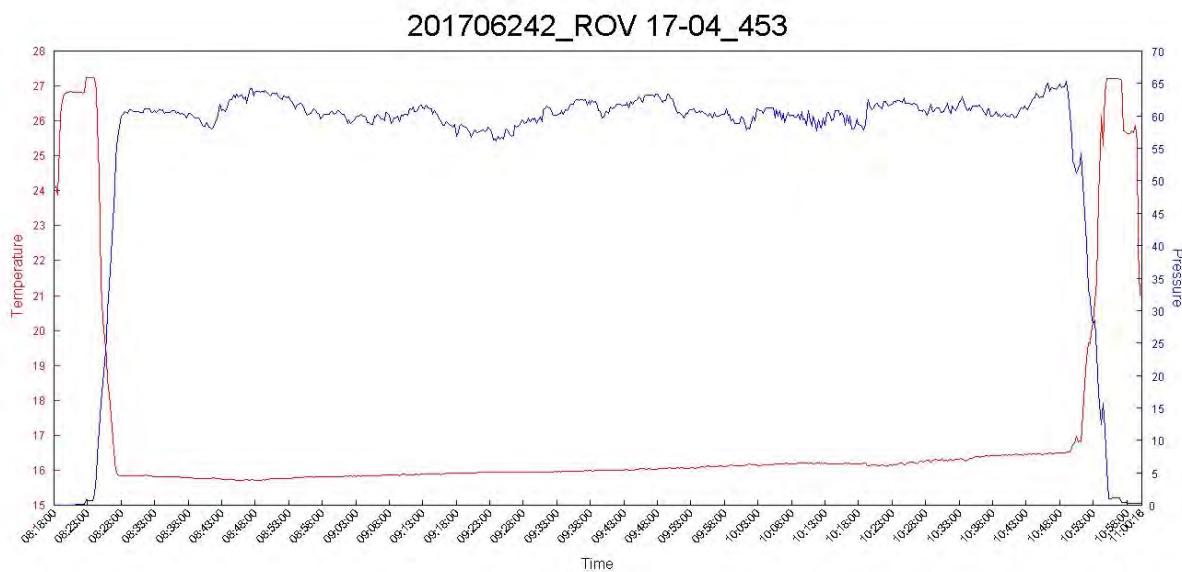
Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	60	Total Transect Length (km):	1.561
Maximum Bottom Depth (m):	65	Surface Current (kn):	0.5
On Bottom (Time- EDST):	8:26	On Bottom (Lat/Long):	30.3614°N; -80.2255°W
Off Bottom (Time- EDST):	10:47	Off Bottom (Lat/Long):	30.37°N; -80.2198°W
Physical (bottom); Temp (°C):	18.2	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-04 are as follows: Depth Maximum: 65 m, Temperature: 15.7-18.2 °C

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Dive Imagery:



Figure 1: -65 m

Lionfish (*Pterois volitans*) on reef. 66 were counted during the ROV dive.



Figure 2: -61.2 m

Rugose rock habitat with sponges, black corals, and *Filogrania* worms.



Figure 3: -60.8 m

Scamp (*Mycteroperca phenax*) and amberjack (*Seriola* sp.) on reef.



Figure 4: -60.3 m

Large anchor lost on reef.



Figure 5: -59.9 m

Male scamp grouper (*Mycteroperca phenax*) in grey head color phase.



Figure 6: -61.4 m

Pair of hogfish (*Lachnolaimus maximus*).

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 24-VI-17-2; ROV 17-04, UNCW Dive 453; Florida, North Florida MPA, west ridge, Site 4, 62 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 60-63 m

MB map shows N-S linear ridge along west side of MPA. Transect along ridge heading N.

08:20- Launch; seas 3 ft from SW, current- 0.6 kn to 333 dg, sunny, air- 27.4, wind- 15 kn from 212 dg, water- 24.81 dg C, salinity-36.68. Dense sea snot in water column.

08:26- On bottom; depth- 62 m , visibility- 5 m, current- 0.5 kn from S.

Flat coarse sand, shell hash, 100% soft bottom. 150 m west of ridge. Sabellid polychaete worms and tubes, Cerianthidae, *Ellisella* whip, Didemnidae.

08:36- 62 m, flat sand, shell hash, rubble.

08:36- West base of ridge, 62 m base, 60 m top. Scattered flat rock slabs, 2-3 m diameter, <1 m relief. Biota: dense biota, *Stichopathes* (dense), Didemnidae, *Filograna* (10 cm balls, dense), *Ircinia campana*, purple *Nicella* fans. No definite ledge. Edge matches the MB location. East base, 65 m, flat sand shell hash. Narrow hard bottom zone, ~50 m wide. Lionfish. Numerous *Ellisella* whips, all laying down- bottom trawl?

08:51- 64 m, back on ridge, heading N. <1 m boulders. Biota- *Ellisella barbadensis*, *Stichopathes*, Didemnidae, *Tanacetipathes* 25 cm bush, *I. campana*, Didemnidae- white spheres, and yellow-green, Spirastellidae, *Filograna*, dense tomtate, DMST sponge, purple *Aplysina* tube,

Antipathes furcata, hydroids, 2 scamp, 50 cm *Oculina* on vertical rock.

09:02- 62 m, east face of ridge, 1-2 m relief, scattered fractured boulders, high rugosity, 30 dg slope. Biota- gray head scamp, large school vermillion snapper, 50 cm *Tanacetipathes*, 7 red snapper, amberjack, *Diodogorgia*, 15+ red snapper, large anchor, grey trigger, grey trigger nests in sediment, 30 m purple *Muricea*, *Aiolochroia crassa*, fishing line.

09:14- 60 m, top of east edge of ridge; dense jumble of fractured square boulders, 1-3 m diameter, 1 m relief; dense cover biota. Ridge only 20-30 m wide. Flat sand on each side. On MB ridge ends north of here, and restarts 150 m to the east. Biota: 50 red snapper, hundreds of red snapper, fishing line, *Cinachyrella*, *Schizoporella*, bryozoa.

09:33- 63 m, ridge is petering out, scattered <1/2 m rock boulders, fairly flat. Back on 1-2 m relief ridge zone. Dense *Stichopathes* and *Tanacetipathes* bushes. 2 *Oculina*- 30 cm, 10 cm.

10:00- 62 m, end of ridge, matches end on MB. Hd east 220 m to start of south end of next N-S ridge on MB. Valley between the two ridges is 62 m, flat sand.

10:16- begin of south end of second ridge; east slope 64 m at base, 60 m at top; jumble of fractured square rock boulders; 1-3 m diam. 1-2 m relief, 30 dg slope, same dominant biota. Large cluster of *Oculina* 1-2 m on vertical rock. Six 10 cm clusters *Oculina* on overhang. 30 cm *Hypnogorgia*, white. 2 hogfish.

10:32- ridge continues, same habitat, same species. East of the ridge is flat sand.

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

10:37- continue heading N along top edge of east face of ridge; varies from 1-3 m relief, high rugosity, 30 dg slope, to lower 1-2 m scattered rock boulders. *Iciligorgia*.

10:47- end dive.

Dominant Benthic Macrobiota:

Scleractinia coral- *Oculina varicosa* (several, 1 m cluster; six 10 cm clusters)

Antipatharia coral- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant)

Gorgonian coral- *Diodogorgia*, *Muricea*, *Nicella*, *Ellisella* whips (knocked down)

Porifera- *Ircinia campana*, *Spirastrellidae*, *Aplysina*, *Aiolochroia crassa*, DSMT demosponge

Asciidiacea- Didemnidae (abundant)

Annelida- *Filograna* (abundant)

Hydroida

Dominant Fish:

Lionfish- 66

Scamp-24, tomate, blue angels, reef butterfly, spotfin hog, red snapper- >100, amberjack, gag- 3, reticulate moray, mutton snapper, squirrel fish, cornet fish, vermillion snapper, grey trigger fish.

Human Debris:

Fishing line.

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

CPCe Percent Cover Analysis:

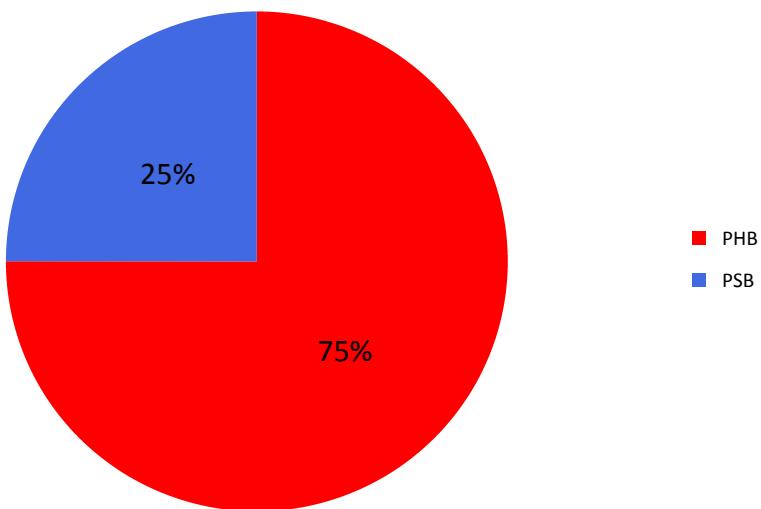
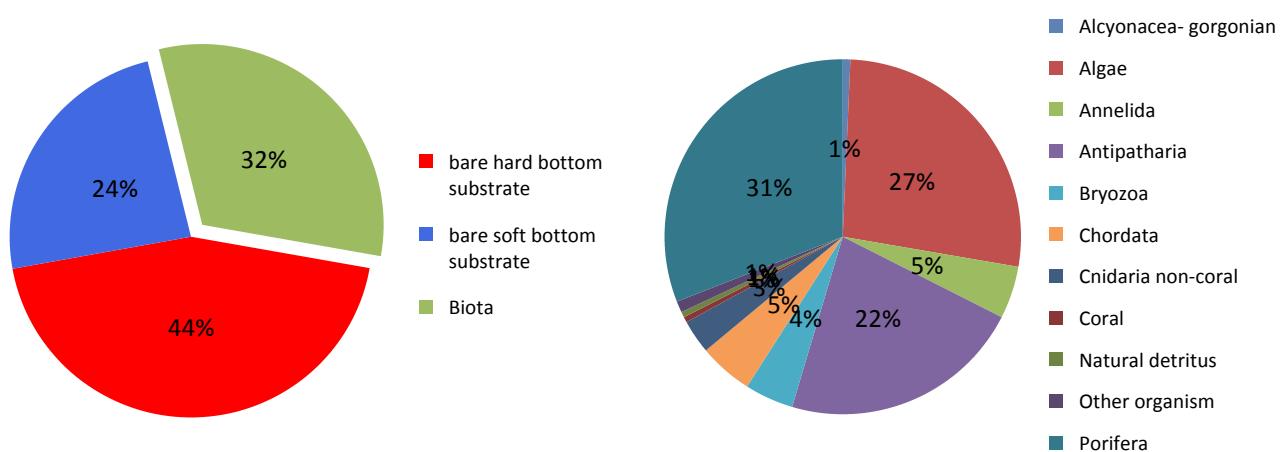


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-04. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-04.

A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-04.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	31.63%	X
Algae	8.55%	X
Ochrophyta	0.16%	
Rhodophyta	8.39%	X
Corallinales	7.96%	X
Rhodophyta	0.43%	
<i>Halymenia</i> sp.		X
Porifera	9.79%	X
Demospongiae	9.79%	X
<i>Aiolochroia crassa</i> (Hyatt, 1875)	0.11%	X
<i>Aplysina</i> sp.	0.05%	X
Axinellidae		X
<i>Chondrilla</i> sp.	0.11%	
<i>Cinachyrella</i> sp.		X
Demospongiae- tan starlet thick encrusting		X
Demospongiae unid. sp.	4.30%	
<i>Erylus</i> sp.	0.11%	
<i>Ircinia campana</i> (Lamarck, 1814)	0.32%	X
<i>Ircinia</i> sp.	0.59%	X
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.16%	
Microcionidae		X
<i>Oceanapia</i> sp.	0.11%	
Poecilosclerida	0.16%	
Spirastrellidae	3.77%	X
Cnidaria	8.34%	X
Alcyonacea - gorgonian	0.22%	X
<i>Diodogorgia</i> sp.	0.11%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Hypnogorgia</i> sp.		X
<i>Muricea</i> sp.	0.11%	X
<i>Nicella</i> sp.		X
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Anthozoa - Non Coral		X
Cerianthidae		X

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Antipatharia	6.99%	X
<i>Antipathes furcata</i> Gray, 1857		X
Antipathidae	0.16%	
<i>Stichopathes lutkeni</i> Brook, 1889	4.68%	X
<i>Tanacetipathes</i> sp.	2.15%	X
Hydrozoa	0.97%	X
Hydroidolina	0.97%	X
Scleractinia	0.16%	X
<i>Oculina varicosa</i> Lesueur, 1821	0.16%	X
Annelida	1.51%	X
Polychaeta	1.51%	X
<i>Filograna</i> sp.	1.40%	X
Sabellidae	0.11%	X
Bryozoa	1.40%	X
Bryozoa	1.40%	X
Bryozoa	0.43%	
<i>Schizoporella</i> sp.	0.97%	X
Mollusca		X
Bivalvia		X
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	0.16%	X
Tunicata	0.16%	X
Asciidiacea	0.05%	
Didemnidae	0.11%	X
Chordata - Vertebrate	1.40%	
Chordata	1.40%	
Actinopterygii	1.40%	
Non-Fauna	0.16%	
Detritus	0.16%	
Natural Detritus	0.16%	
UNKNOWN	0.32%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Human debris- other		X
Bare Substrate	68.37%	
Non-Fauna	68.37%	
Habitat	68.37%	
Bare coral rubble	0.27%	
Bare rock, pavement, boulder, ledge	41.85%	
Bare rubble/cobble	2.04%	

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Bare soft bottom	23.99%
dead standing Scleractinia	0.22%
Grand Total	100.00%

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-04.

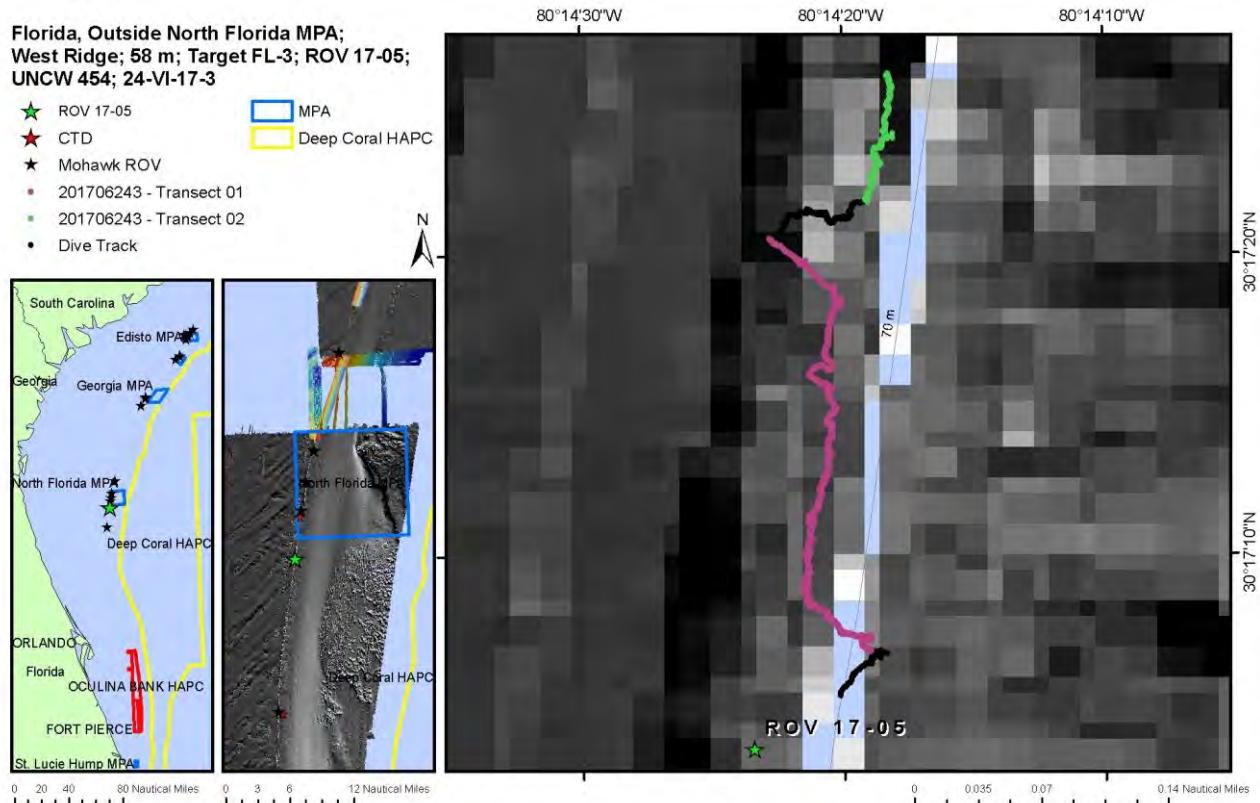
Class/Scientific Name- Common Name	17-04
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1490
<i>Muraena robusta</i> Osório, 1911- Stout Moray	0.2981
Beryciformes	
Holocentridae- Squirrelfish	3.1297
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	3.4277
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	3.7258
Perciformes	
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	9.5380
<i>Calamus</i> sp.- Porgy	0.1490
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.1490
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.8942
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	9.8361
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	2.3845
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	3.2787
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	4.1729
<i>Chromis</i> sp.- Damselfish	1.7884
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	782.4143
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	0.1490
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.1490
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.4471
<i>Halichoeres</i> sp.- Wrasse	4.3219
<i>Holacanthus</i> sp.- Angelfish	9.9851
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.5961
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.1923
<i>Lutjanus analis</i> (Cuvier, 1828)- Mutton Snapper	0.4471
<i>Lutjanus apodus</i> (Walbaum, 1792)- Schoolmaster	0.2981
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	0.1490
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	2.6826
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1490
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	4.0238
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	17.1386
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	0.4471
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	0.5961
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.1490
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.2981
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.7258

Dive Site: Florida, North Florida MPA; West Ridge; 65 m; Target FL-4; ROV 17-04; UNCW 453; 24-VI-17-2

<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	122.9508
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.5961
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	2.8316
<i>Seriola</i> sp.- Amberjack	3.2787
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	1.0432
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.8942
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.1490
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	12.2206
Scorpaenidae- Scorpionfish	0.5961
Syngnathiformes	
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.2981
Syngnathidae- Pipefish	0.1490
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1490
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	1.0432
Canthigaster sp.- Puffer	8.9419
UNKNOWN	1.4903

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Navy_2011_CONFIDENTIAL_USWTR_Tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/24/2017
Specimens:	0
Digital Photos:	230
No. DVD:	2
Hard Drive No.:	1

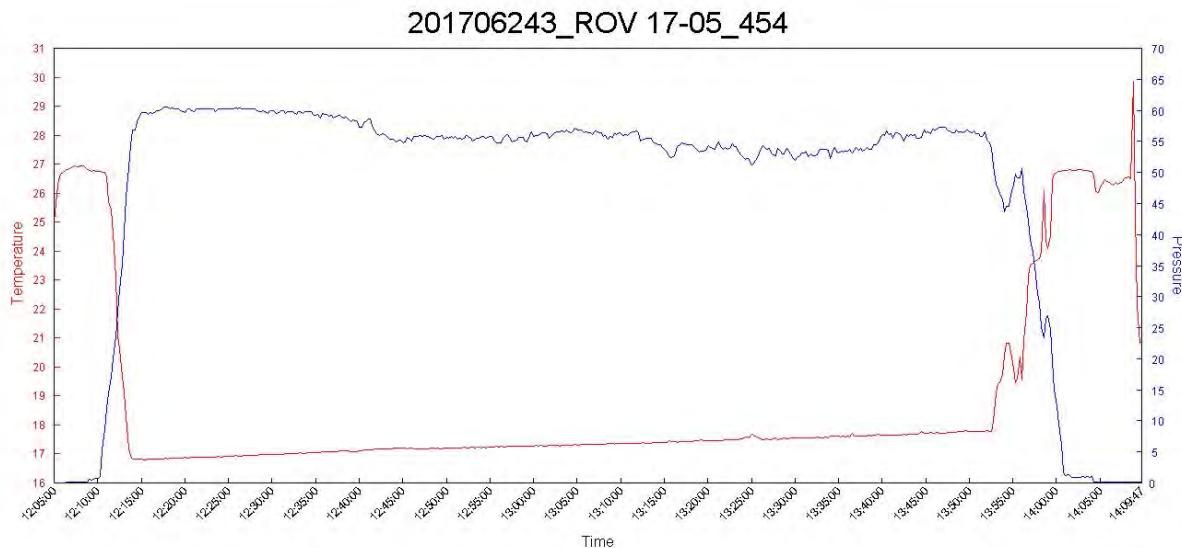
Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	55	Total Transect Length (km):	0.813
Maximum Bottom Depth (m):	62.3	Surface Current (kn):	0.3
On Bottom (Time- EDST):	12:12	On Bottom (Lat/Long):	30.2845°N; -80.2386°W
Off Bottom (Time- EDST):	13:50	Off Bottom (Lat/Long):	30.2902°N; -80.2383°W
Physical (bottom); Temp (°C):	19.7	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-05 are as follows: Depth Maximum: 60.5 m, Temperature: 16.8-19.7 °C

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Dive Imagery:



Figure 1: -61.3 m
Tattler (*Serranus phoebe*) at base of reef.



Figure 2: -56.6 m
Yellow Clathriidae (?) sponge. Many species are impossible to identify without a specimen.



Figure 3: -56.5 m
Orangeback bass (*Serranus annularis*).



Figure 4: -58.1 m
Large stout moray eel (*Muraena robusta*).



Figure 5: -56.1 m
Top of ridge with sponges, corals (*Oculina varicosa*), black coral and algae.



Figure 6: -57 m
Large rock slabs with schools of fish.

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 24-VI-17-3; ROV 17-05, UNCW Dive 454; Florida, North Florida MPA, west ridge, outside MPA, Site 3, 58 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization, no digital still photo transects for habitat and benthic macrobiota characterization taken.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 55-62 m

MB map shows N-S linear ridge south of MPA. Transect starts 2 nmi SW of MPA, along ridge heading N. MB does not indicate habitat- same looking MB is both flat sediment and 2-3 m relief, high rugosity habitat. East slope steeper (20-30 dg), and rugose; west side, low relief, less rugose.

12:07- Launch; sunny, air- 27.5, wind- 15 kn from 212 dg, seas 3-4 ft from SW, current- 0.3 kn to 87 dg, water- 24.63 dg C, salinity- 36.66.

12:12- On bottom; depth- 62 m , visibility- 10 m, current- 0.75 kn from S. Flat sediment, rock pavement with sediment veneer. *Stichopathes*, *Ircinia campana*, *Titanideum fraunfeldii*, knocked down *Ellisella barbadensis*, *Sargassum*, hydroids, purple gorgonians, Didemnidae. East base of ridge on MB. Head west to ridge.

12:33- 60 m, east side of ridge, scattered flat top boulders, <1/2 m relief; dense biota on top; 50% hard bottom.

12:37- 59 m, at foot of east base, 56 m top; fractured flat boulders <1 m relief. Biota- dense biota, *Stichopathes*, 30 cm bushy *Tanacetipathes*, Didemnidae, hydroids, *Diogogorgia*, *Aplysina* purple finger, Axinellidae, Clathriidae, *Filograna*, Spirastrellidae, *I. campana*, DMST, *Erylus*, purple *Nicella*, *Muricea*, *Carioja*, *Antipathes furcata*, Rhodophyta thin EB, Chlorophyta (sparse *Ulva* like). Large fractured rock slabs, 1-2 m relief, high rugosity.

13:00- 59 m, continue N along east edge of ridge, 1 m fractured flat boulders, 2 m relief overall, low slope, high rugosity. Dense biota.

13:15- 55 m, low relief rock pavement, flat blocks, and sand, <1/2 m. Off main ridge, not sure which way on MB. Head NW to find west side of ridge. Can not go west due to current.

13:30- 55 m, on MB are at west side of ridge; actual low relief rock pavement, sediment, low flat rock <1/2 m. Change heading heading to NE.

13:38- 58 m, east edge of ridge; flat top square slabs, 1 m relief, high rugosity, 10 dg slope to east, 2 m relief overall, dense fish. Head N along east edge of ridge.

13:47- 59 m, more relief, rugose; large scamp, large gag, dense tomtate.

13:49- 58 m, end dive.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia coral- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant), *Antipathes furcata* Gorgonian coral- *Diogogorgia*, *Muricea*, *Nicella*, *Titanideum fraunfeldii*, *Carioja*

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Porifera- *Ircinia campana*, Spirastrellidae, *Aplysina*, *Aiolochroia crassa*, DSMT demosponge, *Erylus*, Clathriidae

Asciidiacea- Didemnidae (abundant)

Annelida- *Filograna* (abundant)

Hydroida

Algae- Rhodophyta thin EB, Chlorophyta (*Ulva*?)

Dominant Fish:

Lionfish- 59

Gag- 1, scamp-3, graysby- 1, tomtate, reef butterfly, yellow tail reef, blue angel, sharpnose puffer, soldier, purple reef, squirrel, sunshine fish, Amberjack, Almaco.

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

CPCe Percent Cover Analysis:

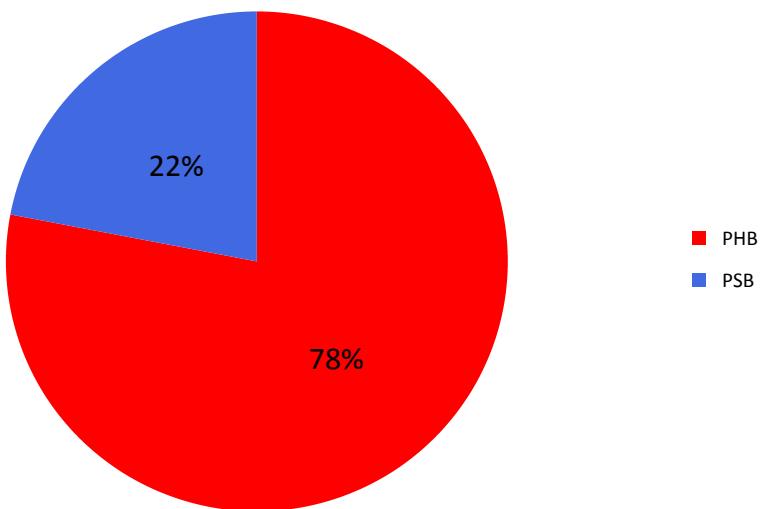


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-05. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

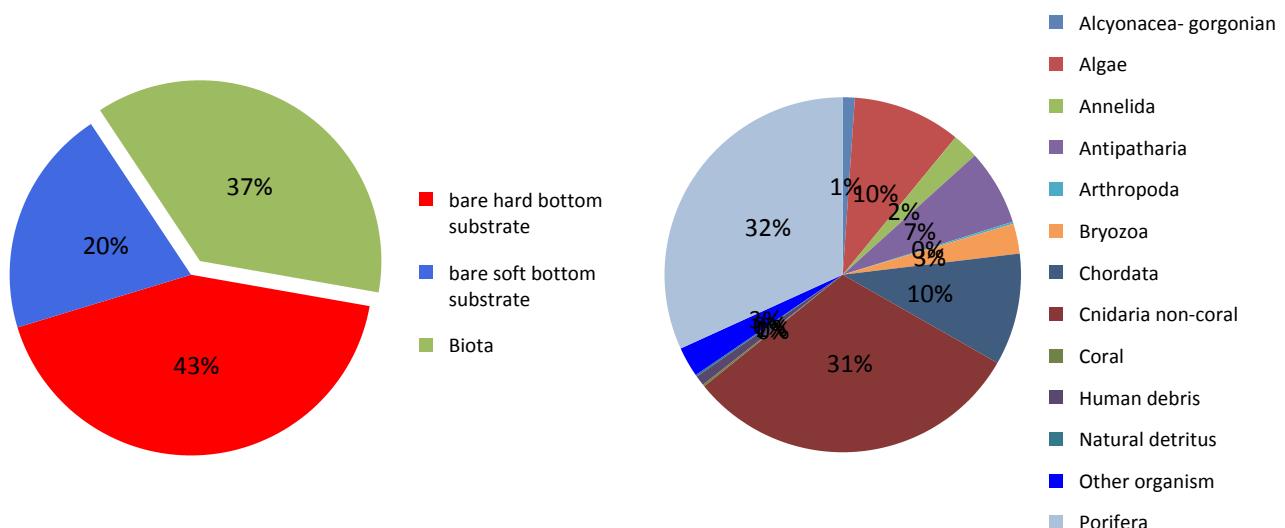


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-05.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-05.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-05 dive notes
Biota	36.73%	X
Algae	3.64%	X
Cyanobacteria	0.07%	
Chlorophyta	0.13%	
Ochrophyta	0.13%	X
Ochrophyta	0.07%	
<i>Sargassum</i> sp.	0.07%	X
Rhodophyta	3.30%	X
Corallinales	2.02%	
Rhodophyta	1.28%	
Rhodophyta- Red Blade	0.00%	X
Porifera	11.79%	X
Demospongiae	11.79%	X
<i>Aplysina</i> sp.	0.00%	X
Demospongiae- tan starlet thick encrusting	0.67%	X
Demospongiae unid. sp.	6.33%	
Dictyoceratida	0.07%	
<i>Erylus</i> sp.	0.07%	X
<i>Ircinia campana</i> (Lamarck, 1814)	0.47%	X
<i>Ircinia</i> sp.	1.95%	
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.07%	
Microcionidae	0.00%	X
Poecilosclerida	0.07%	
Spirastrellidae	2.09%	
<i>Zyzya</i> sp.	0.00%	X
Cnidaria	14.49%	X
Alcyonacea - gorgonian	0.40%	X
Alcyonacea- gorgonian	0.07%	
<i>Carijoa</i> sp.	0.00%	X
<i>Diodogorgia</i> sp.	0.20%	X
<i>Ellisella elongata</i> (Pallas, 1766)	0.00%	X
Ellisellidae	0.07%	
<i>Nicella</i> sp.	0.07%	
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)	0.00%	X

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Antipatharia	2.56%	X
<i>Antipathes atlantica</i> Gray, 1857	0.07%	
<i>Antipathes furcata</i> Gray, 1857	0.47%	X
<i>Stichopathes lutkeni</i> Brook, 1889	1.68%	X
<i>Tanacetipathes</i> sp.	0.34%	X
Hydrozoa	11.46%	X
Hydroidolina	11.46%	X
Scleractinia	0.07%	
Scleractinia- unid cup	0.07%	
Annelida	0.88%	X
Polychaeta	0.88%	X
<i>Filograna</i> sp.	0.88%	X
Arthropoda	0.07%	X
Decapoda	0.07%	X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)	0.07%	X
Bryozoa	1.01%	X
Bryozoa	1.01%	X
Bryozoa	0.40%	X
<i>Schizoporella</i> sp.	0.61%	X
Mollusca	0.00%	X
Gastropoda	0.00%	X
<i>Naticidae</i> - Egg Case	0.00%	X
Chordata - Invertebrate	1.68%	X
Tunicata	1.68%	X
Ascidiae	0.27%	
Didemnidae	1.42%	X
<i>Eudistoma</i> sp.	0.00%	X
Chordata - Vertebrate	2.09%	
Chordata	2.09%	
Actinopterygii	2.09%	
Non-Fauna	0.07%	
Detritus	0.07%	
Natural Detritus	0.07%	
UNKNOWN	1.01%	
Human Debris	0.34%	X
Non-Fauna	0.34%	X
Human debris	0.34%	X
Human debris- fish line/gear	0.07%	X
Human debris- other	0.27%	
Bare Substrate	62.94%	
Non-Fauna	62.94%	
Habitat	62.94%	

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW
454; 24-VI-17-3

Bare rock, pavement, boulder, ledge	41.91%
Bare rubble/cobble	0.61%
Bare soft bottom	20.42%
Grand Total	100.00%

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-05.

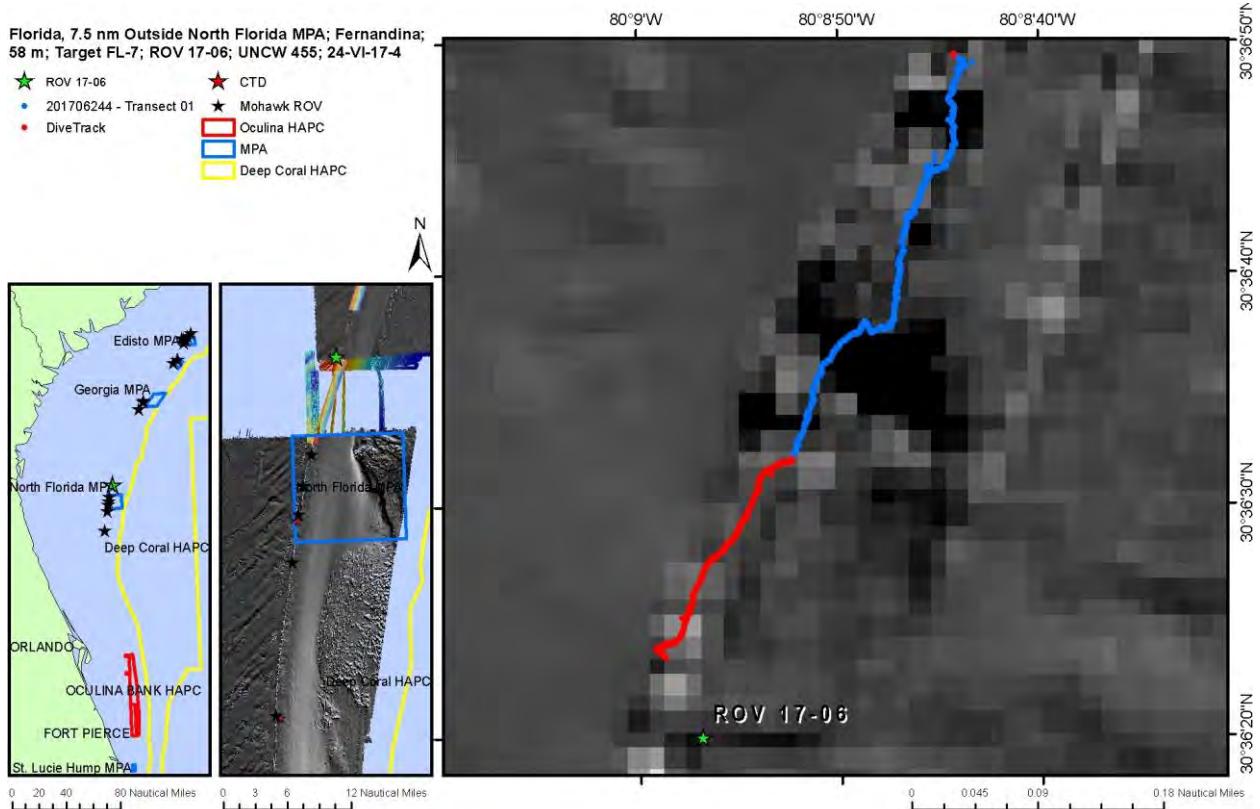
Class/Scientific Name- Common Name	17-05
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.1695
<i>Muraena robusta</i> Osório, 1911- Stout Moray	0.1695
<i>Muraenidae</i> - Moray Eel	0.1695
Beryciformes	
<i>Holocentridae</i> - Squirrelfish	3.7288
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	9.6610
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	9.3220
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.1695
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	8.9831
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.3390
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	1.6949
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	13.5593
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	13.5593
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	7.1186
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	5.0847
<i>Chromis</i> sp.- Damselfish	2.0339
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	194.7458
<i>Haemulon sciurus</i> (Shaw, 1803)- Bluestriped Grunt	0.1695
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	0.3390
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.1695
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	2.3729
<i>Halichoeres</i> sp.- Wrasse	14.9153
<i>Holacanthus</i> sp.- Angelfish	8.1356
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.1695
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.0169
<i>Lutjanus</i> sp.- Snapper	0.1695
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1695
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.5085
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	1.8644
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	3.0508
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.1695
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.3390
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	27.1186
<i>Scaridea</i> - Parrotfish	0.1695
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.3390
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.0169

Dive Site: Florida, Outside North Florida MPA; West Ridge; 58 m; Target FL-3; ROV 17-05; UNCW 454; 24-VI-17-3

<i>Seriola</i> sp.- Amberjack	0.1695
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	1.3559
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.1695
<i>Serranus phoebe</i> Poey, 1851- Tattler	1.8644
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.1695
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	11.1864
Tetraodontiformes	
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	1.1864
<i>Canthigaster</i> sp.- Puffer	9.3220
UNKNOWN	1.0169

Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	ShadedCC.tif
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/24/2017
Specimens:	0
Digital Photos:	254
No. DVD:	2
Hard Drive No.:	1

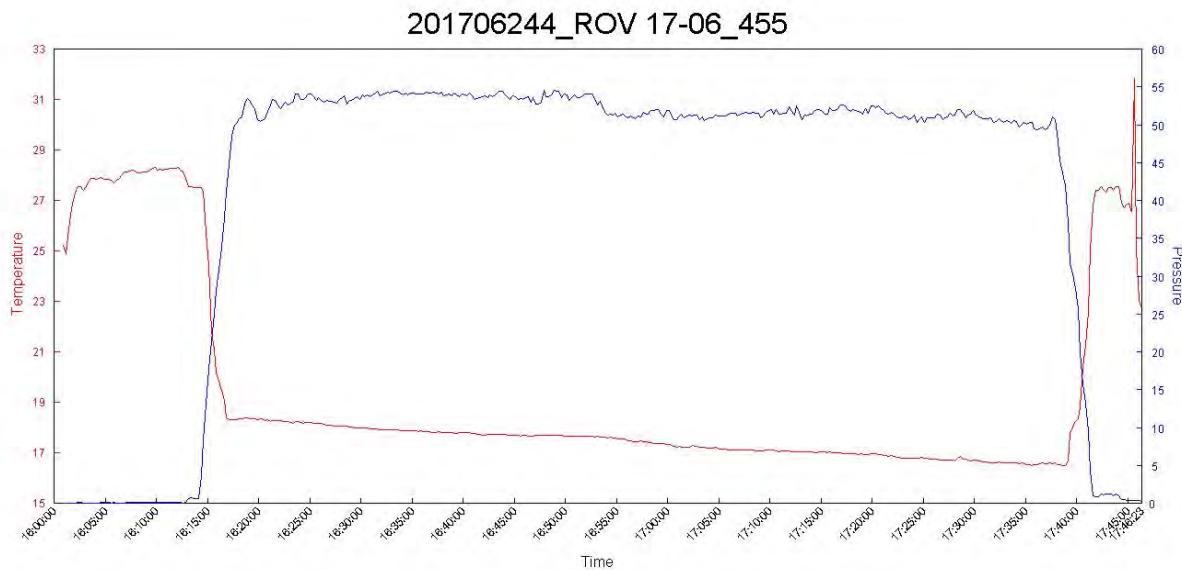
Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	51	Total Transect Length (km):	0.949
Maximum Bottom Depth (m):	55	Surface Current (kn):	0.9
On Bottom (Time- EDST):	16:17	On Bottom (Lat/Long):	30.6063°N; -80.1493°W
Off Bottom (Time- EDST):	17:36	Off Bottom (Lat/Long):	30.6135°N; -80.1454°W
Physical (bottom); Temp (°C):	18.3	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-06 are as follows: Depth Maximum: 54.6 m, Temperature: 16.5-18.4 °C

Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Dive Imagery:



Figure 1: -54.3 m

Sea cucumber- *Isostichopus badionotus*



Figure 2: -54.9 m

Unid. blenny on rock with *Ircinia campana* sponge, *Filograna* annelids and algae.



Figure 3: -52.8 m

Wrasse bass (*Liopropoma eukrines*).



Figure 4: -52.4 m

Jackknife fish (*Equetus lanceolatus*) and spiny lobster.



Figure 5: -53 m

School of lionfish (*Pterois volitans*). 59 were counted on the ROV dive.



Figure 6: -53.2 m

Harlequin bass (*Serranus tigrinus*).

Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 24-VI-17-4; ROV 17-06, UNCW Dive 455; Florida, Fernandina, 7.5 nmi N of North Florida MPA, Site 7, 55 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 51-55 m

MB map shows NNE-SSW narrow ridge, extension of west ridge of North Florida MPA.

16:10- Launch; sunny, air- 27.9, wind- 13 kn from 207 dg, seas 2-3 ft from SW, current- 0.9 kn to 293 dg, water- 25.09 dg C, salinity- 36.65.

16:15- On bottom; depth- 55 m , visibility- 10 m, current- 0.5 kn from S.

Near east slope of ridge on MB. Flat bottom, fractured flat top rock slabs, < 1m relief, coarse sand between rock slabs, no definite linear ridge or ledge. Heading NE. Sand to the east of the hard bottom. Biota- *Stichopathes*, *Didemnidae*, *Filograna*, *Ircinia campana*, 25 cm bushy *Tanacetipathes*, hydroids, encrusting sponges, *Spirastrellidae*, *Axinellidae*, purple *Nicella* fans, *Diodogorgia*, *Eudistoma*, *Chlorophyta* (flat blade, *Ulva*?).

16:28- 55 m, sand, shell hash.

16:38- 55 m, ½ m fractured flat rock slabs, low rugosity, low relief; same biota, tomtates, Lionfish, *Antipathes atlantica*, *Antipathes furcata*, yellow ball *Cinachyrella*?, *Isostichopus badionotus*, Rhodophyta thin EB, *Tanacetipathes*, *Dictyota* (green), *Aplysina conifera*.

16:57- 53 m, MB shows on ridge; low relief rock slabs, pavement, <1/2 m relief; dense biota. Continue heading N. Biota- *Ptilocaulis*, DMST demosponge, dense *Filograna* ball,

17:03- 52 m, pavement and low relief slabs. Bushy *Dictyota* (green), spiny lobster, *Schizoporella*.

17:09- 53 m base, drop off to west, 52 top, fractured rock slabs, high rugosity. Biota- *Iciligorgia* (dense), fish dense, *Dictyota* (dense), *Agelas clathrodes*, Clathriidae, 20 cm yellow *Cinachyrella*?

17:25- 52 m, low relief pavement; dense biota. Transect along west face of ridge.

17:34- 51 m, end dive.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia coral- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant), *Antipathes furcata*, *Antipathes atlantica*

Gorgonian coral- *Diodogorgia*, *Muricea*, *Nicella*

Porifera- *Ircinia campana*, *Spirastrellidae*, *Aplysina* sp., *Aplysina conifera*, DSMT demosponge, Clathriidae, *Ptilocaulis*, *Cinachyrella* , *Agelas clathrodes*

Ascidiae- *Didemnidae* (abundant), *Eudistoma* (large purple)

Annelida- *Filograna* (abundant)

Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Hydroida

Algae- Rhodophyta thin EB, Chlorophyta (*Ulva*?), *Dictyota* (green, common)

Dominant Fish:

Lionfish- 37

Graysby, scamp- 2, tomate, sharpnose, yellowtail reef, blue angel, reef butterfly, spotfin hog, squirrel, yellow head wrasse, amberjack, jackknife fish, eel.

Human Debris:

None.

Dive Site: Florida, Outside North Florida MPA, 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

CPCe Percent Cover Analysis:

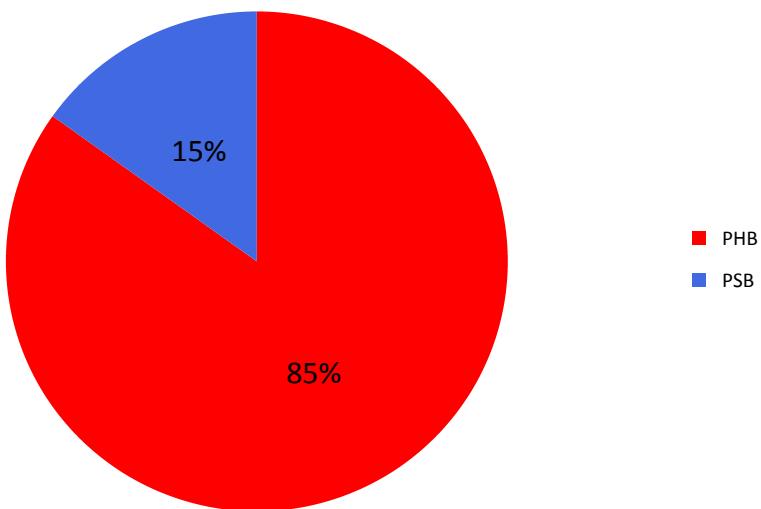
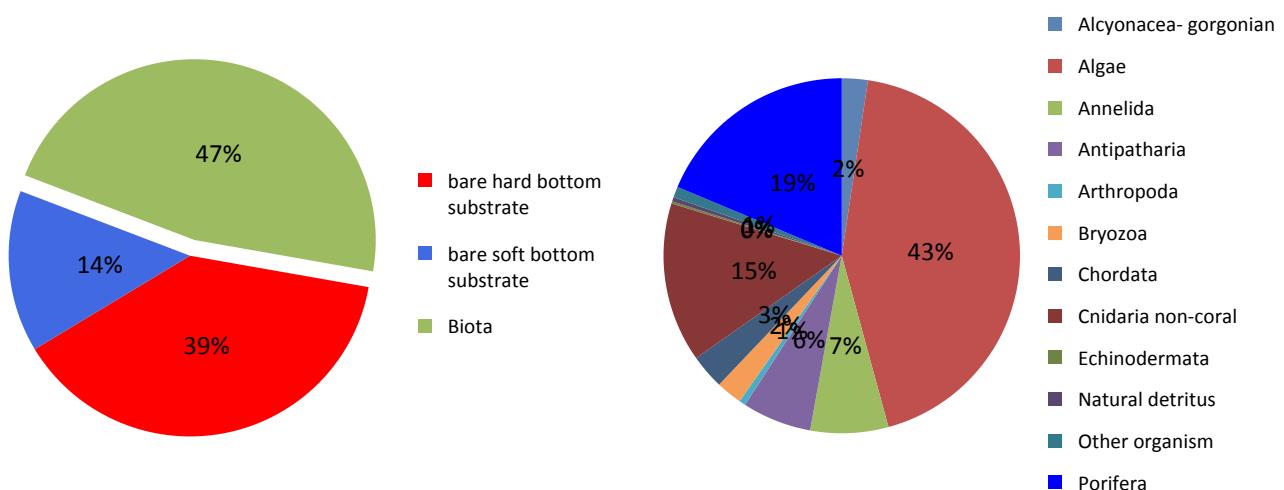


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-06. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-06.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: Florida, Outside North Florida MPA; 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-06.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	46.96%	X
Algae	20.39%	X
Cyanobacteria	3.23%	
Chlorophyta		X
Ochrophyta	10.89%	X
<i>Dictyota</i> sp.	9.78%	X
Ochrophyta	1.11%	
Rhodophyta	6.27%	X
Corallinales	3.23%	
Rhodophyta	3.04%	X
Porifera	8.76%	X
Demospongiae	8.76%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)		X
<i>Aplysina</i> sp.		X
Axinellidae		X
<i>Chondrilla</i> sp.	0.28%	
<i>Cinachyrella</i> sp.		X
<i>Cliona</i> sp.	0.18%	
Demospongiae- tan starlet thick encrusting	0.09%	X
Demospongiae unid. sp.	4.70%	X
<i>Holopsamma</i> sp.		X
<i>Ircinia campana</i> (Lamarck, 1814)	0.46%	X
<i>Ircinia</i> sp.	1.66%	
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.09%	
Microcionidae		X
<i>Ptilocaulis</i> sp.		X
<i>Scopalina</i> sp.	0.18%	
Spirastrellidae	1.11%	X
Cnidaria	10.89%	X
Alcyonacea - gorgonian	1.11%	X
Alcyonacea- gorgonian	0.28%	X
<i>Carijoa</i> sp.	0.09%	
<i>Diodogorgia</i> sp.	0.09%	X
<i>Iciligorgia schrammi</i> Duchassaing, 1870	0.55%	X

Dive Site: Florida, Outside North Florida MPA; 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

<i>Muricea</i> sp.		X
<i>Nicella</i> sp.	0.09%	X
Antipatharia	2.95%	X
<i>Antipathes atlantica</i> Gray, 1857		X
<i>Antipathes furcata</i> Gray, 1857		X
Antipathidae	0.37%	
<i>Stichopathes lutkeni</i> Brook, 1889	1.29%	X
<i>Tanacetipathes</i> sp.	1.29%	X
Hydrozoa	6.83%	X
Hydroidolina	6.83%	X
Annelida	3.32%	X
Polychaeta	3.32%	X
<i>Filograna</i> sp.	3.32%	X
Serpulidae		X
<i>Spirobranchus giganteus</i> (Pallas, 1766)		X
Arthropoda	0.28%	X
Decapoda	0.28%	X
<i>Panulirus argus</i> (Latreille, 1804)	0.09%	X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)	0.18%	
Bryozoa	1.11%	X
Bryozoa	1.11%	X
Bryozoa	0.37%	
<i>Schizoporella</i> sp.	0.74%	X
Echinodermata	0.09%	X
Crinoidea	0.09%	
Crinoidea	0.09%	
Holothuroidea		X
<i>Isostichopus badionotus</i> (Selenka, 1867)		X
Chordata - Invertebrate	0.46%	X
Tunicata	0.46%	X
Asciidiacea	0.09%	
Didemnidae	0.37%	X
<i>Eudistoma</i> sp.		X
Chordata - Vertebrate	1.01%	
Chordata	1.01%	
Actinopterygii	1.01%	
Non-Fauna	0.18%	
Detritus	0.18%	
Natural Detritus	0.18%	
UNKNOWN	0.46%	
Bare Substrate	53.04%	X
Non-Fauna	53.04%	X

Dive Site: Florida, Outside North Florida MPA; 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

Habitat	53.04%	X
Bare coral rubble	0.09%	
Bare rock, pavement, boulder, ledge	37.73%	
Bare rubble/cobble	0.74%	
Bare soft bottom	14.48%	
Burrow		X
Grand Total	100.00%	

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-06.

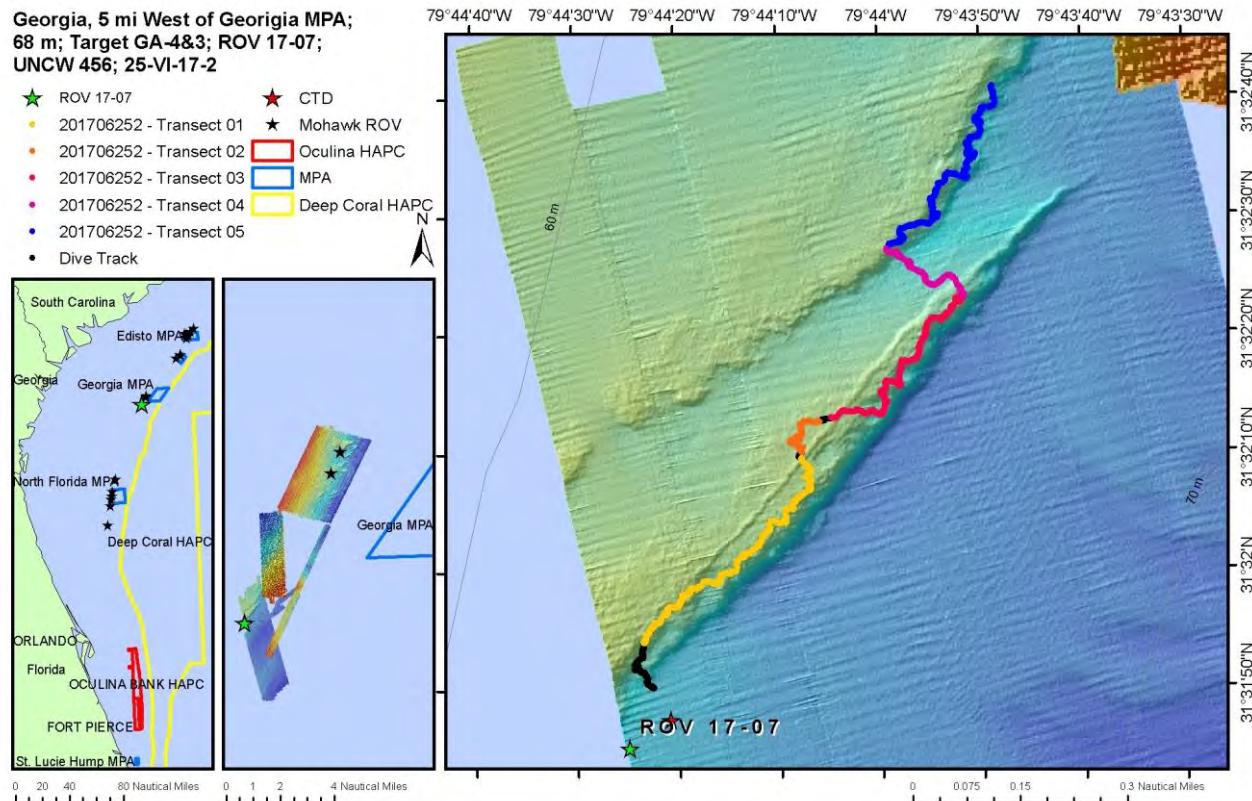
Class/Scientific Name- Common Name	17-06
Actinopterygii	
Beryciformes	
Holocentridae- Soldierfish	0.3666
Holocentridae- Squirrelfish	3.2997
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	5.8662
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	4.9496
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.9166
<i>Apogon</i> sp.- Cardinalfish	0.3666
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	10.0825
<i>Calamus</i> sp.- Porgy	0.7333
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.3666
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.1998
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	8.6159
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	20.7149
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	15.2154
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.9331
<i>Chromis</i> sp.- Damselfish	1.4665
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	0.3666
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	47.8460
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	4.5830
<i>Halichoeres</i> sp.- Wrasse	19.4317
<i>Holacanthus</i> sp.- Angelfish	9.8992
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.1833
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.7333
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.3666
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.1833
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	0.7333
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	2.0165
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.3666
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.1833
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	7.3327
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.3666
<i>Seriola</i> sp.- Amberjack	0.9166
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.7333
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.7333
<i>Serranus chionaraia</i> Robins & Starck, 1961- Snow Bass	0.1833
<i>Serranus phoebe</i> Poey, 1851- Tattler	2.9331

Dive Site: Florida, Outside North Florida MPA; 51 m; Target FL-7; ROV 17-06; UNCW 455; 24-VI-17-4

<i>Serranus tigrinus</i> (Bloch, 1790)- Harlequin Bass	0.1833
Sparidae- Porgy	0.1833
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	3.6664
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.1833
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	8.7993
Tetraodontiformes	
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	2.0165
<i>Balistes</i> sp.- Triggerfish	0.1833
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.1833
<i>Canthigaster</i> sp.- Puffer	19.7984
Elasmobranchii	
Myliobatiformes	
<i>Dasyatis</i> sp.- Stingray	0.1833
UNKNOWN	6.9661

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_10_15_Georgia_East_bag.bag
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/25/2017
Specimens:	0
Digital Photos:	363
No. DVD:	3
Hard Drive No.:	1

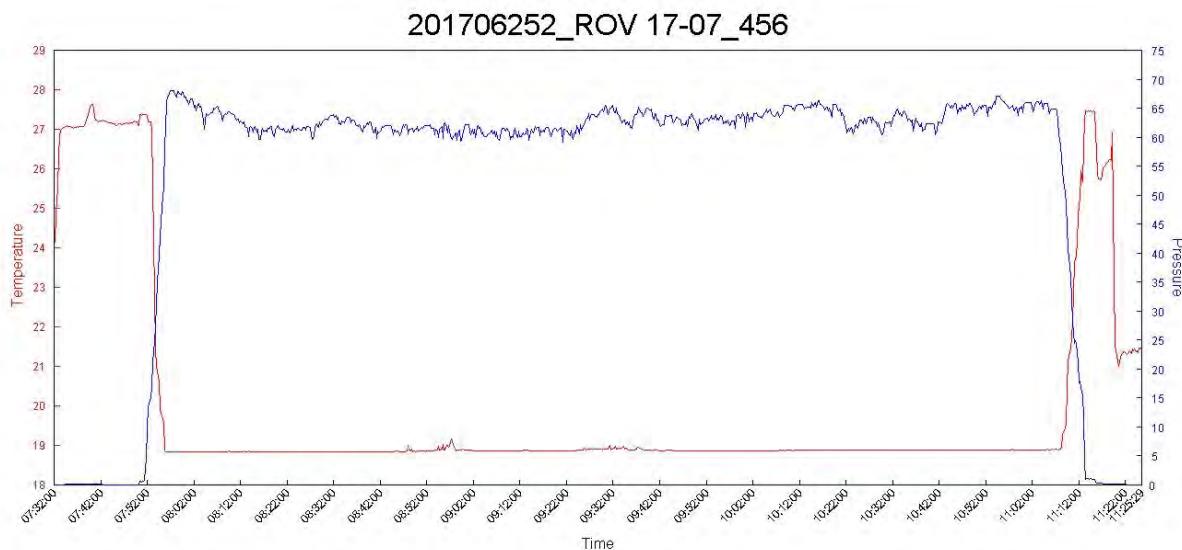
Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	62	Total Transect Length (km):	2.387
Maximum Bottom Depth (m):	69.7	Surface Current (kn):	0.8
On Bottom (Time- EDST):	7:54	On Bottom (Lat/Long):	31.5302°N; -79.7396°W
Off Bottom (Time- EDST):	11:05	Off Bottom (Lat/Long):	31.5444°N; -79.7303°W
Physical (bottom); Temp (°C):	19.9	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-07 are as follows: Depth Maximum: 68 m, Temperature: 18.8-19.9 °C

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Dive Imagery:



Figure 1: -61.9 m
Blue angelfish (*Holacanthus bermudensis*).



Figure 2: -62.3 m
Loggerhead turtle and scamp grouper (*Mycteroperca phenax*).



Figure 3: -62.4 m
Loggerhead turtle and scamp (*Mycteroperca phenax*).



Figure 4: -63.3 m
White tunicates- *Eudistoma*.



Figure 5: -64.6 m
Thorny starfish- *Goniaster*.



Figure 6: -62.7 m
Slipper lobster- *Scyllarides*.

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 25-VI-17-2; ROV 17-07, UNCW Dive 456; Georgia, 5 nmi SW of Georgia MPA, Site Ga-4 and Ga-3, 68 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 62-69 m

Site Ga-4, MB map (NF 2015, 2 m resolution) shows NE-SW linear ridge, 130 m wide, along the east edge of a shelf or plateau. Site Ga-4- west of site Ga-3 is second NE-SW ridge. Conduct two transects- Site GA-3, transect along ridge heading NE, then cut over to Site Ga-3.

07:49- Launch; sunny, air- 27.5, wind- 14 kn from 244 dg, seas 2-3 ft from SW, current- 0.8 kn to 332 dg, water- 24.99 dg C, salinity- 36.94.

07:54- On bottom; depth- 69 m , visibility- 5 m, current- 0.25 from SW. Landed east of ridge. Heading NW to ridge.

Flat, coarse sand, shell hash, dense terebellidae worm tubes.

07:59- 69 m, low relief pavement, 50% hard bottom, 25 cm relief. Few small boulders <1/4 m. Biota- hydroids, demosponges, yellow sphere sponges, sparse biota, Didemnidae, Lionfish, *Filograna*, encrusting orange sponges.

08:05- flat sand, few small cobble, boulders, near ridge on MB.

08:08- 65 m, on ridge according to MB. Low relief pavement, sediment veneer, no ledges. School of 50 red snapper, *Ircinia campana*, *Stichopathes*, hydroids, Didemnidae, 20 cm spherical sponge. 63 m, flat, but 6 m shallower than start. MB- half way up slope of ridge, but not apparent visually. Biota- still sparse, on pavement, heading NE.

08:18- 63 m, pavement, low relief ledge on pavement, dense fish, turtle, dense Cubbyu. MB shows we are on upper part of east face of ridge, transect paralleling face. Back on pavement, sediment veneer, sparse biota, scattered 25 cm boulders. *Eudistoma* (grey spheres), 25 cm yellow hemispherical sponge with several oscula (not *Cinachyrella*), Goniasteridae (spines on surface), *Zyzyza*.

08:32- 65 m, MB- top of escarpment of ridge. Actual- flat, pavement, no ledges, few small cobble, 25 cm boulders, fairly barren. Heading NE along face of slope. *Stichopathes*, *Ircinia*, 3 slipper lobster in open on flat rock. *Aplysina* white fingers, dense *Diadogorgia*. ½ m ledge with fish- Lionfish, *Tanacetipathes*, moray, cubbyu, CCA, cluster of 15+ lionfish.

08:54- 64 m, MB- middle of ridge. Same low relief pavememt, varies from fairly barren to dense biota. Change heading to NW, head to west slope of ridge. *Narcissia trigonaria*,

09:03- 63 m, MB at east base of western ridge. Flat sand. 62 m on top, MB- on west base of western ridge. Flat sediment, sparse pavement. Dense Terebellidae worms. Head east toward east side of ridge again.

09:20- 62 m, MB- top of ridge, rock pavement, low relief, 25 cm boulders.

9:25- 65 m, MB- on eastern slope of ridge. Low relief pavement, no ledges, areas of low relief boulders 25 cm. Biota- *Stichopathes*, Didemnidae, hydroids. Heading NE along face of slope. Biota- *Muricea*.

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

09:58- 65 m, change transect. Head W 230 m, to second ridge on MB. Stopped photo transect. Current 0.1 from SW.

10:12- 67 m. MB- middle of valley between east ridge and west ridge. Bottom is 100% soft bottom, coarse sediment, dense Terebellidae tubes.

10:16- 67 m. MB- base of west ridge. 100% sediment, some pavement. 65 m- pavement low relief.

10:20- 63 m, face of slope on MB. Start photo transect of GA-3 site. 100% pavement, no ledges. Heading NE along the slope. Biota- *Stichopathes*, *Didemnidae*, *Diogorgia*, *Ircinia campana*, hydrooids, encrusting yellow and orange sponges. Low relief ledges <1/2 m. Cubbyu, lionfish, red snapper, scamp, *Filograna*.

10:28- 63 m, MB- upper slope, low relief pavement, no ledges. Same biota, low density. ½ m ledge with large gag, scamp, red snapper, cubbyu, lionfish.

10:44- 67 m, MB- base of slope; low relief rock pavement, scattered 25 cm relief boulders. Yellow 10 cm spherical sponges (common, Clathriidae?), *Verongida* massive lobate, drift sargassum, rock with 10+ lionfish, fishing line, 20 cm white massive lobate *Zyzya*. *Spondylus* yellow, *Phyllangia americana*, tarp debris.

11:04- 66 m, MB- end point of GA-3 site, pavement, low relief 25 cm ledges. End of dive.

Dominant Benthic Macrobiota:

Scleractinia coral- *Phyllangia americana*

Antipatharia- *Tanacetipathes* (bushy, 30 cm, abundant), *Stichopathes* (abundant), *Antipathes atlantica*

Gorgonacea- *Diogorgia*, *Muricea*, *Nicella*

Porifera- *Ircinia campana*, Spirastrellidae, *Aplysina*, yellow sphere (Clathriidae), encrusting yellow and orange sponges, *Zyzya*

Asciidiacea- Didemnidae

Annelida- *Filograna*, Terebellidae (tubes on sand)

Asciidiacea- *Eudistoma* (large grey), Didemnidae

Hydroids

Astroidea- *Narcissia trigonaria*, *Goniaster*

Mollusca- *Spondylus*, lions paw

Algae- CCA

Dominant Fish:

Lionfish- 279

Scamp- 6, hogfish- 4, gag- 2, graysby- 1, amberjack, tomate, cubbyu, red snapper- 142, reef butterfly, tattler, short bigeye, blue angel, bank butterfly, sharpnose, orange back bass, cornet fish

Human Debris:

Fishing line.

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

CPCe Percent Cover Analysis:

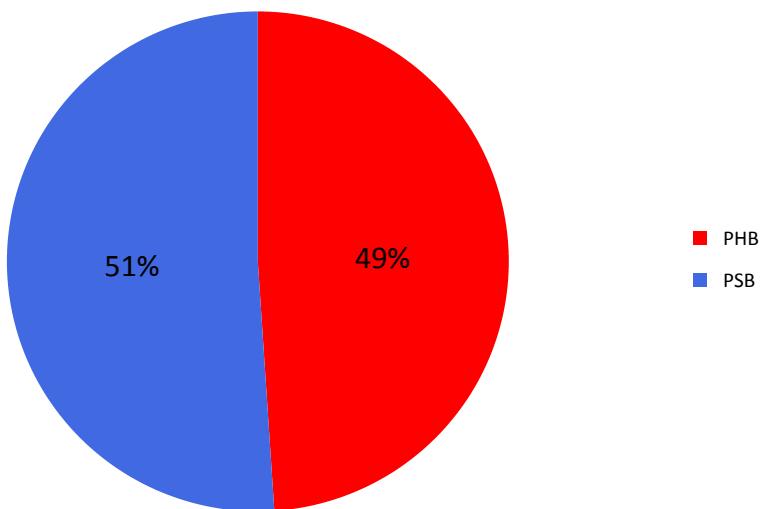
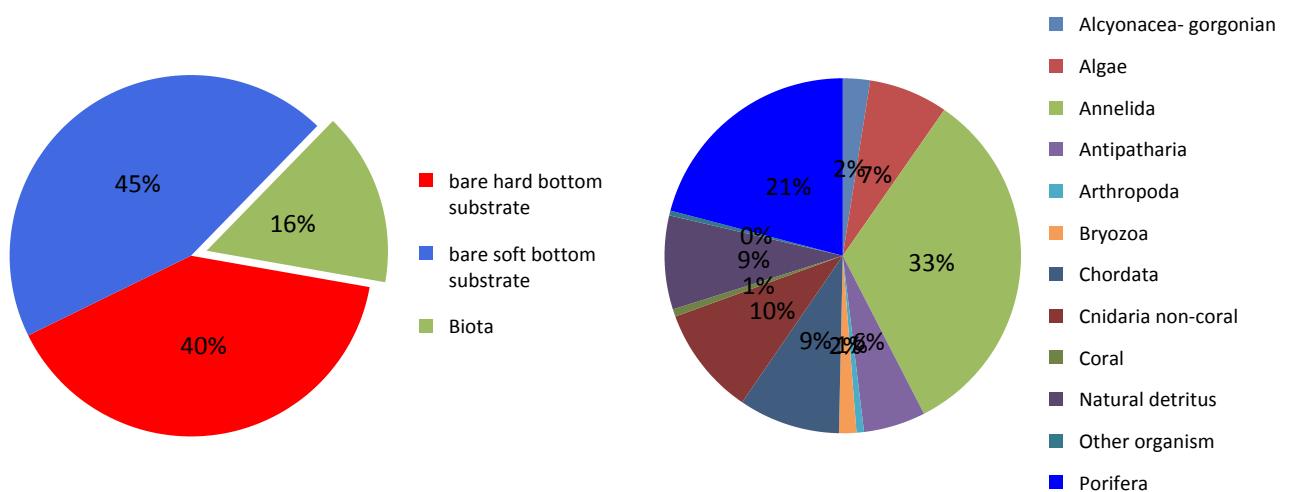


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-07. CPCe© points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-07.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-07.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-07 dive notes
Biota	15.52%	X
Algae	1.12%	X
Cyanobacteria	0.03%	
Ochrophyta	0.17%	X
<i>Sargassum</i> sp.	0.17%	X
Rhodophyta	0.91%	X
Corallinales	0.91%	X
Porifera	3.24%	X
Demospongiae	3.24%	X
<i>Agelas</i> sp.	0.07%	
<i>Aplysina</i> sp.		X
Axinellidae		X
<i>Clathria</i> sp.	0.07%	
Demospongiae- tan starlet thick encrusting	0.07%	X
Demospongiae unid. sp.	2.51%	X
<i>Ircinia campana</i> (Lamarck, 1814)	0.03%	X
<i>Ircinia</i> sp.	0.07%	X
Microcionidae		X
<i>Polymastia</i> sp.		X
Spirastrellidae	0.42%	X
<i>Zyzyza</i> sp.		X
Cnidaria	2.89%	X
Alcyonacea - gorgonian	0.38%	X
Alcyonacea- gorgonian	0.03%	
<i>Carijoa</i> sp.	0.03%	
<i>Diodogorgia</i> sp.	0.28%	X
<i>Ellisella</i> sp.	0.03%	
<i>Muricea</i> sp.		X
Antipatharia	0.87%	X
Antipathidae	0.14%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.73%	X
Hydrozoa	1.53%	X
Hydroidolina	1.53%	X
Scleractinia	0.10%	X

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Phyllangia americana Milne Edwards & Haime, 1849		X
Scleractinia- unid cup	0.10%	
Annelida	5.09%	X
Annelida	4.92%	
Polychaeta	0.17%	X
<i>Filograna</i> sp.	0.17%	X
Sabellidae		X
Terebellidae		X
Arthropoda	0.10%	X
Cirripedia	0.03%	
Cirripedia	0.03%	
Decapoda	0.07%	X
Anomura		X
Decapoda	0.03%	
<i>Scyllarides</i> sp.	0.03%	X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)		X
Bryozoa	0.24%	X
Bryozoa	0.24%	X
Bryozoa	0.10%	
<i>Schizoporella</i> sp.	0.14%	X
Echinodermata		X
Asteroidea		X
<i>Goniaster tessellatus</i> (Lamarck, 1816)		X
<i>Narcissia trigonaria</i> Sladen, 1889		X
Mollusca		X
Bivalvia		X
<i>Nodipecten nodosus</i> (Linnaeus, 1758)		X
<i>Spondylus</i> sp.		X
Gastropoda		X
<i>Busycon</i> sp.		X
Naticidae- Egg Case		X
Chordata - Invertebrate	0.28%	X
Tunicata	0.28%	X
Asciidiacea	0.14%	
Didemnidae	0.14%	X
<i>Eudistoma</i> sp.		X
Chordata - Vertebrate	1.15%	
Chordata	1.15%	
Actinopterygii	1.15%	
Non-Fauna	1.32%	
Detritus	1.32%	
Natural Detritus	1.32%	

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

UNKNOWN	0.07%
Human Debris	X
Non-Fauna	X
Human debris	X
Human debris- fish line/gear	X
Human debris- anchor line	X
Human debris- other	X
Bare Substrate	84.48%
Non-Fauna	84.48%
Habitat	84.48%
Bare coral rubble	0.17%
Bare rock, pavement, boulder, ledge	35.77%
Bare rubble/cobble	3.94%
Bare soft bottom	44.53%
dead standing Scleractinia	0.07%
Grand Total	100.00%

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-07.

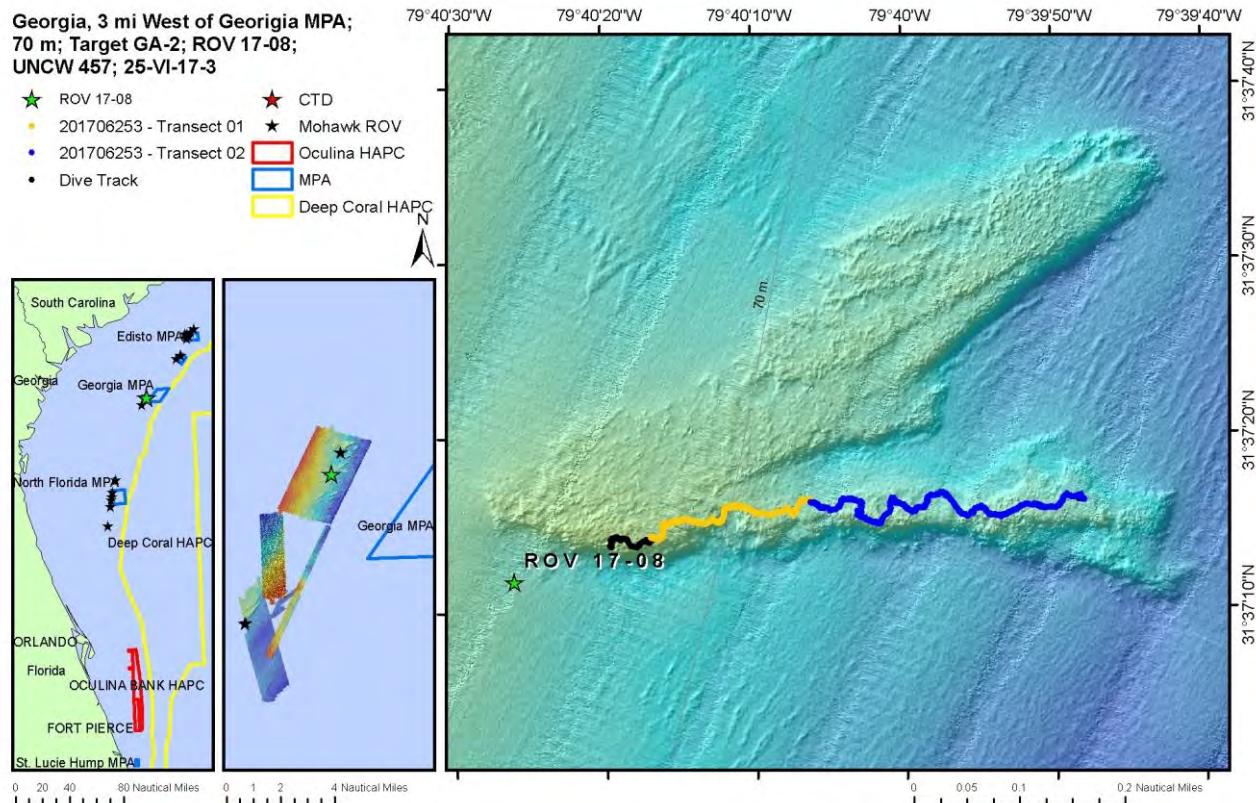
Class/Scientific Name- Common Name	17-07
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.1185
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1185
<i>Muraena robusta</i> Osório, 1911- Stout Moray	0.1185
Ophichthidae- Snake Eel	0.1185
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.1185
Batrachoidiformes	
<i>Opsanus</i> sp.- Toadfish	0.2370
Beryciformes	
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	0.8296
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	0.3555
Lophiiformes	
<i>Ogcocephalus</i> sp.- Batfish	0.1185
Perciformes	
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.1185
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	2.6073
<i>Calamus</i> sp.- Porgy	1.7777
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.4740
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	9.9550
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	16.7101
<i>Chaetodon</i> sp.- Butterflyfish	0.4740
<i>Chromis enchraysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	4.3849
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	0.4740
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	3.0813
<i>Chromis</i> sp.- Damselfish	1.5406
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	0.4740
<i>Halichoeres bathophilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	2.7258
<i>Halichoeres</i> sp.- Wrasse	6.9922
<i>Holacanthus</i> sp.- Angelfish	6.5181
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.9481
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.7777
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	17.0657
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.4740
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.7111
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	2.6073
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	56.4115

Dive Site: Georgia, 5 mi West of Georgia MPA; 68 m; Target GA-4&3; ROV 17-07; UNCW 456; 25-VI-17-2

<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	1.6592
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	11.2586
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	5.9256
<i>Rhomboptilus aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	35.5534
<i>Rypticus maculatus</i> Holbrook, 1855- Whitespotted Soapfish	0.5926
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	9.0069
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.7777
<i>Seriola</i> sp.- Amberjack	6.2811
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	4.2664
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	1.6592
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	0.3555
<i>Serranus phoebe</i> Poey, 1851- Tattler	11.4956
<i>Serranus</i> sp.- Sea Bass	0.1185
Sparidae- Porgy	0.5926
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	37.4496
Scorpaenidae- Scorpionfish	0.1185
Syngnathiformes	
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.1185
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1185
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	2.7258
<i>Canthigaster</i> sp.- Puffer	13.9844
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	1.5406
Tetraodontidae- Puffer	0.9481
UNKNOWN	3.7924

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_MPA_G A
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/25/2017
Specimens:	0
Digital Photos:	87
No. DVD:	1
Hard Drive No.:	1

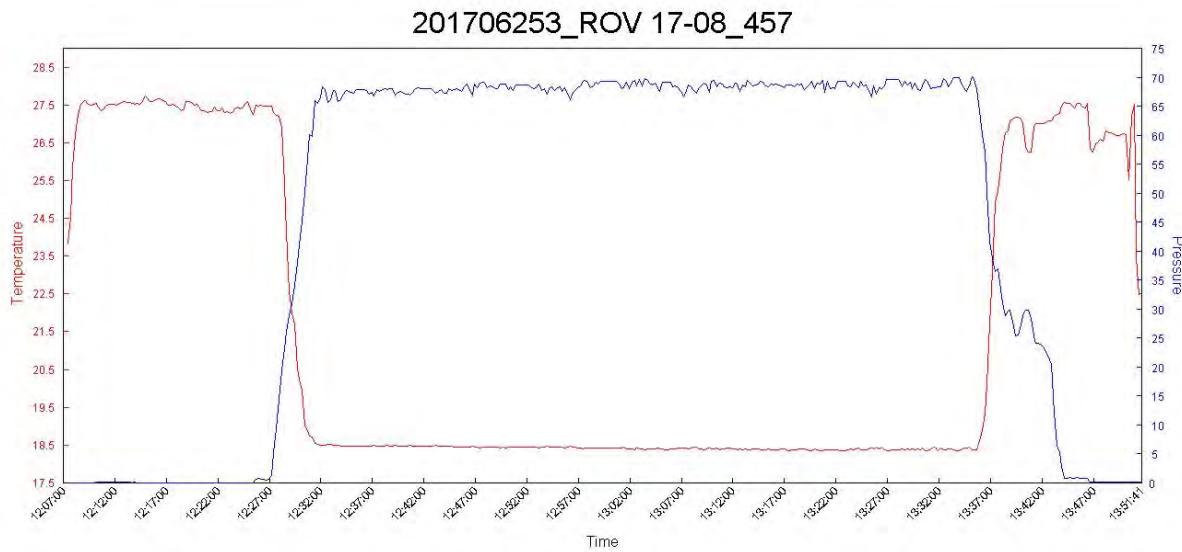
Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	69	Total Transect Length (km):	0.913
Maximum Bottom Depth (m):	70.1	Surface Current (kn):	0.8
On Bottom (Time- EDST):	12:30	On Bottom (Lat/Long):	31.6201°N; -79.672°W
Off Bottom (Time- EDST):	13:32	Off Bottom (Lat/Long):	31.6208°N; -79.6635°W
Physical (bottom); Temp (°C):	20	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-08 are as follows: Depth Maximum: 69.7 m, Temperature: 18.3-20 °C

Dive Imagery:



Figure 1: -68.6 m
Several lionfish (*Pterois volitans*) and butterflyfish.



Figure 2: -68.8 m
Leopard toadfish (*Opsanus pardus*).



Figure 3: -68.7 m
Ghost trawl net.



Figure 4: -69.6 m
Lionfish (*Pterois volitans*) on low relief rock. 50 were counted on the dive.



Figure 5: -69.7 m
Bubble wrap sponge- *Hadromerida*.



Figure 6: -67.5 m
Greater barracuda (*Sphyraena barracuda*) swimming over reef.

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 25-VI-17-3; ROV 17-08, UNCW Dive 457; Georgia, 3 nmi W of Georgia MPA, Site Ga-2, 70 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 69-70 m

MB map (NF 2015, 2 m resolution) shows flat topped mound, 0.6 nmi long; transect heading east along south facing slope. Part of transect over same transect as dive 14-03.

12:23- Launch; pt/cloudy, air- 27.9, wind- 10 kn from 238 dg, seas 2-3 ft from SW, current- 0.8 kn to 81 dg, water- 25.02 dg C, salinity- 36.90.

12:30- On bottom; depth- 70 m , visibility- 5 m, current- 0.1 from NW.

MB- 100 m south of base of ridge; 100% soft bottom, coarse sand, shell hash, rubble. Head N to ridge. Biota- *Bebryce*.

MB- at base of ridge, 69 m; flat sand, few 15 cm rocks; 90% soft bottom. Biota- Spirastrellidae, hydroids, Didemnidae, encrusting sponges, drift *Sargassum*. Transect up to top of ridge; all flat sand, shell hash, few 10-20 cm relief outcrops. Top 68.5 m. Transect east along slope. Biota- *Ircinia campana*, lionfish, short bigeye, *Goniaster tessalata*.

12:48- 69 m, following transect line of 2014 where saw 30+ scamp. *Titanideum*, flounder, toadfish, *Virgularia presbytes* sea pen. Trawl net. Heading east along 2014 transect line. 90% soft bottom, patches of pavement, 10-20 outcrops with few fish, low density of biota. Spirastrellidae, Diodogorgia, hydroids, Didemnidae.

12:58- 69.5 m. Start photo transect. Hd east along face of slope on MB, along line of 2014 Dive 14-03. Lionfish on most of the outcrops. 25 cm ledge- gag, cubbyu, red snapper.

Ellisella whips knocked down.

13:16- 69.5 m. MB- base of wall. Same habitat, 90% soft sand, shell hash, scattered low relief pavement, occasional 10-20 cm crevice, fairly barren except on outcrops. Fishing line. Hard bottom pavement with dense Diodogorgia. Biota- 20 cm yellow cake- *Hadromerida bubble wrap sponge*.

13:30- 70 m, 100% sand, shell hash. End of dive.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia- *Stichopathes*

Gorgonacea- *Diodogorgia*, *Ellisella* whips (knocked down), *Titanideum frauenfeldii*

Pennatulacea- *Virgularia presbytes*

Porifera- *Ircinia campana*, Spirastrellidae, encrusting yellow and orange sponges, Zyzzya, *Hadromerida* (bubble wrap)

Asciidiacea- Didemnidae

Annelida- Terebellidae (tubes on sand)

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-
3

Hydroida

Astroidea- *Goniaster tesselata*

Algae- none

Dominant Fish:

Lionfish- 50

Red snapper- 4, gag- 1, moray, scamp- 1, spotfin butterfly, short bigeye, yellowtail reef fish, sharp nose puffers

Human Debris:

Fishing line, trawl net, plastic mesh bags

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

CPCe Percent Cover Analysis:

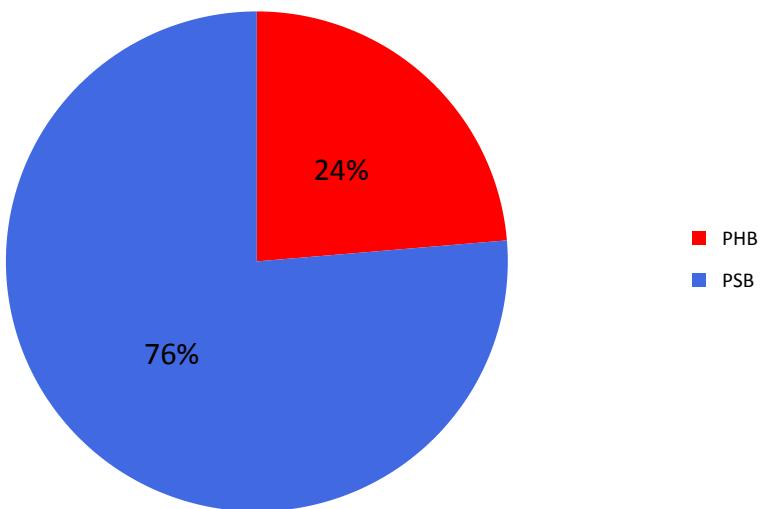


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-08. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

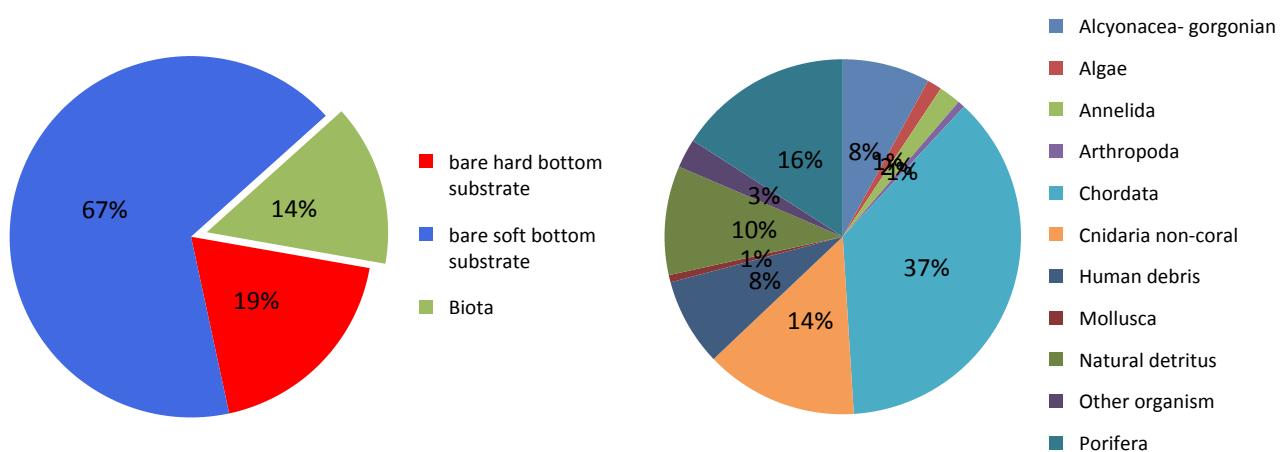


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-08.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-08.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	13.30%	X
Algae	0.19%	X
Ochrophyta		X
<i>Sargassum</i> sp.		X
Rhodophyta	0.19%	
Corallinales	0.19%	
Porifera	2.30%	X
Demospongiae	2.30%	X
Demospongiae unid. sp.	1.91%	X
Heteroscleromorpha (syn.Hadromerida)		X
<i>Ircinia campana</i> (Lamarck, 1814)	0.10%	X
Spirastrellidae	0.29%	
<i>Zyzyya</i> sp.		X
Cnidaria	3.16%	X
Alcyonacea - gorgonian	1.15%	X
<i>Bebryce</i> sp.		X
<i>Diadogorgia</i> sp.	1.15%	X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Anthozoa - Non Coral	0.10%	X
<i>Virgularia presbytes</i> Bayer, 1955		X
Zoanthidae	0.10%	
Antipatharia		X
<i>Stichopathes lutkeni</i> Brook, 1889		X
Hydrozoa	1.91%	
Hydroidolina	1.91%	
Annelida	0.29%	X
Annelida	0.19%	
Polychaeta	0.10%	X
Sabellidae		X
Serpulidae	0.10%	
Arthropoda	0.10%	X
Decapoda	0.10%	X
Anomura		X
Decapoda	0.10%	

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

<i>Stenorhynchus seticornis</i> (Herbst, 1788)	X
Echinodermata	X
Astroidea	X
<i>Goniaster tessellatus</i> (Lamarck, 1816)	X
Mollusca	0.10%
Gastropoda	0.10%
Gastropoda	0.10%
Chordata - Invertebrate	0.77%
Tunicata	0.77%
Asciidiacea	0.48%
Didemnidae	0.29%
Chordata - Vertebrate	4.59%
Chordata	4.59%
Actinopterygii	4.59%
Non-Fauna	1.44%
Detritus	1.44%
Natural Detritus	1.44%
UNKNOWN	0.38%
Human Debris	1.15%
Non-Fauna	1.15%
Human debris	1.15%
Human debris- fish line/gear	X
Human debris- other	X
Human debris- net	1.15%
Human debris- trawl net	X
Bare Substrate	85.55%
Non-Fauna	85.55%
Habitat	85.55%
Bare rock, pavement, boulder, ledge	13.21%
Bare rubble/cobble	5.65%
Bare soft bottom	66.70%
Grand Total	100.00%
	X

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-2; ROV 17-08; UNCW 457; 25-VI-17-3

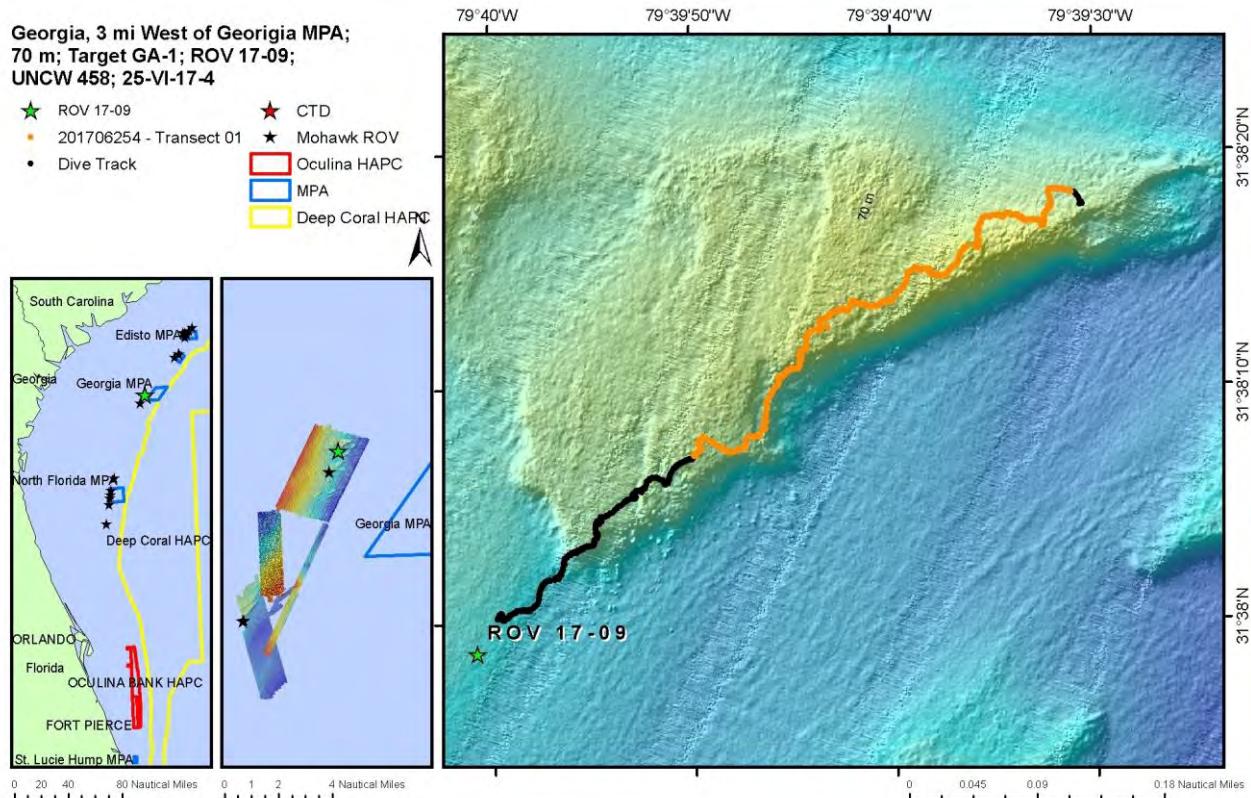
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-08.

Class/Scientific Name- Common Name	17-08
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.2525
Muraenidae- Moray Eel	0.5051
Batrachoidiformes	
<i>Opsanus tau</i> (Linnaeus, 1766)- Oyster Toadfish	0.2525
Perciformes	
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.5253
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	0.5051
<i>Chaetodon</i> sp.- Butterflyfish	0.5051
<i>Chromis encrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	3.5354
<i>Halichoeres</i> sp.- Wrasse	1.0101
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	1.0101
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.2525
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.2525
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	8.8384
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	11.3636
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.7576
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.2525
<i>Seriola</i> sp.- Amberjack	2.2727
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	0.5051
<i>Serranus phoebe</i> Poey, 1851- Tattler	8.5859
Pleuronectiformes	
Bothidae- Flounder	0.2525
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	10.8586
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	1.2626
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.5051

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-1; ROV 17-09; UNCW 458; 25-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_MPAG_A
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/25/2017
Specimens:	0
Digital Photos:	78
No. DVD:	1
Hard Drive No.:	1

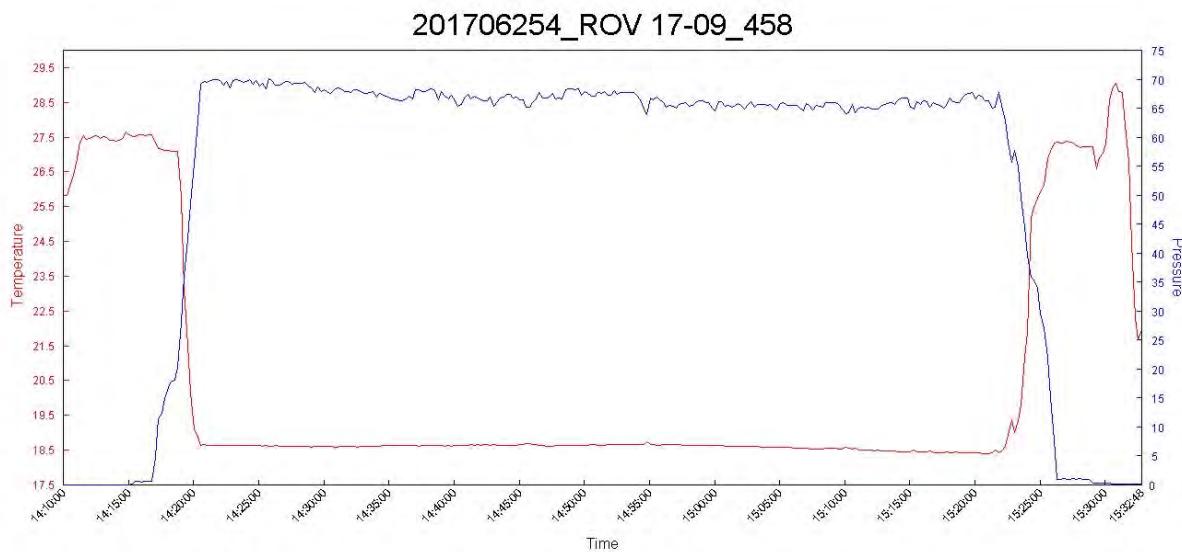
Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-1; ROV 17-09; UNCW 458; 25-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	66	Total Transect Length (km):	1.015
Maximum Bottom Depth (m):	71	Surface Current (kn):	0.1
On Bottom (Time- EDST):	14:19	On Bottom (Lat/Long):	31.6331°N; -79.6668°W
Off Bottom (Time- EDST):	15:19	Off Bottom (Lat/Long):	31.6379°N; -79.6586°W
Physical (bottom); Temp (°C):	25.8	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-09 are as follows: Depth Maximum: 70.1 m, Temperature: 18.4-25.8 °C

Dive Imagery:



Figure 1: -68.3 m

76 lionfish were counted on the dive.

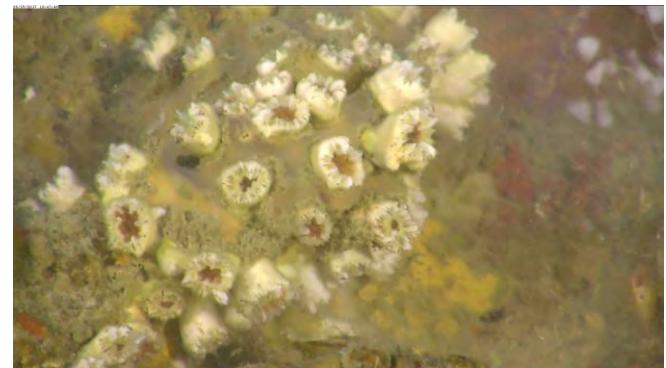


Figure 2: -68.4 m

Clusters of solitary cup corals on rock ledge.



Figure 3: -66.3 m

Flat rock pavement on ridge crest, with gorgonian-*Ellisella*, and hydroids.



Figure 4: -66.1 m

Lionfish, hydroids and sponges on low relief rock.



Figure 5: -66.1 m

Human debris on reef.



Figure 6: -66 m

Banded coral shrimp- *Stenopus hispidus*.

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 25-VI-17-4; ROV 17-09, UNCW Dive 458; Georgia, 3 nmi W of Georgia MPA, Site Ga-1, 70 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 55- 70 m

MB map (NF 2015, 2 m resolution) shows flat topped mound, 0.5 nmi long, with NE-SW ridge along east facing drop off; transect heading NE along face of slope. Part of transect over same transect as dive 14-04 and 15-04.

14:13- Launch; pt/cloudy, air- 28.0, wind- 11 kn from 202 dg, seas 2-3 ft from SW, current- 0.6 kn to 113 dg, water- 24.99 dg C, salinity- 36.94.

14:19- On bottom; depth- 70 m , visibility- 5 m, current- 0.1.

Landed 200+ m south of start WP. Flat sand, shell hash, 100% sediment, few 10-20 cm ledges, patches of pavement. Head N. *Virgularia presbytes*, Luidea, human debris, *Ellisella* knocked down, *Diodogorgia*, *Titanideum*, *Stichopathes*, fishing line, lionfish, bank butterfly, bigeye, Spirastrellidae.

14:30- 68.5 m, hard bottom, pavement, sediment veneer, MB- south tip of ridge and mound. Biota- dense *Diodogorgia*, *Stichopathes*, *Filograna*.

14:33- 68 m, MB- on slope of ridge. 100% flat sand, some pavement with sediment.

14:34- 68 m, MB- upper edge of ridge. Following dive transect of 14-04 and 15-04. Distinct ledge, 50 cm, undercut, flat rock pavement on top, sand at base. School of red snapper-11, lionfish, *Diodogorgia* on rock but fairly barren.

14:38- start photo transect. 68 m, flat rock pavement with sediment, no ledges, few 10-20 cm ledges and outcrops. Biota- *Stichopathes*, *Diodogorgia*, *Filograna*, Didemnidae, *Titanideum*, encrusting orange sponges, *Ircina campana*, *Astrangia*, Corallimorpharia, *Narcissia trigonaria*, slipper lobster, ledge with numerous lionfish, yellow ball (Clathriidae?). 30 cm ledge- cardinal fish, cubbyu, lionfish, *Spirobranchus gigantea*, Spirastrellidae, grey trigger, *Zyzyya*, fishing line, plastic mesh bag.

14:56- 66 m, MB- upper edge of slope. Pavement, sediment, low relief ledge, crevices <25 cm. Biota- hydroids, bryozoan, plastic sack, stinging hydroid, exactly on track of 14-04 and 15-04. Plastic bag, Yellow hemispherical sponge.

15:18- 68 m, end of 14-04 dive transect, MB- top edge of ridge. Flat pavement, sediment veneer, barren.

Dominant Benthic Macrobiota:

Scleractinia coral- *Astrangia*

Antipatharia-*Stichopathes*

Gorgonacea- *Diodogorgia*, *Ellisella* whips (knocked down), *Titanideum frauenfeldii*

Pennatulacea- *Virgularia presbytes*

Corallimorpharia

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-1; ROV 17-09; UNCW 458; 25-VI-17-4

Porifera- *Ircinia campana*, Spirastrellidae, encrusting yellow and orange sponges, *Zyzya*, Clathriidae yellow ball

Asciidiacea- Didemnidae

Annelida- Terebellidae (tubes on sand)

Hydroida

Asteroidea- *Goniaster tesselata*, *Luidea*, *Narcissia trigonaria*

Decapoda- *Stenorhynchus seticornis*, *Stenopus hispidus*, slipper lobster

Algae- none

Dominant Fish:

Lionfish- 76

Red snapper- 20, tattler, reef butterfly, short bigeye, sharpnose puffer, spotfin butterfly, yellowtail reef fish

Human Debris:

Fishing line, plastic mesh bags

CPCe Percent Cover Analysis:

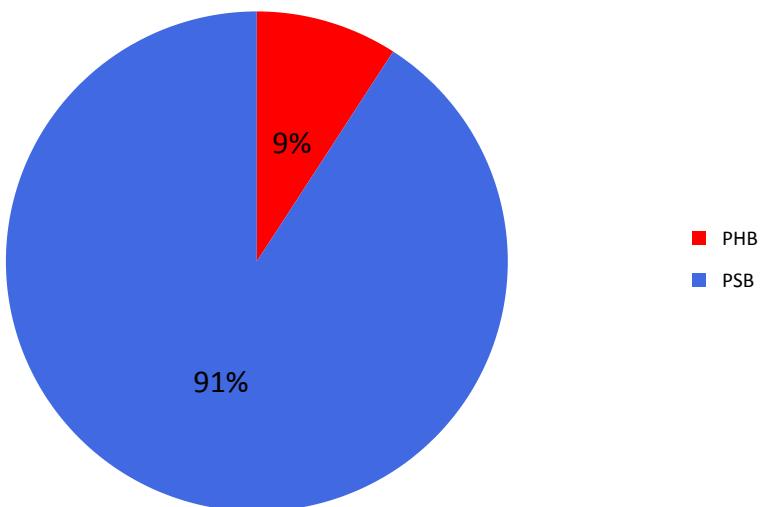
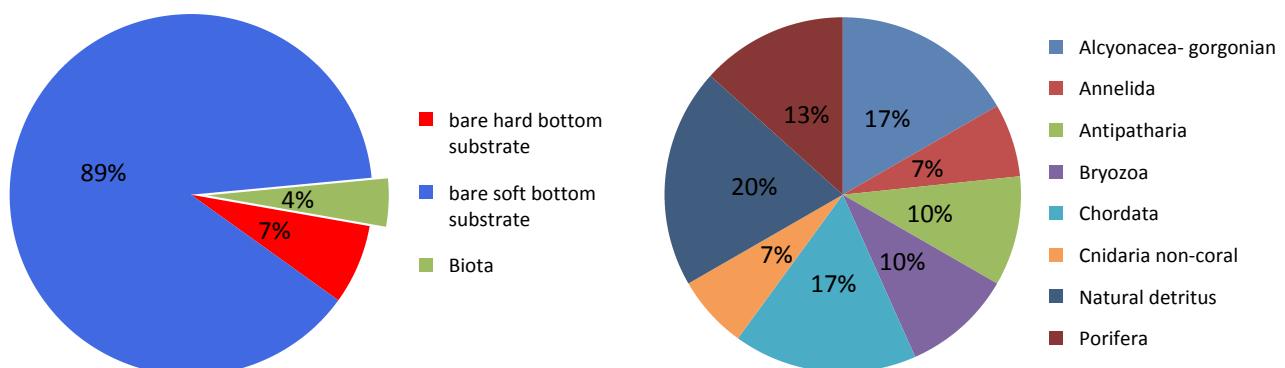


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-09. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-09.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-09.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-09 dive notes
Biota	4.29%	X
Porifera	0.57%	X
<i>Demospongiae</i>	0.57%	X
<i>Demospongiae- orange sphere</i>		X
<i>Demospongiae unid. sp.</i>	0.43%	X
<i>Ircinia campana</i> (Lamarck, 1814)		X
<i>Spirastrellidae</i>	0.14%	
<i>Zyzya</i> sp.		X
Cnidaria	1.43%	X
<i>Alcyonacea - gorgonian</i>	0.71%	X
<i>Diodogorgia</i> sp.	0.71%	X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Anthozoa - Non Coral		X
Corallimorpharia		X
<i>Virgularia presbytes</i> Bayer, 1955		X
Antipatharia	0.43%	X
<i>Stichopathes lutkeni</i> Brook, 1889	0.43%	X
Hydrozoa	0.29%	X
<i>Hydroidolina</i>	0.29%	X
Scleractinia		X
<i>Astrangia</i> sp.		X
Annelida	0.29%	X
Polychaeta	0.29%	X
<i>Filograna</i> sp.	0.29%	X
<i>Spirobranchus giganteus</i> (Pallas, 1766)		X
Arthropoda		X
Decapoda		X
<i>Scyllarides</i> sp.		X
<i>Stenopus hispidus</i> Latreille, 1825		X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)		X
Bryozoa	0.43%	X
Echinodermata		X
Asteroidea		X
<i>Luidia alternata</i> (Say, 1825)		X

Dive Site: Georgia, 3 mi West of Georgia MPA; 70 m; Target GA-1; ROV 17-09; UNCW 458; 25-VI-17-

4

<i>Narcissia trigonaria</i> Sladen, 1889		X
Ophiuroidea		X
Mollusca		X
Gastropoda		X
<i>Busycon</i> sp.		X
Olividae		X
Chordata - Invertebrate	0.57%	X
Tunicata	0.57%	X
Didemnidae	0.57%	X
Chordata - Vertebrate	0.14%	
Chordata	0.14%	
Actinopterygii	0.14%	
Non-Fauna	0.86%	
Detritus	0.86%	
Natural Detritus	0.86%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Human debris- other		X
Bare Substrate	95.71%	
Non-Fauna	95.71%	
Habitat	95.71%	
Bare coral rubble	0.14%	
Bare rock, pavement, boulder, ledge	6.57%	
Bare rubble/cobble	0.43%	
Bare soft bottom	88.57%	
Grand Total	100.00%	

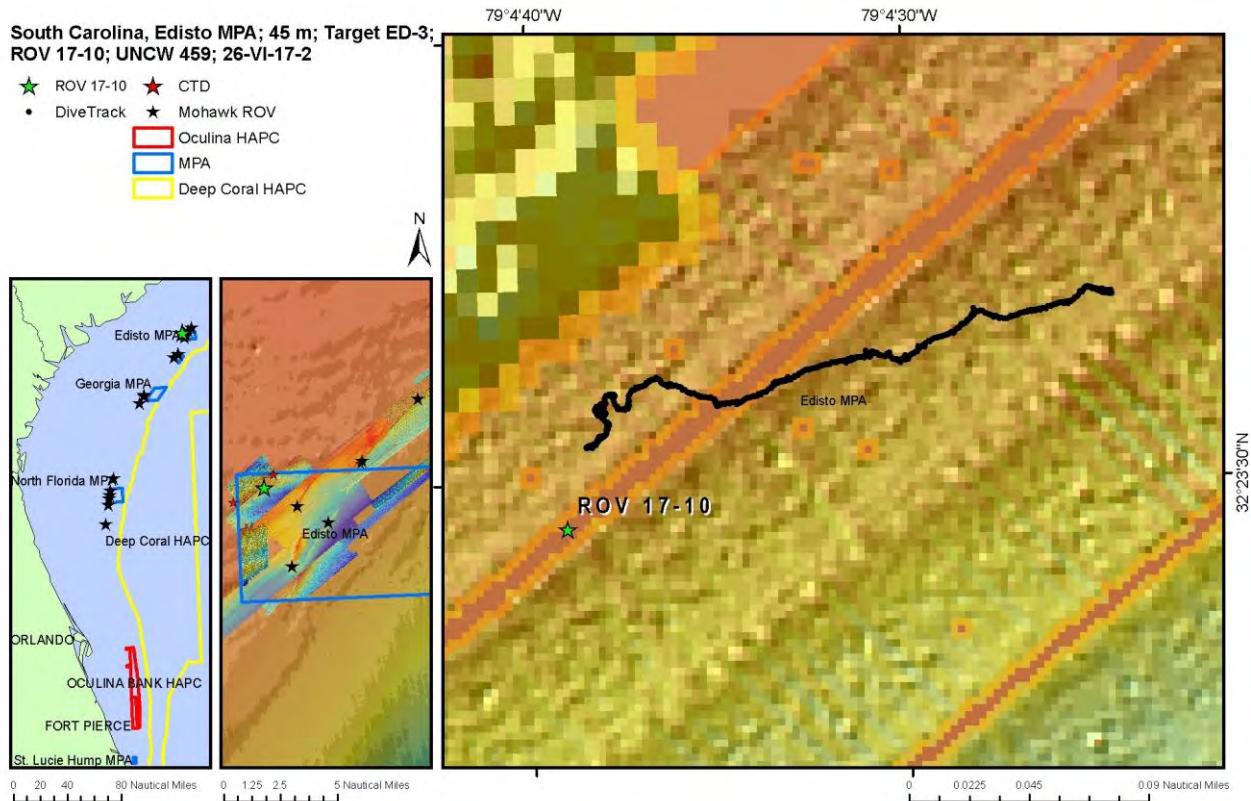
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-09.

Class/Scientific Name- Common Name	17-09
Actinopterygii	
Batrachoidiformes	
<i>Opsanus</i> sp.- Toadfish	0.2645
Beryciformes	
<i>Holocentridae</i> - Soldierfish	0.2645
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	0.7934
Perciformes	
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	1.3224
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	0.2645
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	3.4382
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	5.0251
<i>Chaetodon</i> sp.- Butterflyfish	0.2645
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	5.8186
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	0.5290
<i>Halichoeres</i> sp.- Wrasse	4.2317
<i>Holacanthus</i> sp.- Angelfish	1.3224
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.7934
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	3.9672
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	7.4054
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.2645
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	11.9016
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.1738
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	0.7934
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	1.3224
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.2645
<i>Seriola</i> sp.- Amberjack	3.7027
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.5290
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	0.2645
<i>Serranus phoebe</i> Poey, 1851- Tattler	10.3147
<i>Xyrichtys</i> sp.- Razorfish	0.2645
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	22.7453
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.2645
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.5290
<i>Canthigaster</i> sp.- Puffer	5.2896
UNKNOWN	0.5290

Dive Site: South Carolina, Edisto MPA; 45 m; Target ED-3; ROV 17-10; UNCW 459; 26-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2016_Edisto_MPA
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/26/2017
Specimens:	0
Digital Photos:	88
No. DVD:	1
Hard Drive No.:	1

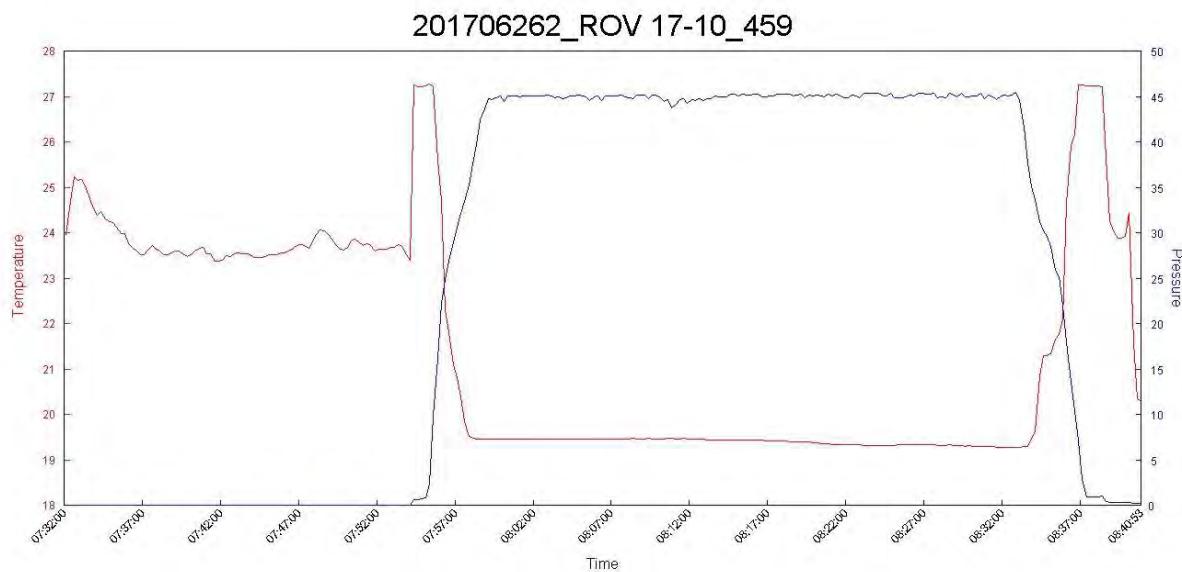
Dive Site: South Carolina, Edisto MPA; 45 m; Target ED-3; ROV 17-10; UNCW 459; 26-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	44.6	Total Transect Length (km):	0.411
Maximum Bottom Depth (m):	46.6	Surface Current (kn):	0.9
On Bottom (Time- EDST):	7:57	On Bottom (Lat/Long):	32.3917°N; -79.077°W
Off Bottom (Time- EDST):	8:31	Off Bottom (Lat/Long):	32.3926°N; -79.0733°W
Physical (bottom); Temp (°C):	20.4	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.3

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-10 are as follows: Depth Maximum: 45.4 m, Temperature: 19.3-20.4 °C

Dive Site: South Carolina, Edisto MPA; 45 m; Target ED-3; ROV 17-10; UNCW 459; 26-VI-17-2

Dive Imagery:



Figure 1: -46.5 m
Pearly razorfish (*Xyrichtys novacula*) on sand bottom habitat.



Figure 2: -46.2 m
Snake eel (Ophichthidae) burrowed into sand.



Figure 3: -46.1 m
SF- replace with image- screengrab 042.



Figure 4: -46.1 m
Starfish- *Astropecten articulatus*.



Figure 5: -46.1 m
Beaded sea cucumber- *Euapta lappa*.



Figure 6: -46.1 m
Portunid crab.

Dive Site: South Carolina, Edisto MPA; 45 m; Target ED-3; ROV 17-10; UNCW 459; 26-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 26-VI-17-2; ROV 17-10, UNCW Dive 459; South Carolina, Edisto MPA, Site Ed-3, 45 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization. No Transect images taken

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. MB shows 38 m depth, ROV 46 m.

Site Description/Habitat/Biota:

Depth range: 46.5 m

MB map (Pisces 2016, 5 m resolution) shows indistinct low relief hard bottom, max relief, 38 m on top, 41 to east. No previous dives.

07:52- Launch; cloudy/rain, air- 24.4, wind- 1 kn from 217 dg, seas calm, current- 0.9 kn to 339 dg, water- 24.91dg C, salinity- 36.61.

07:57- On bottom; depth- 46.5 m , visibility- 5 m, current- 0.3 kn from SE.

MB- near starting WP on top of mound. MB shows 38 m, ROV 46 m. 100% soft bottom, coarse sand/shell, sparse rubble, cyanobacteria on surface. Some bioturbation, some 10 cm to 2 m shallow pits. Heading NE to end WP, all on top of MB mound. *Luidia alternata*, *Goniaster tesselata*, *Astropecten*, *Melita quinquesperforata?*, portunid crab, *Eucidaris tribuloides*.

08:30- 46.5 m, 100% sand/shell bottom. MB- 7 m shallower than actual.

Dominant Benthic Macrobiota:

Astroidea- *Luidia alternata*, *Astropecten*, *Goniaster*

Echinoidea- *Eucidaris tribuloides*, *Melita quinquesperforata?*

Cyanobacteria

Dominant Fish:

Pearly razorfish, flounder, pipefish, snake eel, baby tatler.

Human Debris:

None

Dive Site: South Carolina, Edisto MPA; 45 m; Target ED-3; ROV 17-10; UNCW 459; 26-VI-17-2

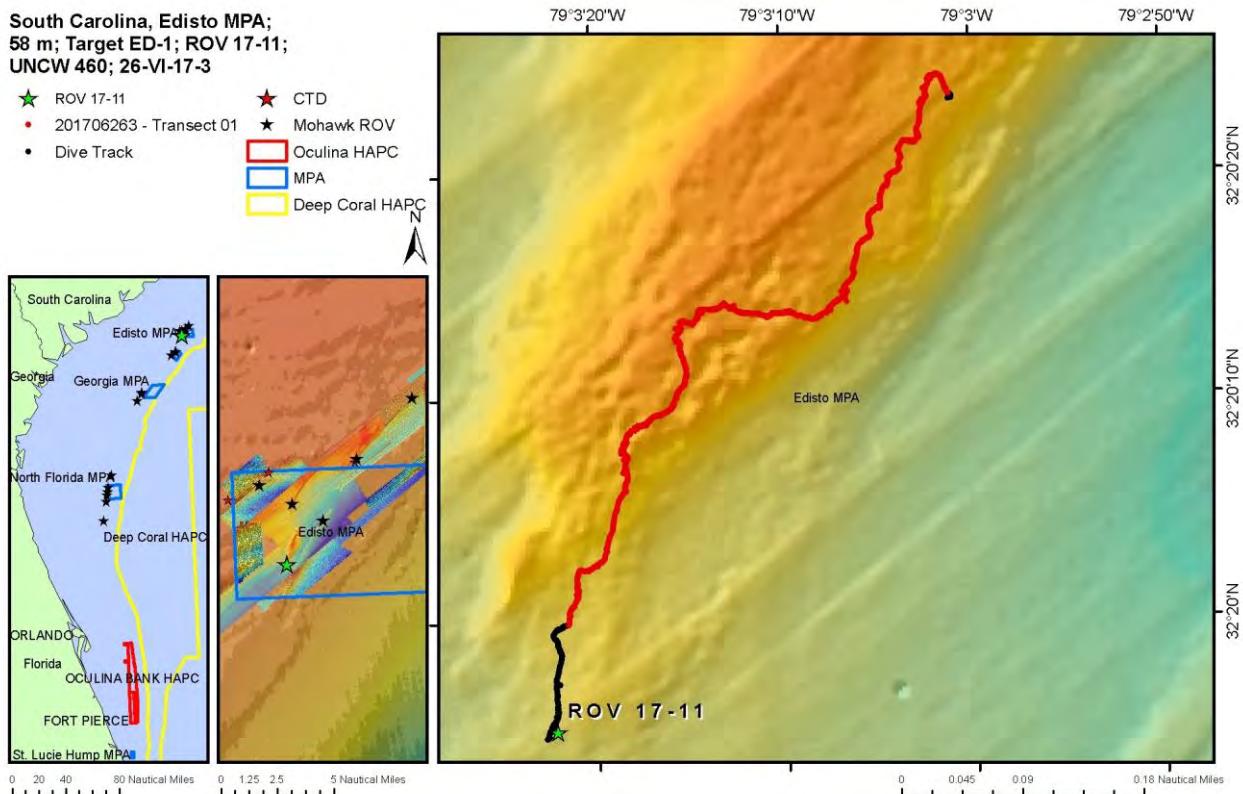
Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Presence of fauna recorded at dive site ROV 17-10.

Group/Phylum/Scientific Name - Authority	ROV 17-10 dive notes
Biota	X
Algae	X
Cyanobacteria	X
Arthropoda	X
Decapoda	X
Portunidae	X
Echinodermata	X
Asteroidea	X
<i>Astropecten</i> sp.	X
<i>Goniaster tessellatus</i> (Lamarck, 1816)	X
<i>Luidia alternata</i> (Say, 1825)	X
Echinoidea	X
<i>Eucidaris tribuloides</i> (Lamarck, 1816)	X
<i>Mellita quinquiesperforata</i> (Leske, 1778)	X
Mollusca	X
Gastropoda	X
<i>Murex</i> sp.	X
Cephalopoda	X
Octopus	X
Grand Total	

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship Pisces Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock345_5m_U TM17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/26/2017
Specimens:	0
Digital Photos:	332
No. DVD:	2
Hard Drive No.:	1

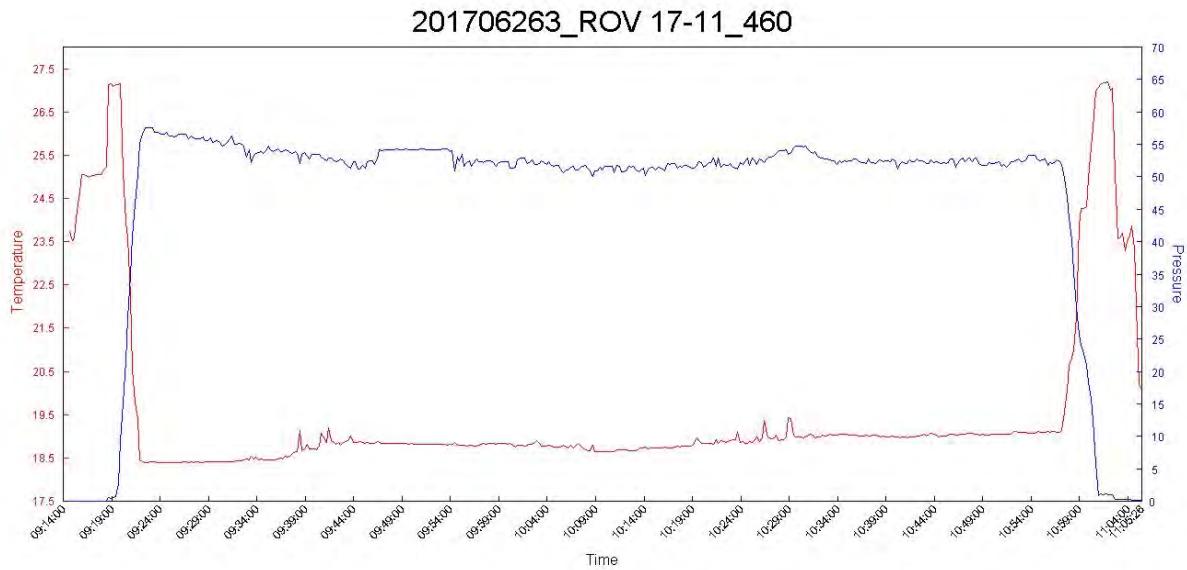
Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	50.7	Total Transect Length (km):	1.253
Maximum Bottom Depth (m):	59.4	Surface Current (kn):	0.1
On Bottom (Time- EDST):	9:20	On Bottom (Lat/Long):	32.3317°N; -79.0559°W
Off Bottom (Time- EDST):	10:55	Off Bottom (Lat/Long):	32.3394°N; -79.0501°W
Physical (bottom); Temp (°C):	24	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-11 are as follows: Depth Maximum: 57.6 m, Temperature: 18.4-24 °C

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

Dive Imagery:

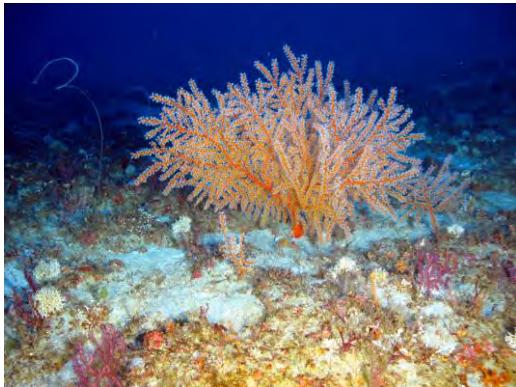


Figure 1: -57.3 m

Swiftia exserta gorgonian were common here.



Figure 2: -54.3 m

Grasby (*Cephalopholis cruentata*) hiding in hole.

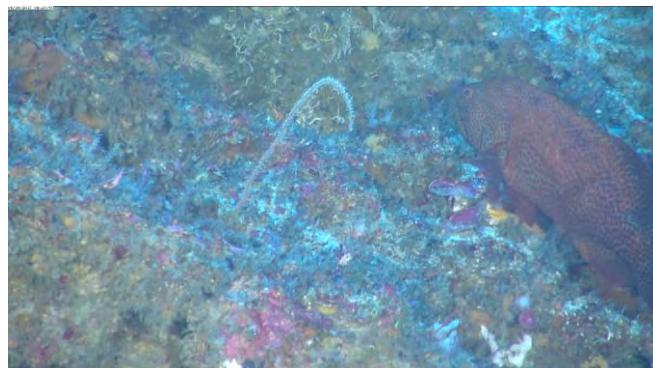


Figure 3: -55.1 m

Graysby (*Cephalopholis cruentata*).



Figure 4: -53.1 m

Fan shaped *Swiftia* grow perpendicular to prevailing current.



Figure 5: -53.6 m

Thorny oyster- *Spondylus*.



Figure 6: -52.5 m

Twospot cardinalfish (*Apogon pseudomaculatus*).

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 26-VI-17-3; ROV 17-11, UNCW Dive 460; South Carolina, Edisto MPA, Site Ed-1, 58 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 52-59 m

MB map (Sedberry OE Block 345, 5 m resolution) shows NE-SW oriented oval mound, 1.6 nmi long, top 51m, 56 east base. Transect along SE face of mound, heading NE; no previous dives.

09:16- Launch; cloudy/rain, air- 24.4, wind- 9 kn from 354 dg, seas calm, current- 0.1 kn to 316 dg, water- 24.73 dg C, salinity- 36.69.

09:20- On bottom; depth- 59 m , visibility- 5 m, current- 01 kn from N.

Landed 388 m south of target WP, off south tip of mound. Heading N. 80% hard bottom, flat pavement, few 25-50 cm ledges, sediment veneer. Biota- dense and diverse, *Stichopathes*, *Filograna*, *Shizoporella*, *Ellisella*, *Nicella* purple, 10-30 cm *Swiftia exserta* (common), *Diogorgia*, hydroids, Rhodophyta- thin blade EB, DMST demosponge. *Ellisella elongata* white whip, *Ircinia campana*, lionfish, beer can, CCA, *Callyspongia vaginalis*, *Antipathes atlantica*, Didemnidae, *Tanacetipathes*. 1m relief- red snapper, dense fish.

09:42- 53 m, at start WP1, top SE edge of mound, rock pavement, low rugosity, with areas of 1-2 m relief, 50-cm to 1 m ledges with eroded faces, high rugosity and fish; mostly low relief pavement. Biota- dense cover of encrusting algae, sponges, CCA, Peyssonnelia, encrusting orange sponges, hydroids, *Ellisella* whips, Didemnidae, lionfish, *Antipathes furcata*, *Swiftia exserta*, beer can, Rhodophyta thin blade, *Filograna*, *Stichopathes*, *Cinachyrella*, *Spondylus*, *Ircinia campana*.

10:05- 52 m, top of mound, flat low relief pavement, dense cover of small biota, mostly Rhodophyta thin blade, Didemnidae, *Filograna*. Head east back to eastern drop off. Muricea, Geodia.

10:18- 52 m, top edge of eastern drop off, rock pavement, 1 m relief ledges, *Aplysina* fingers.

10:23- 53.3 m, MB- on face of east slope. Actual low slope (5 dg), rock pavement, few low relief ledges, mostly pavement, low rugosity. Head NE along face of slope to end WP. Biota- dense small biota- same, Rhodophyta, Didemnidae, *Filograna*, *Stichopathes*, *Diogorgia*, DMST sponge, *I. campana*, few fish, 55.5 m- MB near base of slope.

10:32- 53.7 m, MB- at WP 2, upper east edge of slope. 90% flat rock pavement, low relief, low rugosity, low relief ledges. Same biota. Head NE along east edge to WP 3. Small orange Plexaurids, *Swiftia exserta*, bushy *Tanacetipathes*, *Titanideum*.

10:55- 53 m, end of dive. Squall, 28 kn winds.

Dominant Benthic Macrobiota:

Scleractinia coral- none

Antipatharia-*Stichopathes*, *Antipathes atlantica*, *Tanacetipathes*

Gorgonacea- *Diogorgia*, *Ellisella* whips, *Titanideum frauenfeldii*, *Swiftia exserta* (common), *Ellisella*

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

elongata, 5 cm orange plexaurids, *Muricea*

Porifera- *Ircinia campana*, Spirastrellidae, *Callyspongia vaginalis*, DMST sponge, *Cinachyrella*, *Aplysina fingers*

Asciidiacea- Didemnidae

Hydroida

Mollusca- *Spondylus*

Algae- CCA, Rhodophyta thin blade erect branching (abundant)

Dominant Fish:

Lionfish- 31

Graysby- 5, gag-1, scamp- 1, bigeye, reef butterfly, squirrelfish, spotfin hog, tomtate, amberjack, yellowtail reef fish, sharpnose puffer, tattler, blue angel, bank butterfly, flying gurnard

Human Debris:

Beer cans.

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

CPCe Percent Cover Analysis:

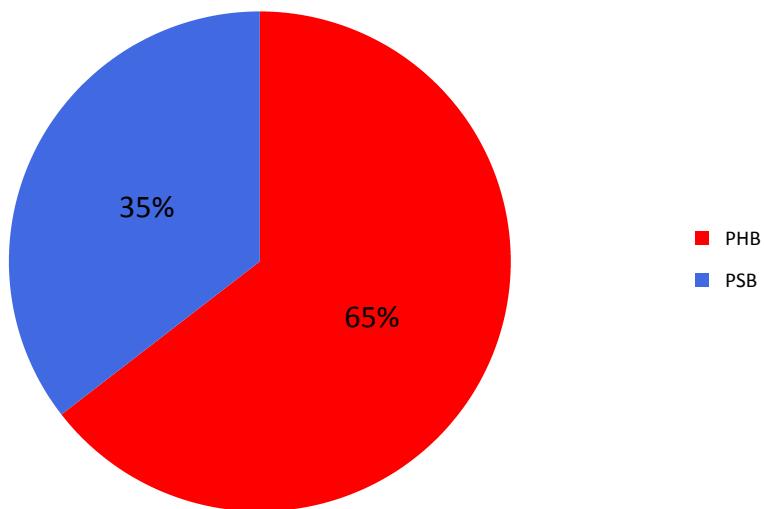
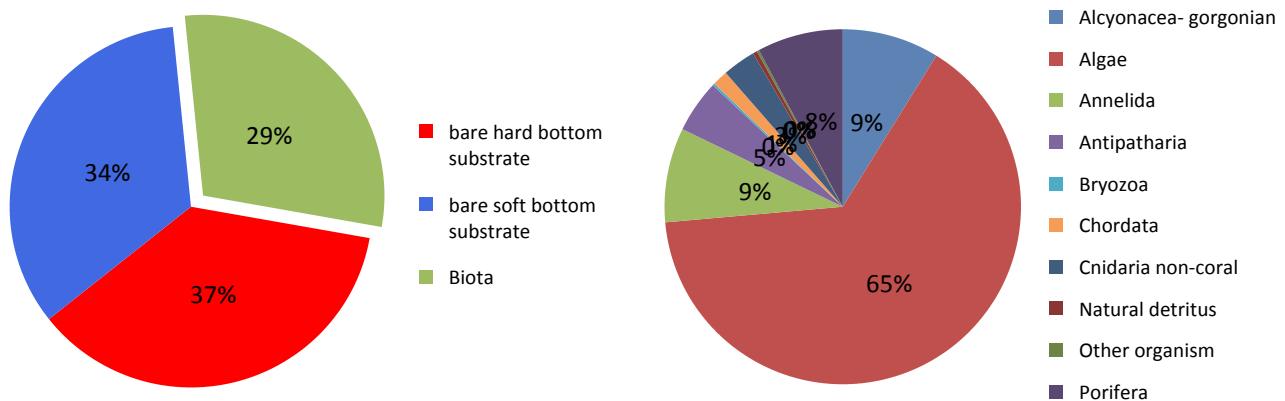


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-11. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-11.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-11.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-11 dive notes
Biota	29.38%	X
Algae	19.04%	X
Cyanobacteria	1.53%	
Ochrophyta	0.88%	
Rhodophyta	16.63%	X
Corallinales	7.81%	X
<i>Peyssonnelia</i> sp.		X
Rhodophyta	8.81%	X
Porifera	2.29%	X
Demospongiae	2.29%	X
<i>Aplysina</i> sp.		X
<i>Callyspongia vaginalis</i> (Lamarck, 1814)		X
<i>Cinachyrella</i> sp.		X
Demospongiae- orange encrusting porous		X
Demospongiae- tan starlet thick encrusting	0.29%	X
Demospongiae unid. sp.	1.65%	
<i>Erylus</i> sp.	0.06%	
<i>Geodia</i> sp.		X
<i>Ircinia campana</i> (Lamarck, 1814)		X
<i>Ircinia</i> sp.	0.06%	X
<i>Niphates</i> sp.	0.06%	
<i>Placospongia</i> sp.	0.12%	
<i>Spongisorites siliquaria</i> van Soest & Stentoft, 1988		X
<i>Xestospongia</i> sp.	0.06%	
Cnidaria	4.88%	X
Alcyonacea - gorgonian	2.59%	X
Alcyonacea- gorgonian	0.12%	
Diodogorgia sp.	0.88%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.	1.00%	X
Ellisellidae	0.24%	
<i>Muricea</i> sp.	0.12%	X
<i>Nicella</i> sp.	0.24%	X

Plexauridae		X
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Antipatharia	1.41%	X
<i>Antipathes atlantica</i> Gray, 1857	0.18%	X
<i>Antipathes furcata</i> Gray, 1857		X
<i>Stichopathes lutkeni</i> Brook, 1889	0.53%	X
<i>Tanacetipathes</i> sp.	0.71%	X
Hydrozoa	0.88%	X
Hydroidolina	0.88%	X
Annelida	2.53%	X
Annelida	0.12%	
Polychaeta	2.41%	X
<i>Filograna</i> sp.	2.41%	X
Arthropoda		X
Decapoda		X
Anomura		X
Bryozoa	0.06%	X
Bryozoa	0.06%	X
<i>Schizoporella</i> sp.	0.06%	X
Mollusca		X
Bivalvia		X
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	0.12%	X
Tunicata	0.12%	X
Asciidiacea	0.06%	
Didemnidae	0.06%	X
Chordata - Vertebrate	0.29%	
Chordata	0.29%	
Actinopterygii	0.29%	
Non-Fauna	0.12%	
Detritus	0.12%	
Natural Detritus	0.12%	
UNKNOWN	0.06%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- other		X
Bare Substrate	70.62%	
Non-Fauna	70.62%	
Habitat	70.62%	
Bare coral rubble	0.29%	

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

Bare rock, pavement, boulder, ledge	32.43%
Bare rubble/cobble	3.82%
Bare soft bottom	34.08%
Grand Total	100.00%

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-11.

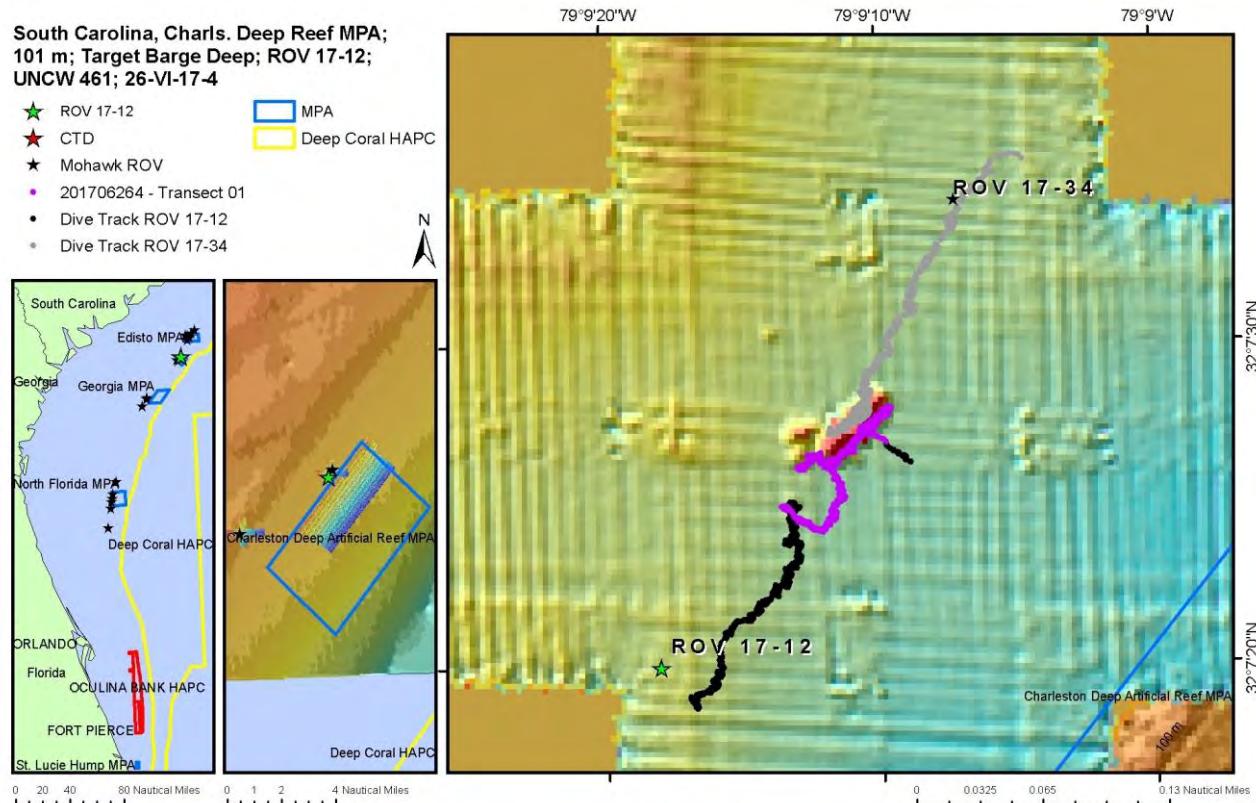
Class/Scientific Name- Common Name	17-11
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.2937
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1468
Ophichthidae- Snake Eel	0.1468
Beryciformes	
Holocentridae- Squirrelfish	0.1468
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	7.4890
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	1.0279
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.2937
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	5.1395
<i>Calamus</i> sp.- Porgy	0.8811
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.4405
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.7342
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	1.6153
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	16.0059
<i>Chromis enchraysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	13.5095
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	12.9222
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.7900
<i>Chromis</i> sp.- Damselfish	35.2423
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	26.4317
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.8811
<i>Halichoeres cyancephalus</i> (Bloch, 1791)- Yellowcheek Wrasse	0.4405
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.8811
<i>Halichoeres</i> sp.- Wrasse	27.9001
<i>Holacanthus</i> sp.- Angelfish	3.3774
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.1468
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.4405
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1468
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	1.1747
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	1.0279
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	0.1468
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	1.3216
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	3.0837
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	1.1747
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.1468
<i>Schultzea beta</i> (Hildebrand, 1940)- School Bass	2.2026

Dive Site: South Carolina, Edisto MPA; 58 m; Target ED-1; ROV 17-11; UNCW 460; 26-VI-17-3

<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.2937
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.5874
<i>Seriola</i> sp.- Amberjack	0.2937
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	2.7900
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	2.9369
<i>Serranus phoebe</i> Poey, 1851- Tattler	5.1395
<i>Serranus</i> sp.- Sea Bass	0.1468
<i>Serranus tigrinus</i> (Bloch, 1790)- Harlequin Bass	0.1468
<i>Serranus tortugarum</i> Longley, 1935- Chalk Bass	0.4405
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	1.1747
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.2937
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.1468
Scorpaeniformes	
<i>Dactylopterus volitans</i> (Linnaeus, 1758)- Flying Gurnard	0.1468
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	5.1395
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.5874
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.5874
<i>Canthigaster</i> sp.- Puffer	6.3142
UNKNOWN	1.0279

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_Barge1
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/26/2017
Specimens:	0
Digital Photos:	166
No. DVD:	
Hard Drive No.:	

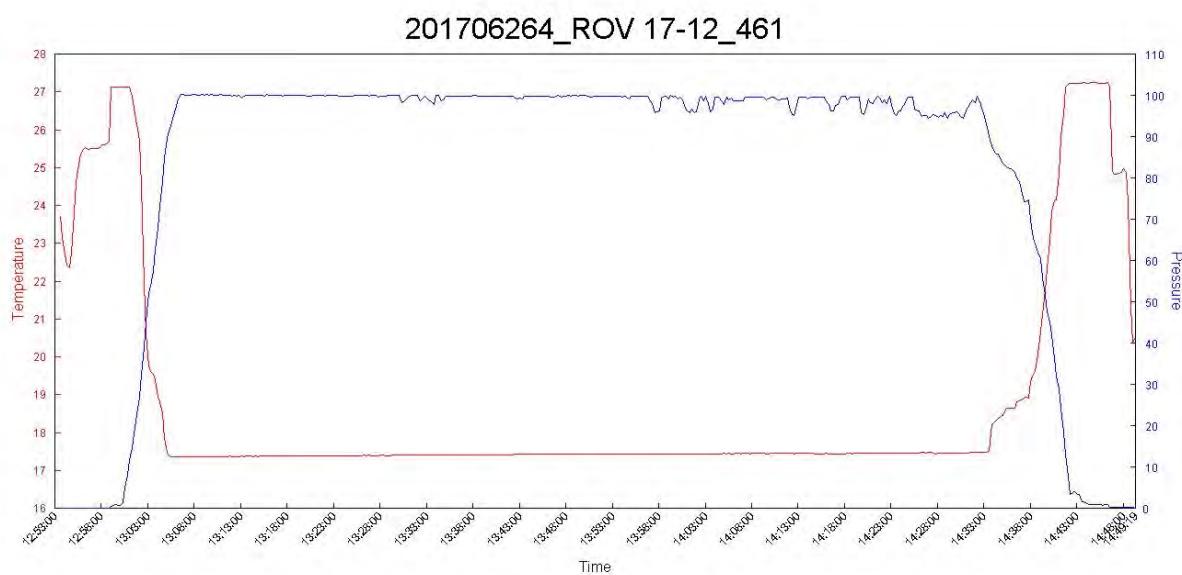
Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	94.1	Total Transect Length (km):	0.566
Maximum Bottom Depth (m):	101	Surface Current (kn):	0.8
On Bottom (Time- EDST):	13:04	On Bottom (Lat/Long):	32.1222°N; -79.1549°W
Off Bottom (Time- EDST):	14:30	Off Bottom (Lat/Long):	32.1245°N; -79.1526°W
Physical (bottom); Temp (°C):	17.9	Salinity:	N/A
		Visibility (m):	3
		Current (kn):	0.75

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-12 are as follows: Depth Maximum: 100.2 m, Temperature: 17.4-17.9 °C

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Dive Imagery:



Figure 1: -101.2 m
Juvenile blackline tilefish (*Caulolatilus cyanops*).



Figure 2: -101.2 m
Unidentified starfish.



Figure 3: -100.8 m
Warsaw grouper (*Hyporthodus nigritus*) on deep barge artificial reef sunk in 2014.



Figure 4: -99.1 m
Barge debris.



Figure 5: -100.8 m
Anthiids (Anthiadinae) in detritus at base of barge.



Figure 6: -100.7 m
Small snowy grouper (*Hyporthodus niveatus*). Barge sides covered with bivalves.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 26-VI-17-4; ROV 17-12, UNCW Dive 461; South Carolina, Barge Deep MPA, 101 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization. No XS images taken

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. ROV position was shifted 43 m north of MB position. Took position at SE and NE corners of the barge. But the barge clearly had not shifted in position, same relative position to debris field and orientation was the same as last year. Appears that the shifts GPS offset relative to ROV is off.

Site Description/Habitat/Biota:

Depth range: 100.5- 102 m

MB map (Nancy Foster 14-08 Barge, 1 m resolution) shows barge laying NE-SW, 81 m long, with pile of debris (cargo containers) off SW end. Sunk in 2014. Previously surveyed 2014 and 2016.

12:57- Launch; cloudy/rain, air- 24.73, wind- 11 kn from 35 dg, seas calm, current- 0.8 kn to 146 dg, water- 24.73 dg C, salinity- 36.76.

13:04- On bottom; depth- 102 m , visibility- 3 to 10 m, current- 0.75 from NW.

On bottom 230 m SW of barge. 100% soft bottom, sand, shell. *Luidia alternata*, *Calappa*, hermit crab in auger shell, 2 juvenile blue tilefish? (5 cm), unid. starfish *Asterias*?, Pennatulacea, spider crab. MB shows 1-2 m object, 15 m long, 25 m SW of debris field- nothing there, 101 m.

13:27- 101 m, piece of metal girder debris. MB- object is 7 m SW of debris field of MB. Warsaw grouper. Radio mast on bottom. *Sargassum* detritus piled around base. Face of metal sheet is dense oyster shells.

13:37- 101 m, in debris field. Metal- *Stichopathes*, oysters, few amberjack, few snowy, patch of small anemones, few lionfish, vertical surface with 100% cover of oysters.

13:53- 100.6 m, ROV at SW corner of barge- navigation shows ROV 43 m (005 dg) N of the position in the MB. South face of barge oriented NE (MB shows barge oriented NE-SW). Vertical surface has 100% cover oysters. Few big fish here. Few snowy, amberjack common, anthiids.

14:04- In debris field, tracking shows us 30+ m NE of the debris field. Debris field is in same position (off SW tip) of barge as before, so not likely moved since 2016. Yellow edge grouper, cubbyu.

14:09- transect along vertical surface of the east side of the barge. Main deck 96 m.

14:22- 100.5 m, at NE corner of bow of barge. In MB we are offset 42 m N.

14:30- end of dive.

Dominant Benthic Macrobiota:

Antipatharia- *Stichopathes*

Actiniaria- small anemones

Pennatulacea

Mollusca- *Ostreidae* (dense on barge)

Asteroid- *Luidia alternata*, *Asterias*

Decapoda- spider crab, *Calappa*, hermit crabs

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Dominant Fish:

Blueline tilefish- 4, lionfish- 5, scamp- 4, snowy grouper- 17, warsaw-1, yellow edge- 1, red barbier (abundant), cubbyu.

Human Debris:

Few fishing lines.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

CPCe Percent Cover Analysis:

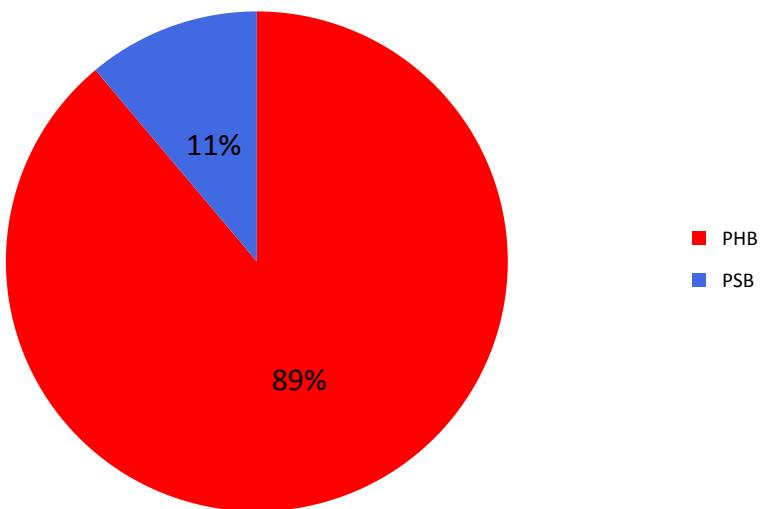


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-12. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

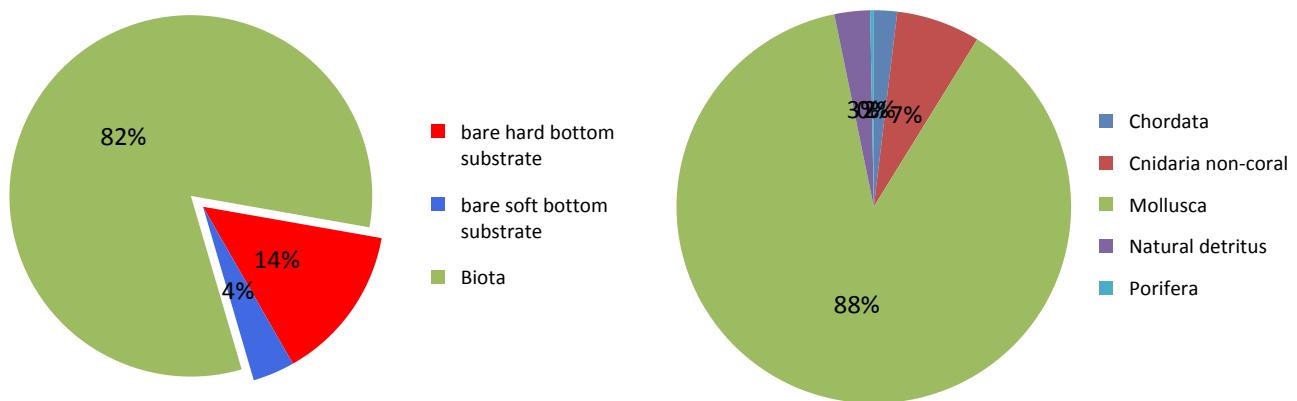


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-12.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site 17-12.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	82.29%	X
Algae		X
Ochrophyta		X
<i>Sargassum</i> sp.		X
Porifera	0.24%	
Demospongiae	0.24%	
<i>Demospongiae unid.</i> sp.	0.24%	
Cnidaria	5.66%	X
Anthozoa - Non Coral	2.41%	X
Pennatulacea		X
Zoanthidae	2.41%	
Hydrozoa	3.25%	
Hydroidolina	3.25%	
Arthropoda		X
Decapoda		X
Anomura		X
<i>Calappa flammea</i> (Herbst, 1794)		X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)		X
Echinodermata		X
Asteroidea		X
<i>Asterias</i> sp.		X
Asteroidea		X
<i>Luidia alternata</i> (Say, 1825)		X
Mollusca	72.41%	
Bivalvia	72.41%	
Chordata - Vertebrate	1.57%	
Chordata	1.57%	
Actinopterygii	1.57%	
Non-Fauna	2.41%	
Detritus	2.41%	
Natural Detritus	2.41%	
Human Debris		X
Non-Fauna		X
Human debris		X

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

Human debris- other	X
Bare Substrate	17.71%
Non-Fauna	17.71%
Habitat	17.71%
Bare rubble/cobble	4.82%
Bare soft bottom	3.73%
Artificial Reef/Wreck	9.16%
Grand Total	100.00%

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 101 m; Target Barge Deep; ROV 17-12; UNCW 461; 26-VI-17-4

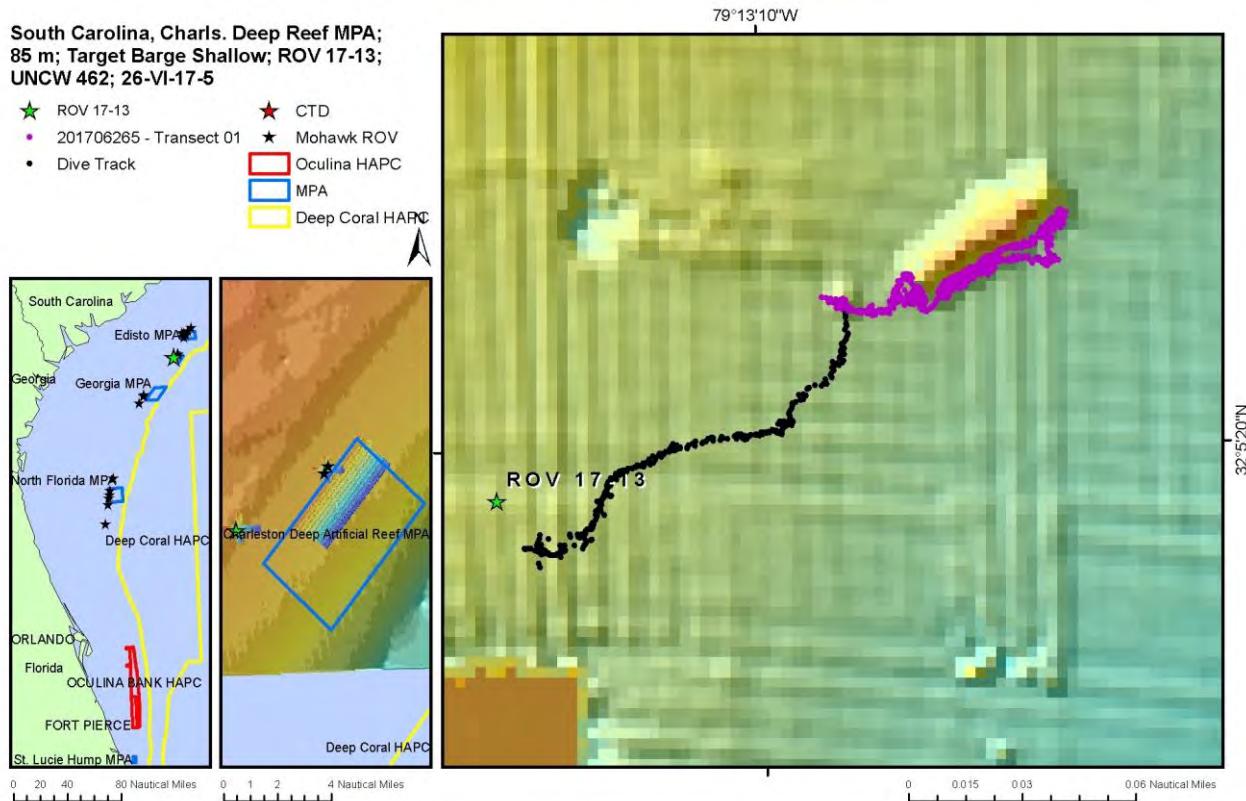
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-12.

Class/Scientific Name- Common Name	17-12
Actinopterygii	
Perciformes	
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	4
<i>Hyporthodus flavolimbatus</i> (Poey, 1865)- Yellowedge Grouper	2
<i>Lutjanus</i> sp.- Snapper	1
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	7
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	1
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	18
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	2
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	3
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	8
<i>Seriola</i> sp.- Amberjack	3
<i>Centropristes ocyurus</i> (Jordan & Evermann, 1887)- Bank Sea Bass	1
<i>Caulolatilus cyanops</i> Poey, 1866- Blackline Tilefish	4
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper-Adult	9
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper-Juvenile	8
Anthiinae- Anthiids	all over barge
<i>Hyporthodus nigritus</i> (Holbrook, 1855)- Warsaw Grouper	1
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	5
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	1

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_Barge2
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/26/2017
Specimens:	0
Digital Photos:	191
No. DVD:	1
Hard Drive No.:	1

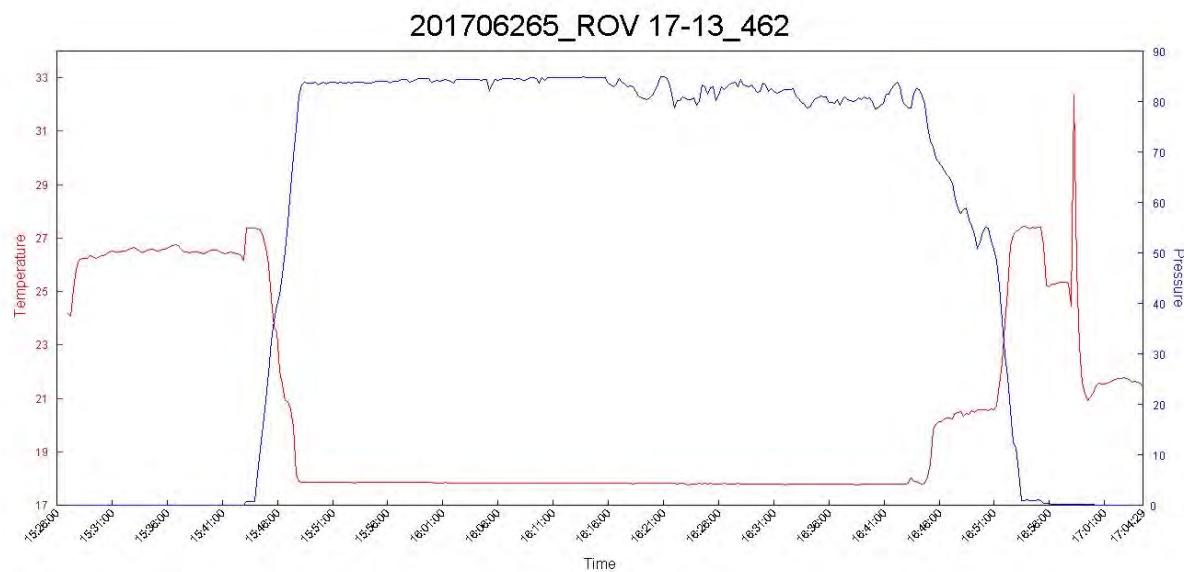
Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Dive Data:

Minimum Bottom Depth (m):	85	Total Transect Length (km):	0.451
Maximum Bottom Depth (m):	87	Surface Current (kn):	0.5
On Bottom (Time- EDST):	15:46	On Bottom (Lat/Long):	32.0886°N; -79.2208°W
Off Bottom (Time- EDST):	16:41	Off Bottom (Lat/Long):	32.0896°N; -79.2183°W
Physical (bottom); Temp (°C):	21.5	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-13 are as follows: Depth Maximum: 84.9 m, Temperature: 17.7-21.5 °C

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Dive Imagery:



Figure 1: -79.7 m
80 m barge artificial reef.



Figure 2: -80.3 m
80 m barge has less benthic macrobiota growth compared to 100 m barge.



Figure 3: -81.2 m
Upper deck of barge.



Figure 4: -81.8 m
Deck of barge with scamp grouper (*Mycteroperca phenax*).



Figure 5: -81 m
Upper deck of barge. Sea urchins- *Arbacia punctulata*.



Figure 6: -80.7 m
Upper deck of barge.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 26-VI-17-5; ROV 17-13, UNCW Dive 462; South Carolina, Barge Shallow MPA, 85 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization. No transect images taken.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. In previous dive it appeared that the shipfts GPS offset relative to ROV was off. Reset to zero offset for this dive. Found 3 different offsets during dive- first debris field, 20 to N; barge SW corner, 15 m to west; SE corner, 7 m to W. Shipfts relative postion to ROV remained same throughout dive (heading NNE).

Site Description/Habitat/Biota:

Depth range: 85- 87 m

MB map (Nancy Foster 14-08 Barge, 1 m resolution) shows 77 m long barge, oriented NE-SW, debris field of cargo containers off SW. 70 nmi offshore. ROV position now appears to be offset 20 m to north of MB position. Base 85 m, main deck 80 m.

15:41- Launch; cloudy/rain, air- 26.6, wind- 8 kn from 23 dg, seas- 1-2 ft, current- 0.5 kn to 161 dg, water- 24.99 dg C, salinity- 36.69.

15:46- On bottom; depth- 85.5 m , visibility- 5 m, current- 0.25 from N.

On bottom, 250 m SW of barge. 100% soft bottom, coarse sand, shell hash. *Stichopathes*, *Eucidaris tribuloides*, hermit crab, 30 cm *Tethyaster grandis*.

16:00- 85.4 m. Arrive at debris field, cargo container. ROV position appears 20 m north of MB position. Oysters on barge. One scamp. On second container. *Arbacia punctulata*.

16:08- 85.7 m, On SW corner of barge, ROV offset is 15 m W of MB position. 80% cover of oysters, *Arbacia punctulata*, few scamp, few lionfish, few amberjack.

16:28- 87 m, SE corner of barge, ROV position is offset 7 m to west. Very little biota on horizontal surfaces, no sponges, no black coral, no gorgonians, no anemones. Very little fishing line.

16:41- end dive.

Dominant Benthic Macrobiota:

Antipatharia- *Stichopathes*

Mollusca- Ostreidae (dense on vertical surface of barge)

Echinoid- *Eucidaris tribuloides*, *Arbacia punctulata*

Astroideida- *Tethyaster grandis*

Decapoda- hermit crabs

Dominant Fish:

Blueline tilefish- 4, lionfish- 47, scamp- 13, snowy grouper- 2, gag- 3, red barbier, cubbyu, amberjack.

Human Debris: Few fishing lines.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

CPCe Percent Cover Analysis:

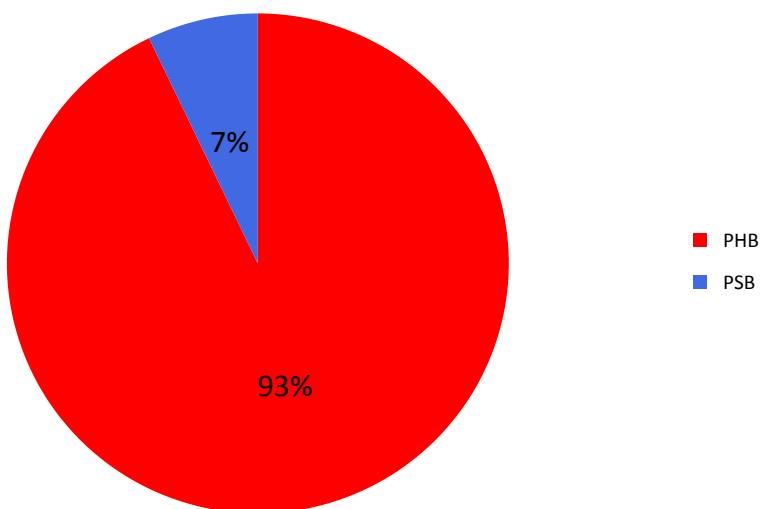
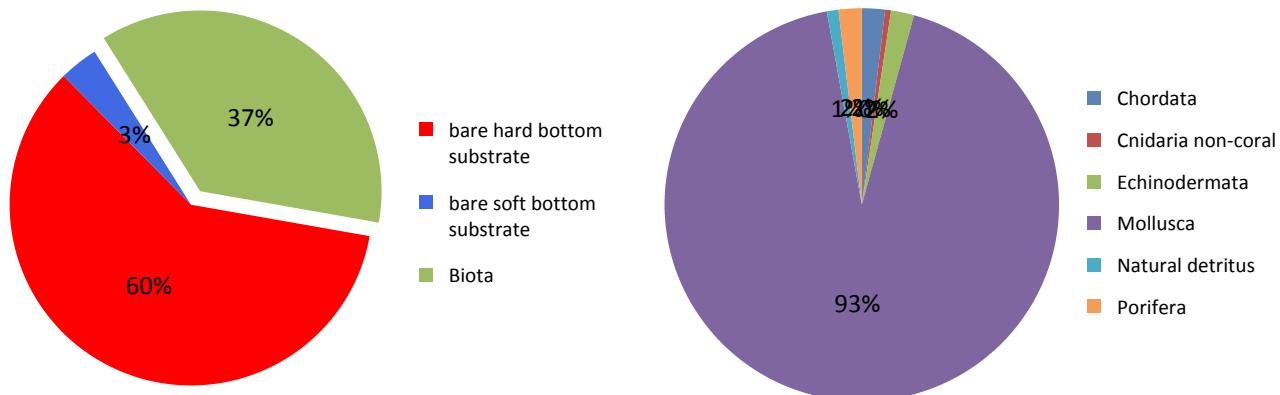


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-13. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-13.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-13.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-13 dive notes
Biota	36.70%	X
Porifera	0.70%	X
Demospongiae	0.70%	X
<i>Demospongiae unid. sp.</i>	0.70%	X
Cnidaria	0.17%	X
Anthozoa - Non Coral	0.17%	
Zoanthidae	0.17%	
Antipatharia		X
<i>Stichopathes lutkeni</i> Brook, 1889		X
Arthropoda		X
Decapoda		X
Anomura		X
Decapoda		X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)		X
Echinodermata	0.70%	X
Asteroidea		X
<i>Tethyaster grandis</i> (Verrill, 1899)		X
Echinoidea	0.70%	X
<i>Arbacia punctulata</i> (Lamarck, 1816)	0.70%	
<i>Arbacia</i> sp.		X
Cidaroida		X
<i>Eucidaris tribuloides</i> (Lamarck, 1816)		X
Mollusca	34.09%	X
Bivalvia	34.09%	X
Chordata - Vertebrate	0.70%	
Chordata	0.70%	
Actinopterygii	0.70%	
Non-Fauna	0.35%	
Detritus	0.35%	
Natural Detritus	0.35%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- other		X

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

Bare Substrate	63.30%
Non-Fauna	63.30%
Habitat	63.30%
Bare rubble/cobble	3.65%
Bare soft bottom	3.48%
Artificial Reef/Wreck	56.17%
Grand Total	100.00%

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 85 m; Target Barge Shallow; ROV 17-13; UNCW 462; 26-VI-17-5

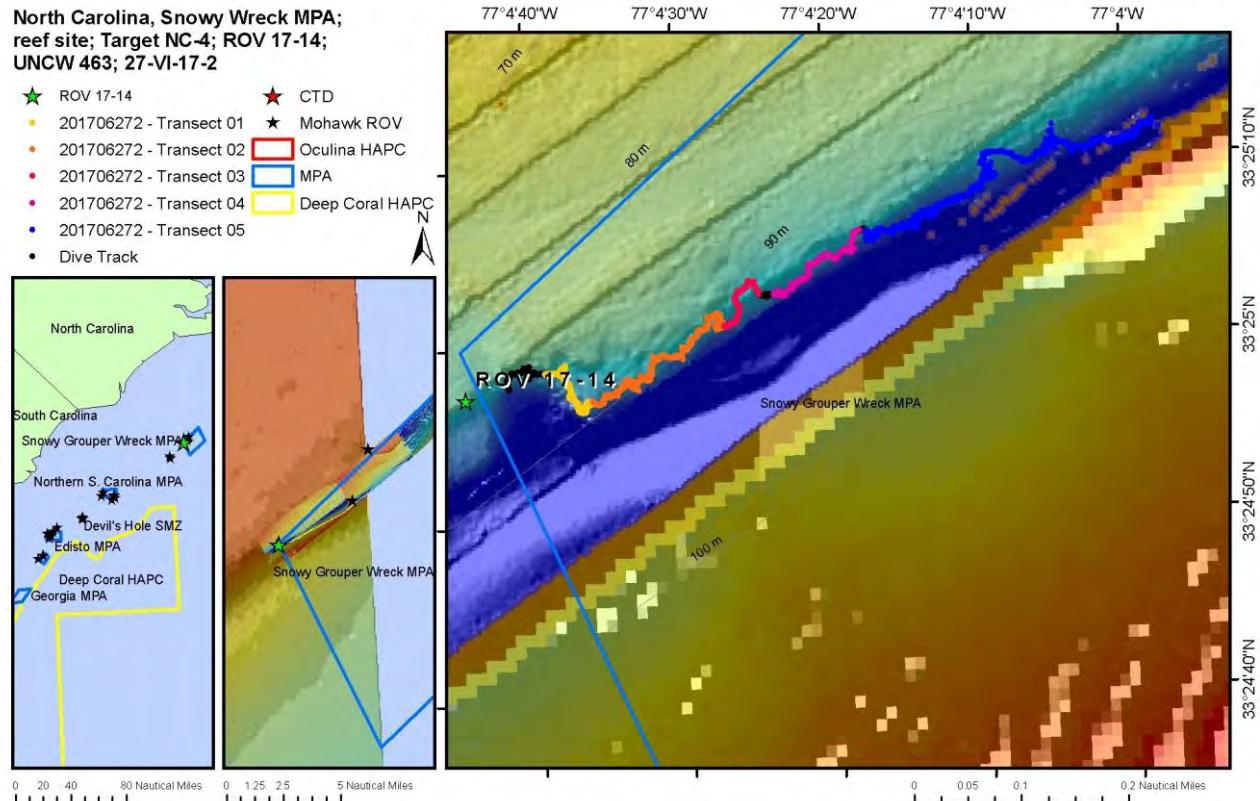
Density of Fish:

Table 2. Count of fish from video transects at dive site ROV 17-13.

Class/Scientific Name- Common Name	17-13
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	1
Perciformes	
<i>Anthiinae</i> - Anthiid	177
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	3
<i>Halichoeres</i> sp.- Wrasse	17
<i>Hemanthias vivanus</i> (Jordan & Swain, 1885)- Red Barbier	40
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	2
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	3
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	7
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	3
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	1
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	3
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	4
<i>Seriola</i> sp.- Amberjack	2
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	3
<i>Centropristes oxyurus</i> (Jordan & Evermann, 1887)- Bank Sea Bass	7
<i>Caulolatilus cyanops</i> Poey, 1866- Blackline Tilefish	4
<i>Holacanthus bermudensis</i> Goode, 1876- Blue Angelfish	3
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper-Adult	1
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper-Juvenile	1
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	42
UNKNOWN	4

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2012_SnowyWreckMP A_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/27/2017
Specimens:	0
Digital Photos:	232
No. DVD:	2
Hard Drive No.:	1

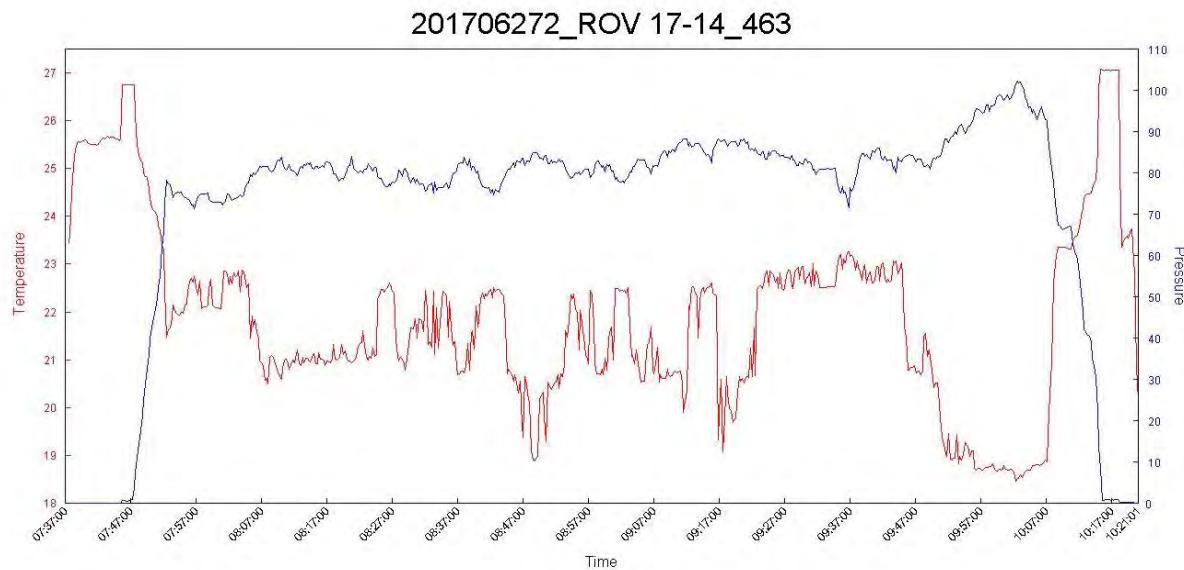
Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	72.1	Total Transect Length (km):	1.429
Maximum Bottom Depth (m):	103.3	Surface Current (kn):	0.8
On Bottom (Time- EDST):	7:50	On Bottom (Lat/Long):	33.4049°N; -77.0784°W
Off Bottom (Time- EDST):	10:03	Off Bottom (Lat/Long):	33.4195°N; -77.0659°W
Physical (bottom); Temp (°C):	24	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-14 are as follows: Depth Maximum: 102.1 m, Temperature: 18.5-24 °C

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Dive Imagery:



Figure 1: -74.8 m

223 lionfish were counted at this site.



Figure 2: -76.3 m

Live *Oculina varicosa* (possibly Madracis?- need specimen to verify) were common from 75- 103 m depths.



Figure 3: -82.6 m

Various gorgonians and whip black corals are common on the rock slope. Juvenile blackfin snapper (*Lutjanus buccanella*) and lionfish.



Figure 4: -79.8 m

Scamp grouper (*Mycteroperca phenax*) were common- 57 counted.



Figure 5: -79.4 m

School of amberjack (*Seriola* sp.).



Figure 6: -77.6 m

Scamp grouper (*Mycteroperca phenax*).

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 27-VI-17-2; ROV 17-14, UNCW Dive 463; North Carolina, NC Snowy Wreck MPA, reef site NC-4, 76 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. MB- show ROV at top edge of wall, MB shows 84, ROV at 74.

Site Description/Habitat/Biota:

Depth range: 75- 103 m

MB map (Pisces 2012 Snowy Wreck MPA, 5 m resolution) ENE-WSW oriented ridge, facing southeast; top 77 m, base 115 m. Transect along face of ridge slope. Previous dives- 2014 and 2012.

07:44- Launch; sunny, air- 25.9, wind- 8 kn from 8 dg, seas- 1 ft, current- 0.8 kn to 34 dg, water- 24.37 dg C, salinity- 35.461.

07:57- On bottom; depth- 80 m , visibility- 5- 10 m, current- 0.1 from SE.

Large boulder, rock pavement, sediment veneer. MB- near start WP, top of ridge in cove-like feature. 75 m- sediment and flat pavement, 1 m ledge, 15 cm *Oculina varicosa*, thin encrusting orange, yellow demosponges, *Stichopathes*, hydroids, 10 cm plexaurid gorgonians, *Filograna*, lionfish. MB- show ROV at top edge of wall, MB shows 84, ROV at 74. Series of 1 m ledges along top edge, sediment in between. Biota- low density, amberjack, red snapper, grouper, *Tanacetipathes*, *Agelas clathrodes*, several spp of 5 cm gorgonians, 1-2 stairstep escarpments, eroded rock, then low slope sand and pavement.

08:07- heading along east edge of cove, near SE corner, 84 m. 1-2 m ledges, rugged, boulders 50 cm. Biota- hydroids, *Stichopathes*, encrusting sponges, lots lionfish.

08:13- 83 m, MB- lower face of escarpment, heading NE along ridge. Low to moderate slope- 10- 30 dg, rock pavement, boulders ½ - 1 m, sediment, low rugosity. Biota- sargassum detritus, fishing line, *Peyssonnelia*.

08:24- 80 m, 5 dg pavement, sediment. Fishing line, black stinging hydroid. Change heading to upper slope.

08:41- 77 m, MB- top of ridge slope, flat sand, pavement, no ledges. Head back down slope.

08:43- 83 m, lower slope; heading NE. Rock pavement ½ to 1 m boulders, hard bottom, 10-20 dg slope, low relief, low rugosity. Biota- *Antipathes atlantica*, 10 cm orange gorgonians, holothurian.

09:00- 80 m, lower slope, same habitat. Change heading to deeper.

09:03- 84 m, low relief rock boulders, overall slope 10-30 dg, pavement, sediment, low rugosity; some 45 dg escarpment, rock boulders, higher rugosity. Biota- 15 cm *Oculina* with fishing line, orange and red plexaurids, *Filograna*, bryozoa bushy grey ball.

09:11- 89 m, boulders, 45 dg escarpments, high rugosity. MB depth 97 m (off 10 m); dark blue base of slope in MB. 30-45 dg escarpments, rugged rock, ½ - 1 m boulders, high rugosity. Same biota, fishing line, 20 cm *Oculina*, 30 cm *Oculina* on vertical face of boulders.

09:30- 82 m, lower slope, rock pavement, low relief.

09:33- 78 m, upper slope, head to second WP. Sand and patches of low relief pavement, low rugosity, 0-10 dg slope.

09:37- 85 m, lower slope.

09:50- 92 m, lower slope, 30-45 dg escarpments, ½ - 1 m boulders, rugose areas, interspersed with sand and

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463;
27-VI-17-2

pavement. Biota- *Swiftia exserta*, *Stichopathes*, orange plexaurids, purple *Nicella*, *A. atlantica*. 95- 97 m - rugged escarpments, vertical rock, eroded rock. Biota- 3 *Oculina* 15 cm, fishing line, *Oculina*- 6. 103 m- rugged, eroded, 60 dg slope, boulders, high rugosity. Biota- *Oculina*- 5 (not counting all), 3. 95 m- same habitat.

10:04- pulled off bottom, end dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa* (white, common 75-103 m)- 25+ (not all counted)

Gorgonacea- 10 cm yellow and orange plexaurid (abundant), several species of gorgonian, *Swiftia exserta*- 1, purple *Nicella*

Antipatharia- *Stichopathes*, *Antipathes atlantica*

Hydroida

Porifera- encrusting yellow and orange demosponges, *Agelas clathrodes*- 1

Bryozoa- bushy grey

Annelida- *Filograna*

Algae- *Peyssonnelia* (uncommon)

Dominant Fish:

Lionfish- 223

Scamp- 57, red snapper- 5, graysby- 3, soapfish, bank butterfly, tattler, reef butterfly, roughtongue bass, spotfin hog, blackfin snapper, amberjack (abundant), blue angel

Human Debris:

Several fishing lines.

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

CPCe Percent Cover Analysis:

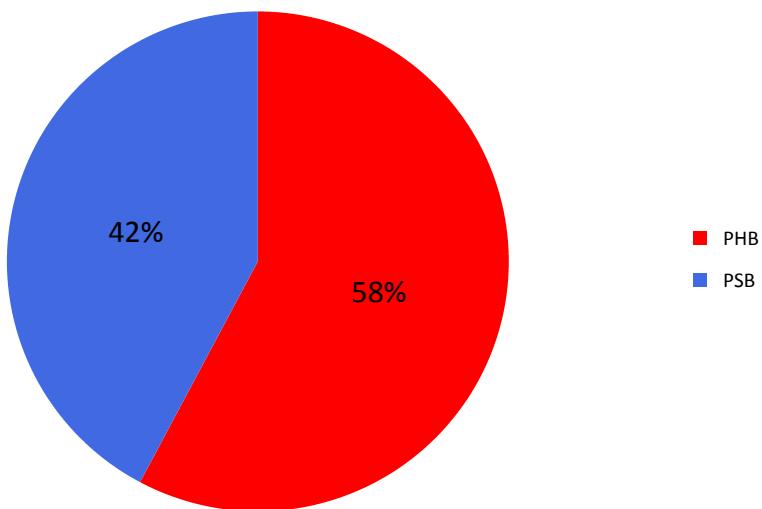
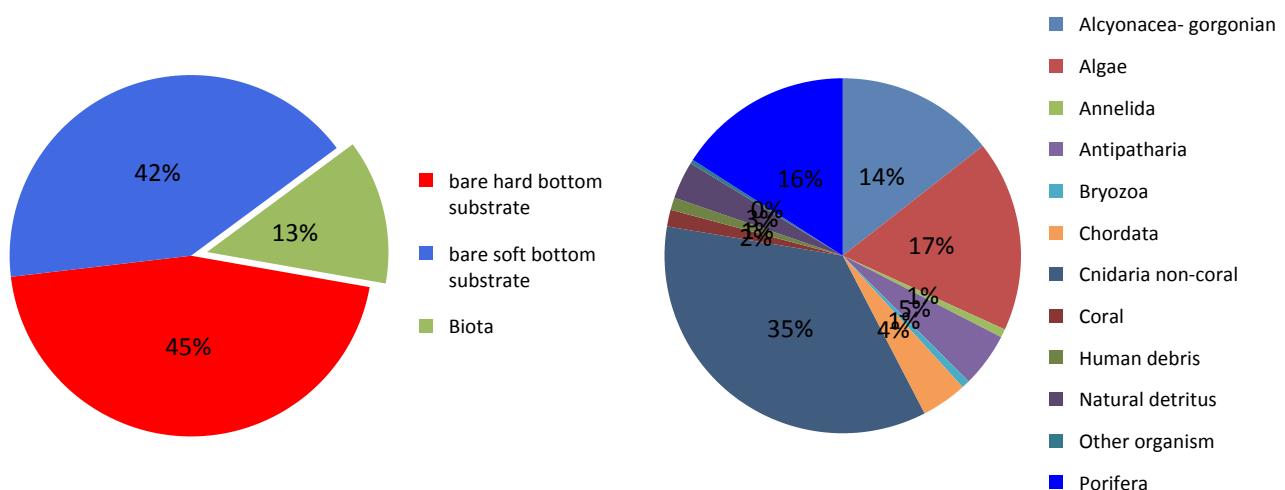


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-14. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-14.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-14.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-14 dive notes
Biota	12.80%	x
Algae	2.26%	x
Chlorophyta	0.15%	
Ochrophyta	1.28%	
Ochrophyta	1.23%	
<i>Sargassum</i> sp.	0.05%	
Rhodophyta	0.83%	x
Corallinales	0.74%	
<i>Peyssonnelia</i> sp.		x
Rhodophyta	0.10%	
Porifera	2.06%	x
Demospongiae	2.06%	x
<i>Agelas clathrodes</i> (Schmidt, 1870)		x
<i>Agelas</i> sp.	0.15%	
Demospongiae- orange encrusting porous		x
Demospongiae- orange sphere		x
Demospongiae unid. sp.	1.77%	x
<i>Geodia</i> sp.	0.05%	
Spirastrellidae	0.10%	
Cnidaria	7.26%	x
Alcyonacea - gorgonian	1.86%	x
Alcyonacea- gorgonian	0.20%	
<i>Carijoa</i> sp.	0.10%	
<i>Diogorgia</i> sp.		x
<i>Ellisella</i> sp.		x
<i>Nicella</i> sp.	1.57%	x
Plexauridae		x
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		x
Antipatharia	0.64%	x
<i>Antipathes atlantica</i> Gray, 1857	0.10%	x
Antipathidae	0.05%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.44%	x
<i>Tanacetipathes</i> sp.	0.05%	x

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Hydrozoa	4.56%	x
Hydroidolina	4.56%	x
Scleractinia	0.20%	x
<i>Oculina varicosa</i> Lesueur, 1821	0.15%	x
Scleractinia- unid cup	0.05%	x
Annelida	0.10%	x
Annelida	0.05%	
Polychaeta	0.05%	x
Filigrana sp.	0.05%	x
Bryozoa	0.10%	x
Bryozoa	0.10%	x
Bryozoa	0.05%	x
Schizoporella sp.	0.05%	
Echinodermata		x
Asteroidea		x
Holothuroidea		x
Chordata - Vertebrate	0.54%	
Chordata	0.54%	
Actinopterygii	0.54%	
Non-Fauna	0.44%	
Detritus	0.44%	
Natural Detritus	0.44%	
UNKNOWN	0.05%	
Human Debris	0.15%	x
Non-Fauna	0.15%	x
Human debris	0.15%	x
Human debris- fish line/gear	0.15%	x
Human debris- anchor line		x
Bare Substrate	87.05%	
Non-Fauna	87.05%	
Habitat	87.05%	
Bare coral rubble	0.05%	
Bare rock, pavement, boulder, ledge	44.19%	
Bare rubble/cobble	1.13%	
Bare soft bottom	41.69%	
Grand Total	100.00%	

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-14.

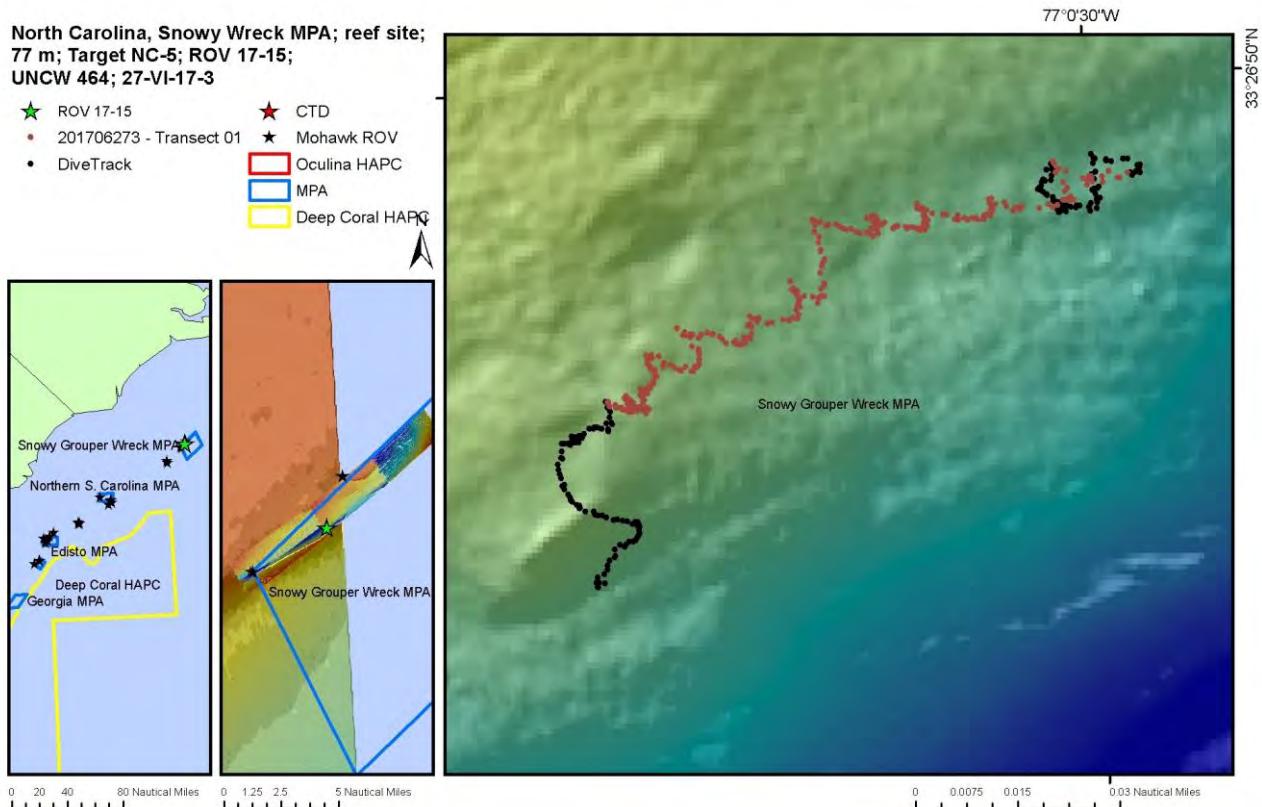
Class/Scientific Name- Common Name	17-14
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.2464
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1232
Muraenidae- Moray Eel	0.1232
Beryciformes	
Holocentridae- Squirrfish	1.2318
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	1.1086
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.4927
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	3.2028
<i>Calamus</i> sp.- Porgy	1.2318
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.6159
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.8623
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	7.6373
Chaetodontidae- Butterflyfish	1.2318
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	0.2464
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	1.3550
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	0.2464
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	0.4927
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	0.1232
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)- Spanish Flag	0.1232
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	16.0138
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	8.2533
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.1232
<i>Halichoeres</i> sp.- Wrasse	0.6159
<i>Hemanthias vivanus</i> (Jordan & Swain, 1885)- Red Barbier	0.2464
<i>Holacanthus</i> sp.- Angelfish	0.9855
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.3695
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	1.9709
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.4782
<i>Liopropoma mowbrayi</i> Woods & Kanazawa, 1951- Cave Basslet	0.2464
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	1.7246
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	0.6159
<i>Mycteroperca interstitialis</i> (Poey, 1860)- Yellowmouth Grouper	0.1232
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1232
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	7.1446
<i>Mycteroperca</i> sp.- Grouper	0.1232

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 76 m; Target NC-4; ROV 17-14; UNCW 463; 27-VI-17-2

<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.2464
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	0.2464
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	12.3183
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.1232
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.7391
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.3695
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.9855
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	19.8325
<i>Pseudocaranx dentex</i> (Bloch & Schneider, 1801)- White Trevally	1.9709
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	1.2318
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	6.0360
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	2.4637
<i>Schultzea beta</i> (Hildebrand, 1940)- School Bass	6.8983
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.1232
<i>Seriola</i> sp.- Amberjack	10.4706
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.6159
<i>Serranus phoebe</i> Poey, 1851- Tattler	13.6733
<i>Serranus tortugarum</i> Longley, 1935- Chalk Bass	0.1232
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	33.7522
Scorpaenidae- Scorpionfish	1.1086
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.1232
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.2464
<i>Canthigaster</i> sp.- Puffer	3.8187
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.4927
UNKNOWN	1.9709

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464; 27-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_MPA_N_C_SnowyWreck
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/27/2017
Specimens:	0
Digital Photos:	12
No. DVD:	
Hard Drive No.:	

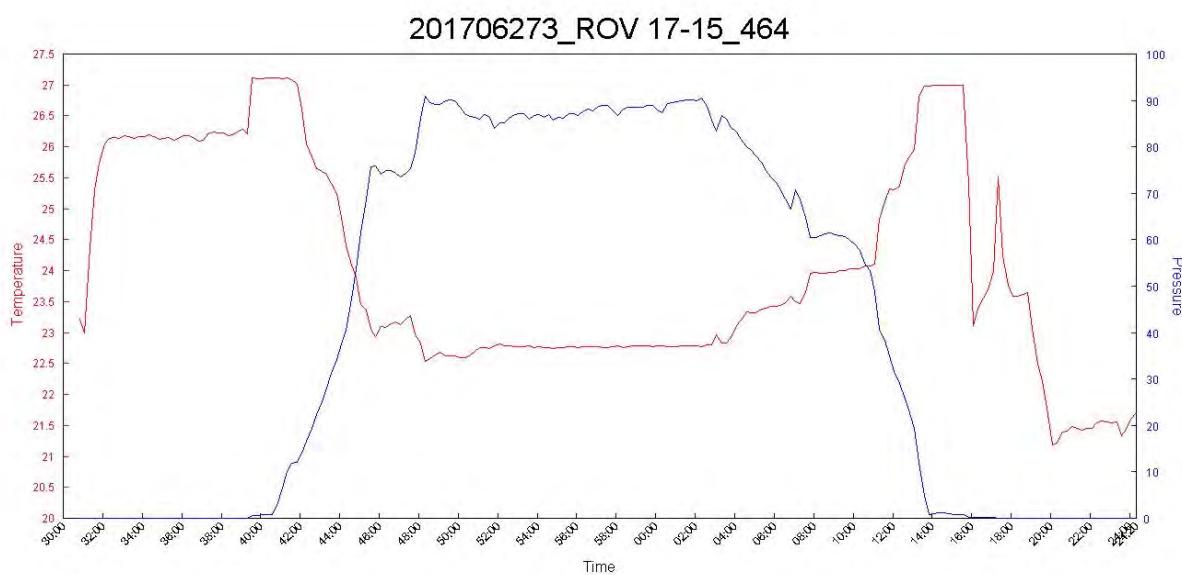
Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464; 27-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	92	Total Transect Length (km):	0.196
Maximum Bottom Depth (m):	92.2	Surface Current (kn):	2.0
On Bottom (Time- EDST):	11:46	On Bottom (Lat/Long):	33.4458°N; -77.0099°W
Off Bottom (Time- EDST):	12:04	Off Bottom (Lat/Long):	33.4469°N; -77.0085°W
Physical (bottom); Temp (°C):	23.1	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.75

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-15 are as follows: Depth Maximum: 90.9 m, Temperature: 22.5-23.3 °C

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464; 27-VI-17-3

Dive Imagery:



Figure 1: -92.2 m
Low relief ledges with cubbyu (*Pareques umbrosus*).

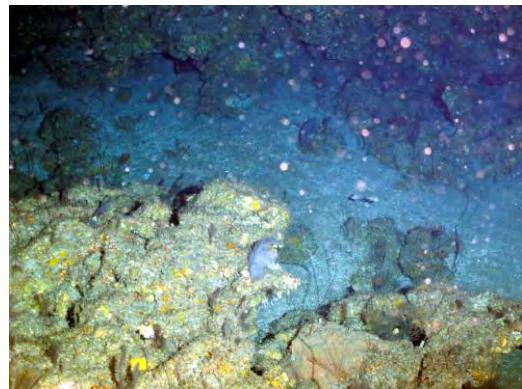


Figure 2: -92.2 m
Reef edge had low density and diversity of macrobiota.



Figure 3: -87.5 m
The upper slope was flat sand and rubble.



Figure 4: -88.1 m
Sand and rubble habitat.



Figure 5: -87.9 m
Lost fishing line on upper slope.



Figure 6: -89.8 m
Only 2 lionfish were seen on this dive.

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464; 27-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 27-VI-17-3; ROV 17-15, UNCW Dive 464; North Carolina, NC Snowy Wreck MPA, reef site NC-5, 77 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS offset is incorrect, relative to accurate MB positions, in both xy and z.

Site Description/Habitat/Biota:

Depth range: 92- 92.5 m

MB map (NF 14-08 Snowy Wreck MPA, 1.5 m resolution) ENE-WSW oriented ridge, facing southeast; top 77 m, base 115 m. Transect along face of ridge slope. Previous dive- 2014.

11:37- Launch; sunny, air- 26.4, wind- 7 kn from 14 dg, seas- 1 ft from NE, current- 2 kn to 48 dg, water- 24.73 dg C, salinity- 35.64.

11:46- On bottom; depth- 92.5 m , visibility- 5 m, current- 0.75 kn from W.

On bottom at WP 2, 92 m (MB- 87 m), MB- upper slope. Flat sediment, 10-50% HB cover rubble/cobble, low relief flat boulders, pavement, few ledges, low rugosity. Biota- low density, *Stichopathes*, *Bebryce*, several small gorgonians, hydroids, encrusting sponges. Head NE along face of slope to WP 3. Pile fishing line, lionfish. Off bottom, difficulty staying on bottom with current.

12:04- end dive, unable to stay on bottom.

Dominant Benthic Macrobiota:

Antipatharia- *Stichopathes*

Gorgonacea- *Bebryce*, small gorgonacea

Hydroids

Porifera- encrusting sponges

Dominant Fish:

Lionfish- 2

Tattlers, reef butterfly, amberjack.

Human Debris:

None.

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464;
27-VI-17-3

CPCe Percent Cover Analysis:

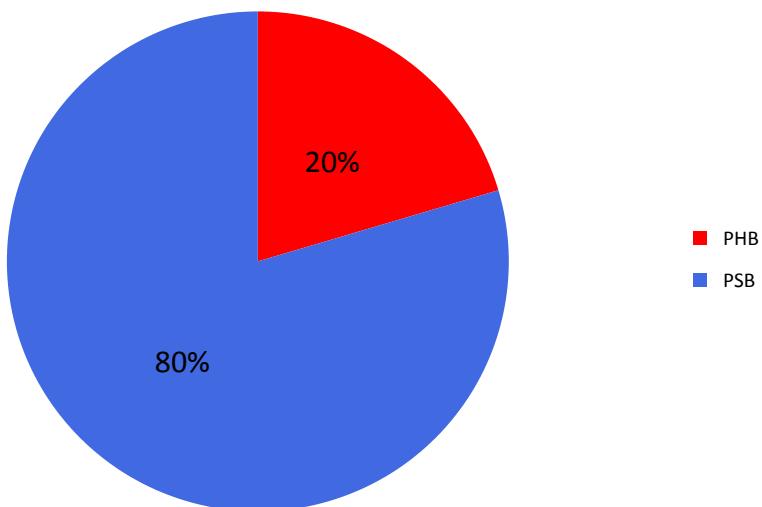


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-15. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

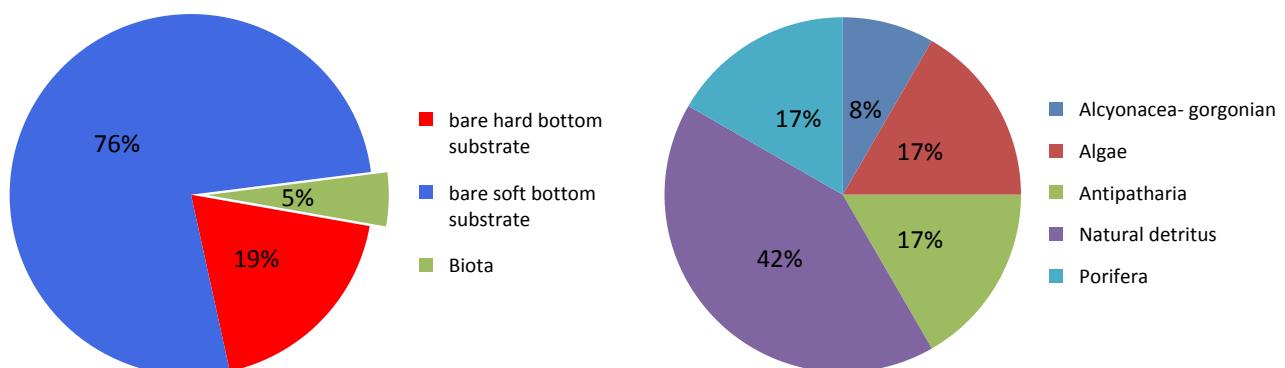


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-15.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 92 m; Target NC-5; ROV 17-15; UNCW 464; 27-VI-17-3

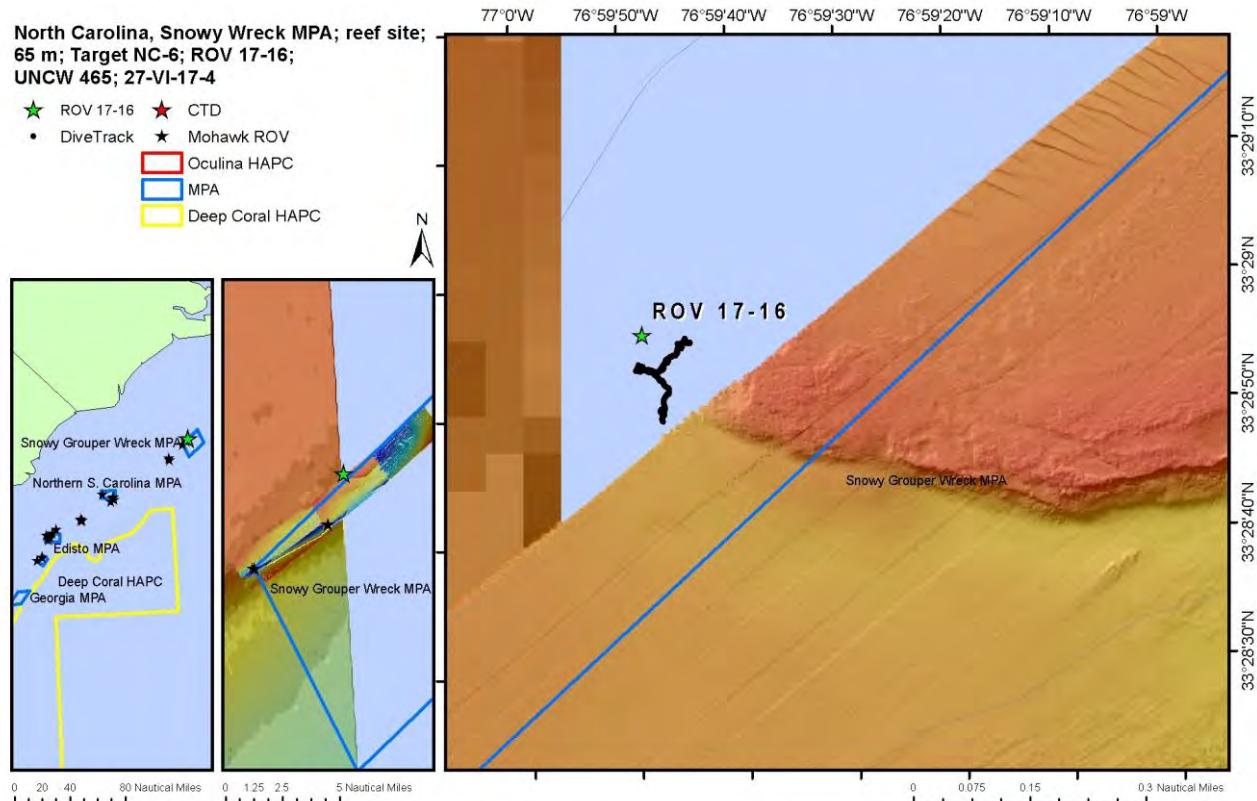
Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-15.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-15 dive notes
Biota	4.80%	X
Algae	0.80%	
Rhodophyta	0.80%	
Corallinales	0.80%	
Porifera	0.80%	X
Demospongiae	0.80%	X
Demospongiae unid. sp.	0.80%	X
Cnidaria	1.20%	X
Alcyonacea - gorgonian	0.40%	X
Alcyonacea- gorgonian		X
<i>Bebryce</i> sp.		X
<i>Ellisella</i> sp.	0.40%	
Antipatharia	0.80%	X
<i>Stichopathes lutkeni</i> Brook, 1889	0.80%	X
Hydrozoa		X
Hydroidolina		X
Non-Fauna	2.00%	
Detritus	2.00%	
Natural Detritus	2.00%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Bare Substrate	95.20%	
Non-Fauna	95.20%	
Habitat	95.20%	
Bare rock, pavement, boulder, ledge	16.80%	
Bare rubble/cobble	2.00%	
Bare soft bottom	76.40%	
Grand Total	100.00%	X

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 65 m; Target NC-6; ROV 17-16; UNCW 465; 27-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_MPAN_C_SnowyWreck
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/27/2017
Specimens:	0
Digital Photos:	12
No. DVD:	
Hard Drive No.:	

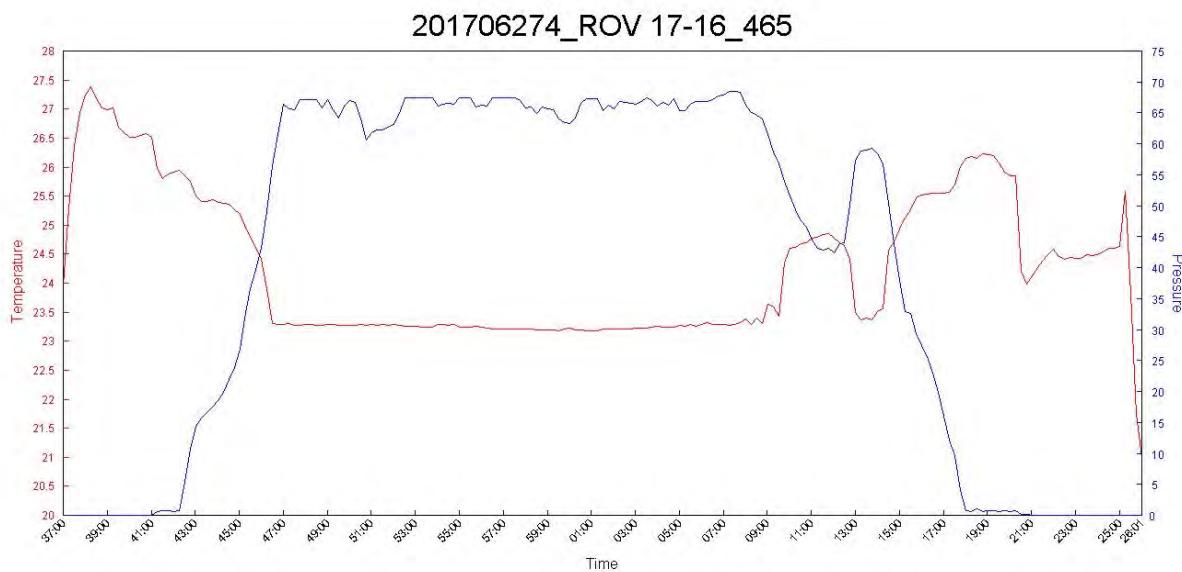
Dive Site: North Carolina, Snowy Wreck MPA; reef site; 65 m; Target NC-6; ROV 17-16; UNCW 465; 27-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	67	Total Transect Length (km):	0.311
Maximum Bottom Depth (m):	68.6	Surface Current (kn):	1.3
On Bottom (Time- EDST):	13:45	On Bottom (Lat/Long):	33.482°N; -76.9959°W
Off Bottom (Time- EDST):	14:07	Off Bottom (Lat/Long):	33.4802°N; -76.9966°W
Physical (bottom); Temp (°C):	24.8	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-16 are as follows: Depth Maximum: 68.5 m, Temperature: 23.2-24.8 °C

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 65 m; Target NC-6; ROV 17-16; UNCW 465; 27-VI-17-4

Dive Imagery:



Figure 1: -67.6 m
Flame box crab- *Callapa flammea*.



Figure 2: -67.6 m
Box crab, lasers are 10 cm.



Figure 3: -68.6 m
This dive missed the target reef by 230 m. Landed on flat rubble bottom.



Figure 4: -68.2 m
Rock rubble with red and brown algae.



Figure 5: -67.6 m
Flat rubble with algae.

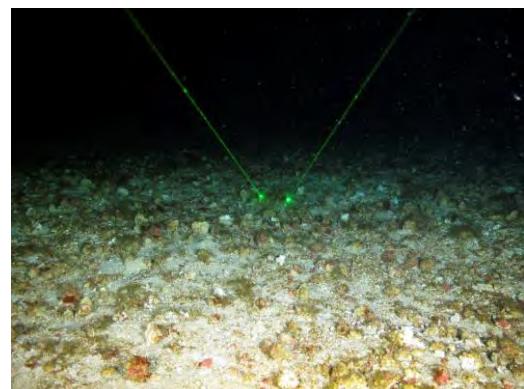


Figure 6: -67.6 m
Rock rubble. Lasers 10 cm. Unable to get to reef site with 1 kn current.

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 65 m; Target NC-6; ROV 17-16; UNCW 465;
27-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 27-VI-17-4; ROV 17-16, UNCW Dive 465; North Carolina, NC Snowy Wreck MPA, reef site NC-6, 65 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization. No XS images.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS offset is incorrect relative to accurate MB positions, in both xy and z.

Site Description/Habitat/Biota:

Depth range: 67-68 m

MB map (NF 14-08 Snowy Wreck MPA, 1.5 m resolution) SE edge of a flat topped plateau, south slope oriented E-W, then curves to NE; top 61 m, base 70 m. Transect along face of ridge slope. Previous dive-2014-15.

13:39- Launch; sunny, air- 26.6, wind- 7 kn from 23 dg, seas- 1 ft from NE, current- 1.5 kn to 66 dg, water- 24.46 dg C, salinity- 35.538.

13:45- On bottom; depth- 67 m , visibility- 5 m, current- 1 kn from SSW.

230 m NW of start WP, heading to WP. Off MB map. Flat sediment, coarse sand, shell hash, dense rubble, 10 to 90% cover, rhodoliths, Rhodophyta, Chlorophyta, *Calappa*, *Ulva*, CCA.

14:07- 68 m, unable to go east, abort dive. End dive. Unable to get to dive site.

Dominant Benthic Macrobiota:

Decapoda- *Calappa*

Algae- Rhodoliths, Chlorophyta, Rhodophyta, *Ulva*, CCA

Dominant Fish:

Unid.- 1

Human Debris:

None

Dive Site: North Carolina, Snowy Wreck MPA; reef site; 65 m; Target NC-6; ROV 17-16; UNCW 465; 27-VI-17-4

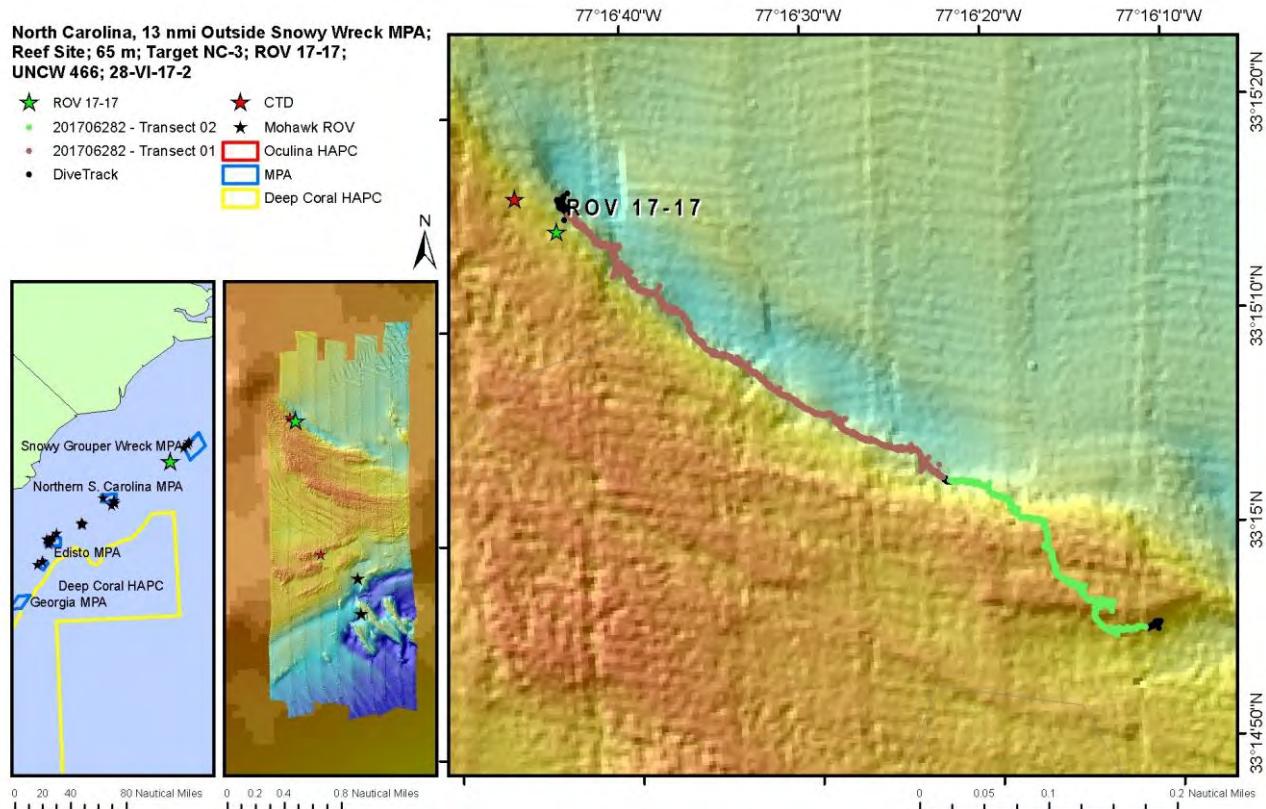
Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Presence of fauna recorded at dive site ROV 17-16.

Group/Phylum/Scientific Name - Authority	ROV 17-16 dive notes
Biota	X
Algae	X
Chlorophyta	X
Ochrophyta	X
Phaeophyceae	X
Rhodophyta	X
Corallinales	X
Arthropoda	X
Decapoda	X
<i>Calappa flammea</i> (Herbst, 1794)	X
Grand Total	

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_SouthernNCOutsideMPA_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/28/2017
Specimens:	0
Digital Photos:	486
No. DVD:	2
Hard Drive No.:	1

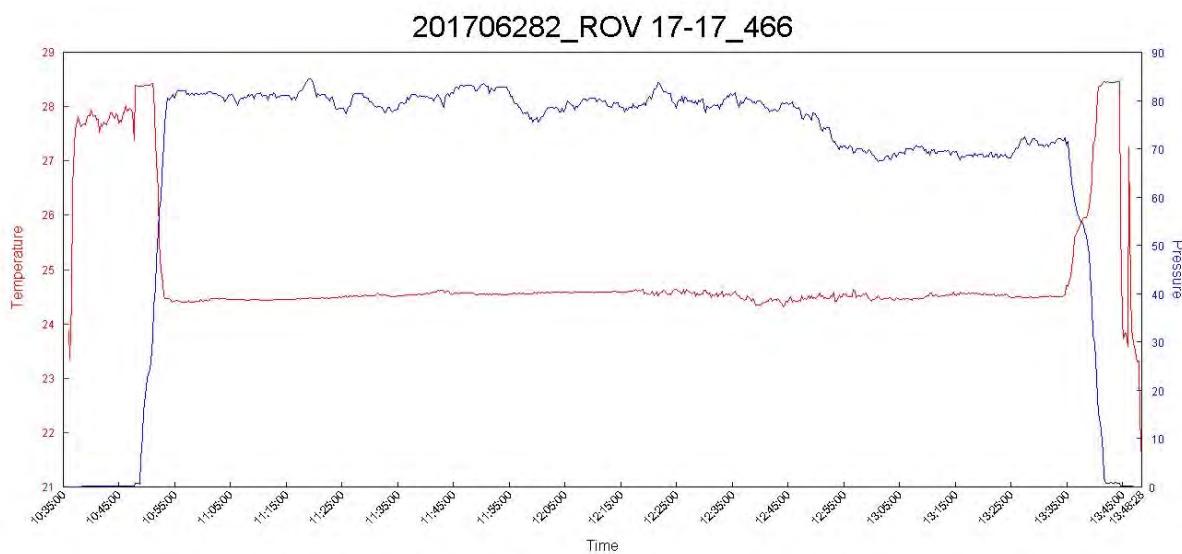
Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	72.5	Total Transect Length (km):	1.201
Maximum Bottom Depth (m):	85.3	Surface Current (kn):	0.4
On Bottom (Time- EDST):	10:52	On Bottom (Lat/Long):	33.2546°N; -77.279°W
Off Bottom (Time- EDST):	13:31	Off Bottom (Lat/Long):	33.2489°N; -77.2698°W
Physical (bottom); Temp (°C):	25.5	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-17 are as follows: Depth Maximum: 84.5 m, Temperature: 24.3-25.5 °C

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Dive Imagery:



Figure 1: -82.3 m

Lower slope of reef escarpment with rock hind grouper (*Epinephelus adscensionis*).

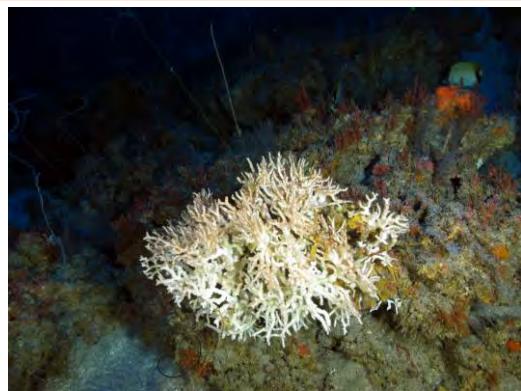


Figure 2: -81.7 m

Large live *Oculina* coral. May be *Madracis*- need specimen to verify.



Figure 3: -82 m

Rock hind (*Epinephelus adscensionis*) hiding in ledge.



Figure 4: -82.1 m

Spotted scorpionfish (*Scorpaena plumieri*).



Figure 5: -78.6 m

99 lionfish were counted during the ROV dive.



Figure 6: -80.9 m

Greater soapfish (*Rypticus saponaceus*), and *Ellisella elongata* gorgonians.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 28-VI-17-2; ROV 17-17, UNCW Dive 466; North Carolina, 13 nmi SW of Snowy Wreck MPA, Site NC-3, 80 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- depth appeared close to MB depth; xy- uncertain of accuracy.

Site Description/Habitat/Biota:

Depth range: 72.5- 84.5 m

MB map (Pisces 2013 Southern NC Outside NC MPA, 5 m resolution) shows flat topped mound with NW-SE oriented north facing slope; top- 68 m, base- 88 m. Transect along face of slope heading SE. Previous dive 2013.

10:46- Launch; sunny, air- 27.5, wind- 16 kn from 60 dg, seas- 3 ft from NE, current- 0.4 kn to 338 dg, water- 25.98 dg C, salinity- 36.56.

10:51- On bottom; depth- 83 m , visibility- 10 m, current- 0.1.

MB- lower slope, near track line. 10-20 dg slope, 1 m rock boulders, $\frac{1}{2}$ m relief, interspersed with sediment, 50% HB, moderate rugosity. Head SE along track line toward WP 2. Biota- *Stichopathes*, hydroids, *Antipathes furcata*, CCA, encrusting sponges, lionfish, various 10 cm gorgonians common, *Diodogorgia*, *Ellisella*, *Bebryce*, *Shizoporella*, bushy *Tanacetipathes*, *Antipathes atlantica*; fish dense- snowy, graysby, scamp, amberjack, white grunt, bank butterfly, lionfish. 30 cm white *Oculina varicosa*- 82 m. Fishing line.

11:08- 83 m, same habitat. Dominant biota- *Stichopathes*, dense 5-10 cm gorgonians orange and yellow.

11:14- *Peyssonnelia*

11:18- smaller boulders, 25 cm, 10 dg slope, 25-30% rock cover.

11:29- 80 m, lower slope. 5-30 dg slope, 50-80% coarse sand, pavement, low relief boulders <1/2 m relief, $\frac{1}{2}$ - 1 m diameter. Dominant biota: *Stichopathes*, small gorgonians, CCA, dense white dead shell hash all over bottom. Fishing line.

11:53- head more upslope, on track line, 79.5 m; MB- lower slope. Low relief, pavement, small boulders, 30-45 dg slope, 50-80% hard bottom, low rugosity, <1/2 m relief. Same biota. *Swiftia exserta* (uncommon). Debris- fishing lines, beer can, strap, bag. 25 cm *Swiftia*, pile fishing line, *Ellisella elongata*.

12:20- 84.5 m, lower slope, scattered 25-50 cm boulders, 50% sediment, 10-30 dg slope. Pile fishing line. 1-2 m diam boulders, $\frac{1}{2}$ m relief, 30-45 dg slope, eroded rock.

12:24- 82 m, at WP 3. Slipper lobster.

12:30- 81 m, 30-45 dg, 1 m jumble boulders, 20% sediment, high rugosity. Dense fish, CCA, *Stichopathes*, small orange gorgonians, *A. furcata*. Pile of fishing line, 10 cm *Oculina* (81 m), 20 cm *Oculina*, bushy black coral, dense fish. 1-2 m relief boulders, *Oculina*, *Oculina*.

12:41- 79 m, escarpment with 1-2 m relief boulders, ledges, high rugosity, 45 dg slope. Biota-same, dense fish, tomatetes, scamp, lionfish; *Oculina* common. Back in scattered boulder zone, $\frac{1}{2}$ m relief. *Holothuria*, *Peyssonnelia*, 75 cm *Oculina*, cup corals, barbier anhiids common.

12:52- 72.5 m, at end WP, upper slope. MB depth- 73.7 m. Heading due south to ridge on top of MB. 70 m,

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

sand dunes with pavement. MB- top of plateau, flat coarse sand. 30 cm *Geodia neptuni*- first large sponge seen; *Peyssonnelia*; *Ptilocaulis*, *Swiftia*, 25 cm black hydroids.

13:25- 73.5 m. MB- 72 m, shows a E-W ridge, 72- 74 m relief. 30 dg slope, sand dunes 50% soft bottom, mounds of lithified rubble. *Peyssonnelia*, *Stichopathes*. Head E along face.

13:31- 73 m. End of dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa* (10- 75 cm), common in boulder zones; cup corals

Antipatharia- *Tanacetipathes*, *Stichopathes*, *Antipathes furcata*,

Gorgonacea- *Diodogorgia*, *Swiftia exserta*, *Ellisella* sp., *Ellisella elongata*, *Bebryce*, 10 cm orange plexaurids

Hydroida

Porifera- encrusting orange; *Geodia neptuni*- 2; *Ptilocaulis*; large sponges rare

Holothuroidea

Algae- CCA, *Peyssonnelia* abundant

Dominant Fish:

Lionfish- 99

Scamp- 32, soapfish, hogfish- 3, red snapper- 2, rock hind, graysby, amberjack, reef butterfly, sunshine fish, sharpnose puffer, wrasse bass, tatler, roughtongue, french angelfish, tomate, cubbyu.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 80 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

CPCe Percent Cover Analysis:

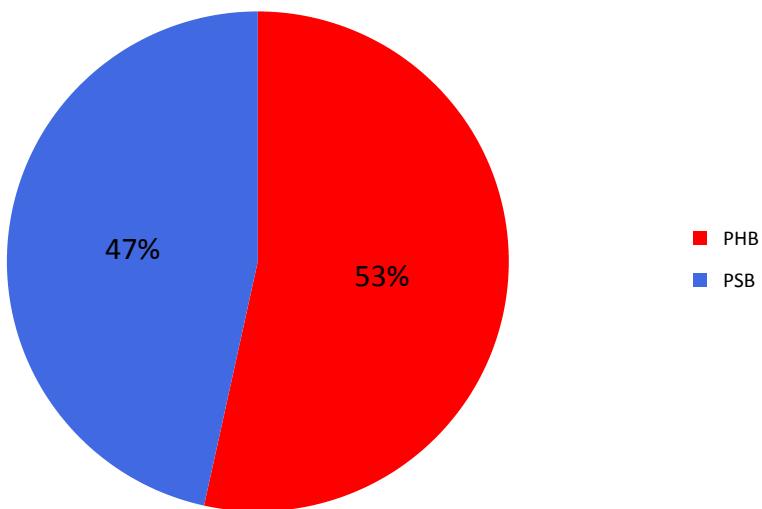
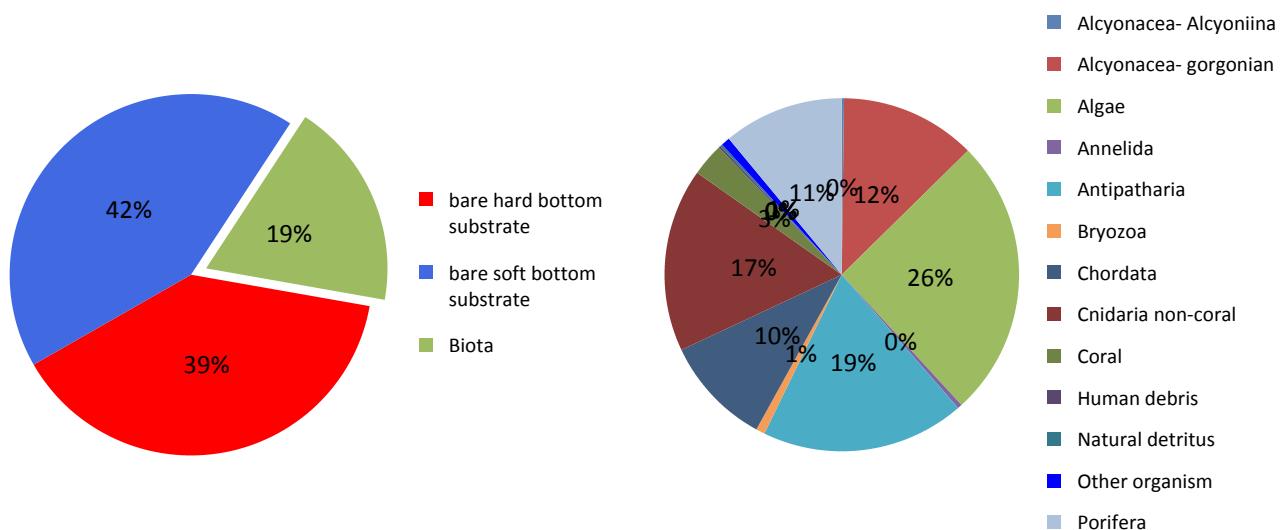


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-17. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-17.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 65 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-17.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	18.54%	X
Algae	4.75%	X
Cyanobacteria	0.04%	
Ochrophyta	0.45%	X
Ochrophyta	0.41%	
<i>Sargassum</i> sp.	0.04%	X
Rhodophyta	4.27%	X
Corallinales	3.75%	X
<i>Peyssonnelia</i> sp.		X
Rhodophyta	0.52%	
Porifera	2.04%	X
Demospongiae	2.04%	X
Demospongiae unid. sp.	1.89%	X
<i>Geodia neptuni</i> complex (Sollas, 1886)		X
<i>Ptilocaulis</i> sp.		X
Spirastrellidae	0.15%	
Cnidaria	9.47%	X
Alcyonacea - Alcyoniina	0.04%	
Alcyoniina	0.04%	
Alcyonacea - gorgonian	2.30%	X
Alcyonacea- gorgonian	0.22%	X
<i>Bebryce</i> sp.	0.11%	X
<i>Carijoa</i> sp.	0.07%	
<i>Diodogorgia</i> sp.	0.04%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.		X
Ellisellidae	0.04%	
<i>Nicella</i> sp.	1.82%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Anthozoa - Non Coral	0.04%	X
Cerianthidae		X
Zoanthidae	0.04%	X
Antipatharia	3.45%	X

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 65 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

<i>Antipathes atlantica</i> Gray, 1857	0.11%	X
<i>Antipathes furcata</i> Gray, 1857	0.63%	X
Antipathidae	0.11%	
<i>Stichopathes lutkeni</i> Brook, 1889	2.30%	X
<i>Tanacetipathes</i> sp.	0.30%	X
Hydrozoa	3.08%	X
Hydroidolina	3.08%	X
Scleractinia	0.56%	X
<i>Oculina varicosa</i> Lesueur, 1821	0.26%	X
Scleractinia- unid cup	0.30%	X
Annelida	0.07%	X
Polychaeta	0.07%	X
<i>Filograna</i> sp.	0.04%	X
Serpulidae	0.04%	
Arthropoda		X
Decapoda		X
Anomura		X
<i>Scyllarides</i> sp.		X
Bryozoa	0.15%	X
Bryozoa	0.15%	X
Bryozoa	0.15%	X
<i>Schizoporella</i> sp.		X
Chordata - Vertebrate	1.86%	
Chordata	1.86%	
Actinopterygii	1.86%	
Non-Fauna	0.04%	
Detritus	0.04%	
Natural Detritus	0.04%	
UNKNOWN	0.15%	
Human Debris	0.04%	X
Non-Fauna	0.04%	X
Human debris	0.04%	X
Human debris- fish line/gear		X
Human debris- other	0.04%	X
Bare Substrate	81.43%	
Non-Fauna	81.43%	
Habitat	81.43%	
Bare coral rubble	0.04%	
Bare rock, pavement, boulder, ledge	34.73%	
Bare rubble/cobble	4.16%	
Bare soft bottom	42.50%	

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 65 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Grand Total

100.00%

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 65 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-17.

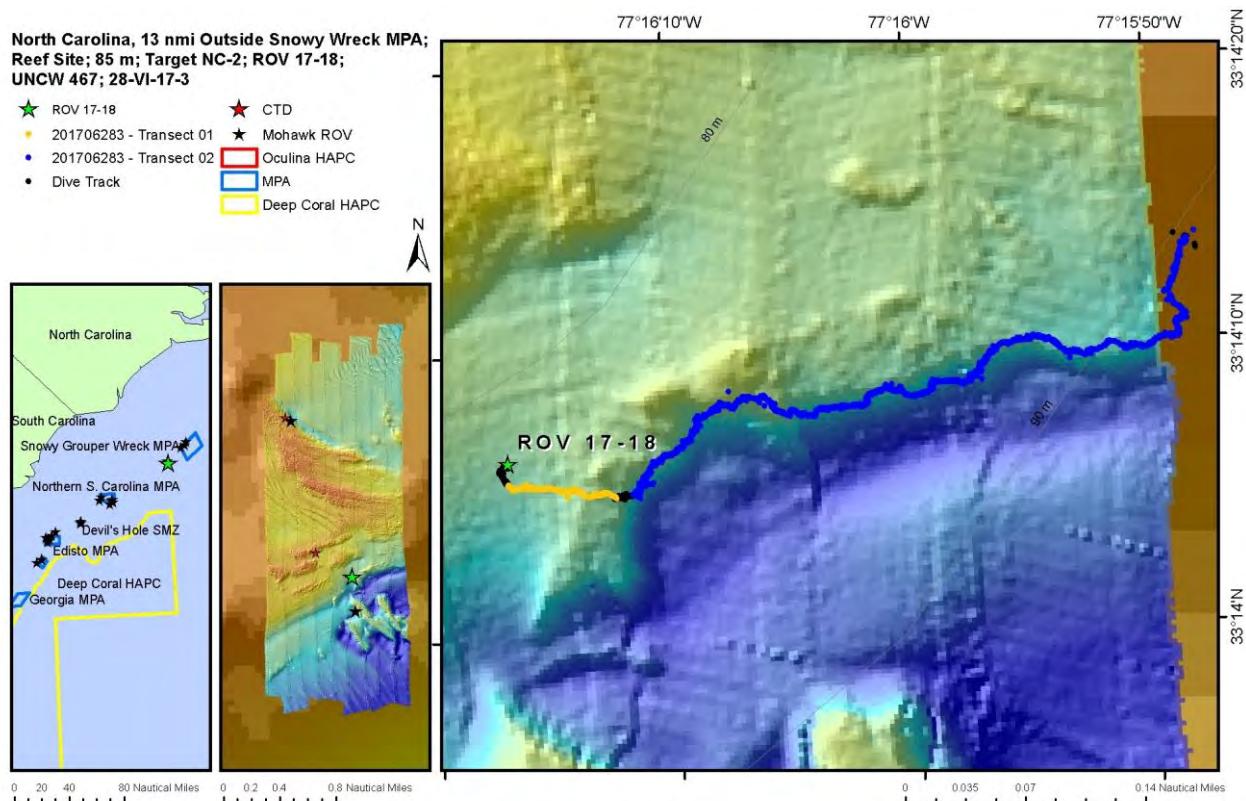
Class/Scientific Name- Common Name	17-17
Actinopterygii	
-	
schooling fish-	61.8092
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.1454
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1454
<i>Muraenidae</i> - Moray Eel	0.1454
Beryciformes	
<i>Holocentridae</i> - Soldierfish	0.2909
<i>Holocentridae</i> - Squirrfish	2.0361
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	2.9087
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	2.0361
<i>Apogon affinis</i> (Poey, 1875)- Bigtooth Cardinalfish	1.5998
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.2909
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	10.1803
<i>Calamus</i> sp.- Porgy	1.3089
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.4363
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	2.3269
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.3269
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	17.4520
<i>Chaetodon</i> sp.- Butterflyfish	0.5817
<i>Chromis enchraysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	11.1984
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	53.5195
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.9087
<i>Chromis</i> sp.- Damselselfish	15.5614
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	0.1454
<i>Epinephelus adscensionis</i> (Osbeck, 1765)- Rock Hind	0.7272
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	0.1454
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	123.6184
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	1.5998
<i>Haemulon</i> sp.- Grunt	2.1815
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	2.4724
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	2.4724
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.4363
<i>Halichoeres</i> sp.- Wrasse	22.6876
<i>Holacanthus</i> sp.- Angelfish	2.1815
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.8726

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 65 m; Target NC-3; ROV 17-17; UNCW 466; 28-VI-17-2

<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.4363
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	3.9267
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	0.1454
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1454
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	5.8173
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	38.3944
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.2909
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.4363
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	7.5625
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.4363
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	1.8906
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	12.9436
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	2.3269
<i>Ptereleotris</i> sp.- Dartfish	0.8726
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	36.3583
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	1.4543
<i>Schultzea beta</i> (Hildebrand, 1940)- School Bass	2.1815
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.4363
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.4543
<i>Seriola</i> sp.- Amberjack	1.8906
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	4.5084
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.4363
<i>Serranus phoebe</i> Poey, 1851- Tattler	4.9447
<i>Serranus tortugarum</i> Longley, 1935- Chalk Bass	0.1454
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.2909
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	15.8522
Scorpaenidae- Scorpionfish	0.2909
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.1454
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	12.0710
<i>Diodon hystrix</i> Linnaeus, 1758- Porcupinefish	0.1454
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.4363
<i>Xanthichthys ringens</i> (Linnaeus, 1758)- Sargassum Triggerfish	1.5998
UNKNOWN	4.5084

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_SouthernNCOutsideMPA_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/28/2017
Specimens:	0
Digital Photos:	217
No. DVD:	2
Hard Drive No.:	1

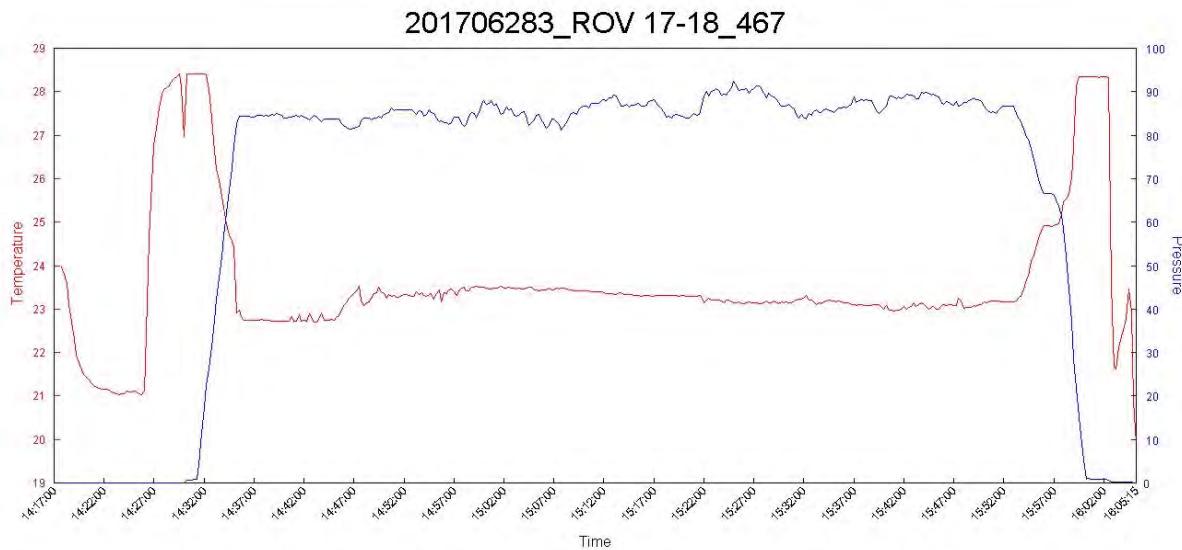
Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	82.1	Total Transect Length (km):	0.932
Maximum Bottom Depth (m):	93.5	Surface Current (kn):	0.5
On Bottom (Time- EDST):	14:33	On Bottom (Lat/Long):	33.2352°N; -77.2714°W
Off Bottom (Time- EDST):	15:51	Off Bottom (Lat/Long):	33.2372°N; -77.2635°W
Physical (bottom); Temp (°C):	25.6	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-18 are as follows: Depth Maximum: 92.5 m, Temperature: 22.7-25.6 °C

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Dive Imagery:



Figure 1: -85 m
Hake hiding under ledge.



Figure 2: -87 m
Bearded brotula (*Brotula barbata*).



Figure 3: -92.4 m
Eyestripe bass (*Liopropoma aberrans*).



Figure 4: -86.8 m
Graysby (*Cephalopholis cruentata*) on rocky escarpment.



Figure 5: -85.8 m
Large white coral. Probably *Oculina varicosa*, which are azooxanthellate and white in deep water.



Figure 6: -91.8 m
Sometimes the deepwater Oculina are pink. This is in the calcium carbonate of the skeleton.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706283

Site/Objectives:

Site #- 28-VI-17-3; ROV 17-18, UNCW Dive 467; North Carolina, 13 nmi SW of Snowy Wreck MPA, Site NC-2, 90 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- depth appeared close to MB depth; xy- uncertain of accuracy. ROV depth 89 m, at top edge of drop off; MB shows ROV on top of plateau 20 m N of the edge (91 m depth).

Site Description/Habitat/Biota:

Depth range: 83- 93 m

MB map (Pisces 2013 Southern NC Outside NC MPA, 5 m resolution) shows irregular shaped, flat topped mounds; 87 top, 102 m base. Transect E along south facing slope of mound. Previous dive 2012-17.

14:28- Launch; Pt/cloudy, air- 28.1, wind- 13 kn from 38 dg, seas- 2 ft from NE, current- 0.5 kn to 352 dg, water- 25.98 dg C, salinity- 36.629.

14:33- On bottom; depth- 86 m , visibility- 10 m, current- 0.

On bottom, on top of plateau, 144 m NW of WP. 100% soft bottom, flat coarse sand, dense shell hash, rubble, scattered 1 m flat boulders, 25 cm relief. Heading E to ridge. Hydroids.

14:44- 83 m, 50% sediment, 25-50 cm diameter boulders, 25 cm relief. Sparse biota.

14:46- 84.5 m, top edge of drop off (MB- 85 m). Huge schools of fish. Sharp edge drop off, $\frac{1}{2}$ to 1 m relief eroded boulders, slope 30-45 dg. 1-2 m boulders, undercut ledges 1 m relief, high rugosity. Transect N along top of slope. Biota- low density, *Stichopathes*, 20 cm *Oculina* on vertical rock face, encrusting yellow sponges, oysters, *Oculina* 10 cm, orange and yellow gorgonians, 75 cm lumpy hemisphere cluster thick fingers with apical oscules *Erylus*?, *Oculina* 30 cm and 20 cm (86 m), CCA, black corals, 10 cm *Oculina*, *Stichopathes*, *Tanacetipathes*.

14:56- 86 m. 15 cm *Oculina* (89 m). WP 2- 86 m, 3 *Oculina*. Slope changes direction- heading E along top edge. *Oculina*- 4, 10-30 m, 87 m; *Antipathes atlantica*, lionfish, scamp, several spp of black coral. Very rugged, 45 dg slope. Sand at bottom of escarpment, 85 m. 10 cm *Oculina*, beer can, *Antipathes furcata*.

15:10- 89 m, low relief rock, small boulders, low rugosity, 30-50% sediment.

15:25- 93 m, 4 *Oculina* (pink, 10- 40 cm). $\frac{1}{2}$ m ledge, low relief boulders, pavement, flat to 10 dfg slope. Same biota. *Oculina*- 15 cm (89 m).

15:36- 89 m, top edge of drop off; MB shows ROV on top of plateau 20 m N of the edge (91 m depth). 1 m relief rock boulders, sharp drop off. Scamp, dense stripped grunt.

15:43- 88 m, top edge of drop off, high rugosity. Off MB. Several 30 cm spherical knobby *Erylus*. 2-3 m relief drop off, rugged rock, high rugosity. *Oculina*- 5, 15-30 cm.

15:50- 88 m. End dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa*- 23 (not all counted), common, 15-30 cm

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Antipatharia- *Stichopathes*, *Tanacetopathes*, *Antipathes atlantica*, several spp. *Antipatharia*

Gorgonacea- 10 cm orange common

Porifera- large sponges rare; *Erylus*- 30 cm lumpy hemisphere; yellow encrusting.

Dominant Fish:

Lionfish- 39

Red snapper- 3, scamp- 17, graysby, spanish flag, cubbyu, roughtongue bass, hake, wrasse bass, butterfly fish.

Human Debris:

Cans

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

CPCe Percent Cover Analysis:

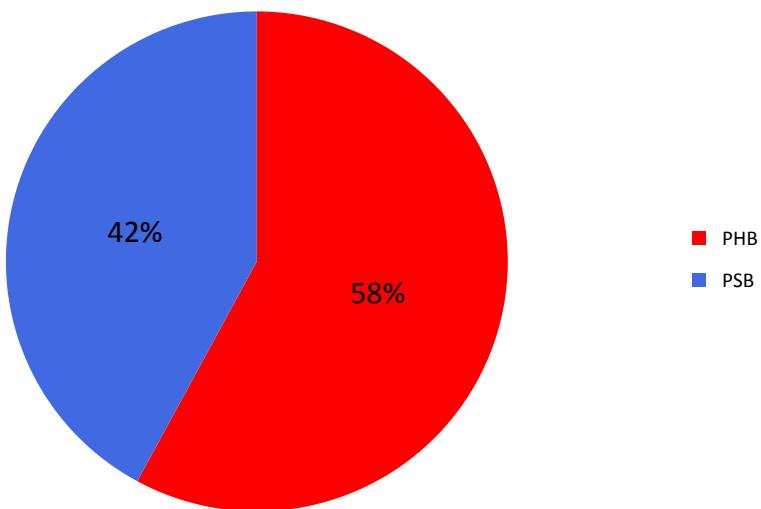
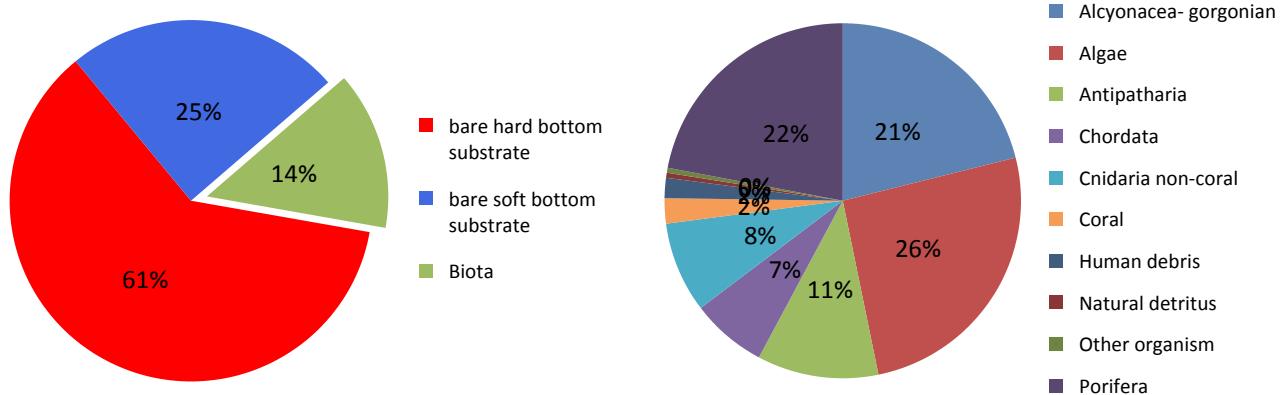


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-18. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-18.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-18.

Group/Phylum/Scientific Name - Authority	CPCe	dive notes
Biota	13.87%	X
Algae	3.63%	X
Chlorophyta	0.13%	
Ochrophyta	0.84%	
<i>Sargassum</i> sp.	0.06%	
Rhodophyta	2.66%	X
Corallinales	2.01%	X
Rhodophyta	0.65%	
Porifera	3.11%	X
Demospongiae	3.11%	X
Demospongiae unid. sp.	2.92%	X
<i>Erylus</i> - PR2		X
<i>Geodia</i> sp.	0.19%	
Cnidaria	6.03%	X
Alcyonacea - gorgonian	2.98%	X
Alcyonacea- gorgonian	0.58%	X
<i>Bebryce</i> sp.	0.06%	
<i>Nicella</i> sp.	2.33%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Antipatharia	1.56%	X
<i>Antipathes atlantica</i> Gray, 1857	0.13%	X
<i>Antipathes furcata</i> Gray, 1857	0.39%	X
Antipathidae	0.26%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.39%	X
<i>Tanacetipathes</i> sp.	0.39%	X
Hydrozoa	1.17%	X
Hydroidolina	1.17%	X
Scleractinia	0.32%	X
<i>Oculina varicosa</i> Lesueur, 1821	0.32%	X
Chordata - Vertebrate	0.97%	
Chordata	0.97%	
Actinopterygii	0.97%	
Non-Fauna	0.06%	
Detritus	0.06%	

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Natural Detritus	0.06%	
UNKNOWN	0.06%	
Human Debris	0.26%	X
Non-Fauna	0.26%	X
Human debris	0.26%	X
Human debris- fish line/gear	0.06%	
Human debris- other	0.19%	X
Bare Substrate	85.87%	
Non-Fauna	85.87%	
Habitat	85.87%	
Bare rock, pavement, boulder, ledge	43.81%	
Bare rubble/cobble	17.37%	
Bare soft bottom	24.63%	
dead standing Scleractinia	0.06%	
Grand Total	100.00%	X

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-18.

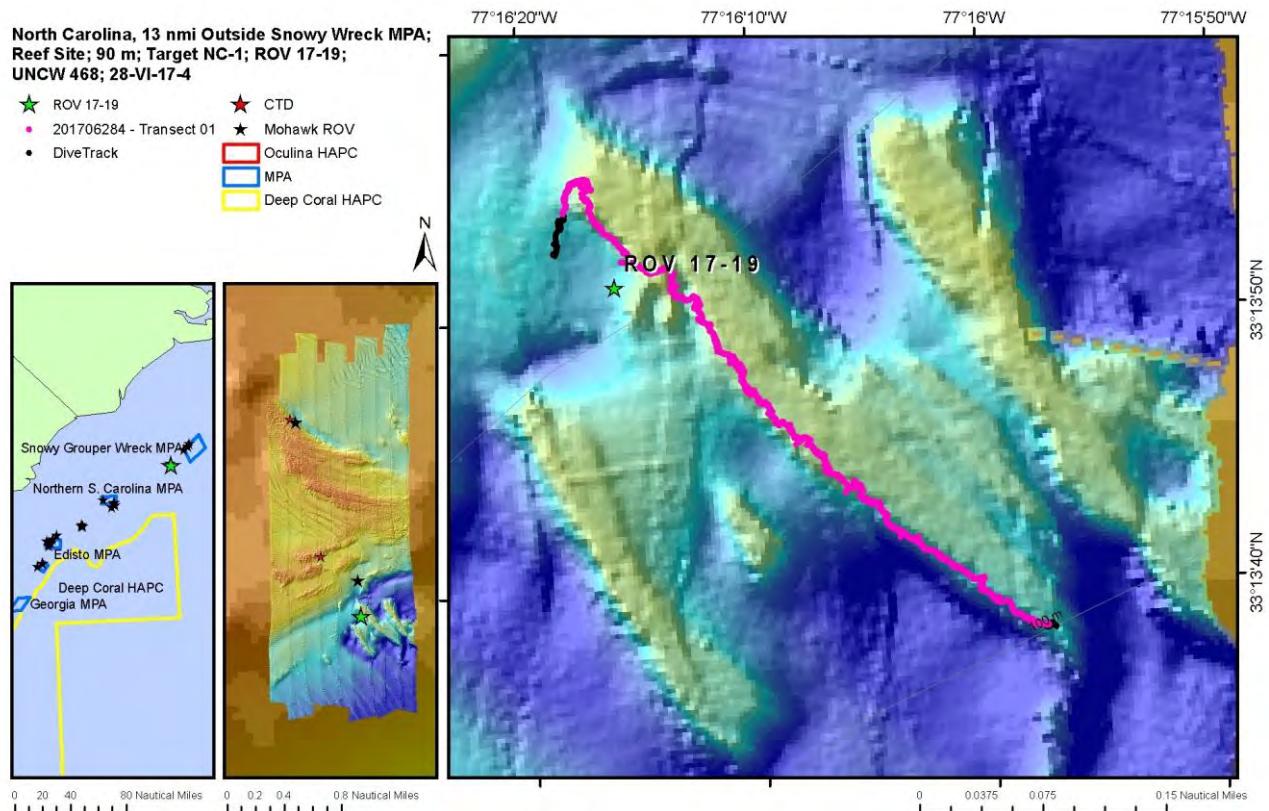
Class/Scientific Name- Common Name	17-18
Actinopterygii	
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.1341
Beryciformes	
<i>Holocentridae</i> - Squirrelfish	2.5483
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	0.5365
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	0.1341
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	0.5365
Gadiformes	
<i>Phycidae</i> - Hake	0.1341
Ophidiiformes	
<i>Brotula barbata</i> (Bloch & Schneider, 1801)- Bearded Brotula	0.1341
Perciformes	
<i>Anthiinae</i> - Anthiid	3.7554
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.1341
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	2.9506
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.2682
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.2682
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.5365
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	4.2918
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	0.1341
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	0.8047
<i>Chromis</i> sp.- Damselfish	0.1341
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	0.1341
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)- Spanish Flag	0.1341
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	4.9624
<i>Haemulon</i> sp.- Grunt	40.2361
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	670.6009
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.4024
<i>Halichoeres</i> sp.- Wrasse	4.1577
<i>Hemanthias vivanus</i> (Jordan & Swain, 1885)- Red Barbier	13.8144
<i>Holacanthus</i> sp.- Angelfish	0.2682
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.8047
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.1341
<i>Liopropoma aberrans</i> (Poey, 1860)- Eyestripe Bass	0.5365
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	2.2800
<i>Lutjanus campechanus</i> (Poey, 1860)- Red Snapper	0.4024
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	2.4142

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 85 m; Target NC-2; ROV 17-18; UNCW 467; 28-VI-17-3

<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	16.6309
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	4.5601
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.6706
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.4024
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	1.4753
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	51.3680
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.9388
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	0.4024
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	0.6706
<i>Rypticus</i> sp.- Soapfish	0.1341
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.1341
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.4024
<i>Seriola</i> sp.- Amberjack	1.3412
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.8047
<i>Serranus phoebe</i> Poey, 1851- Tattler	1.7436
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	7.6448
Scorpaenidae- Scorpionfish	0.1341
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	5.9013
<i>Diodon</i> sp.- Puffer	0.1341
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.1341
UNKNOWN	1.4753

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_SouthernNCOutsideMPA_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/28/2017
Specimens:	0
Digital Photos:	537
No. DVD:	2
Hard Drive No.:	1

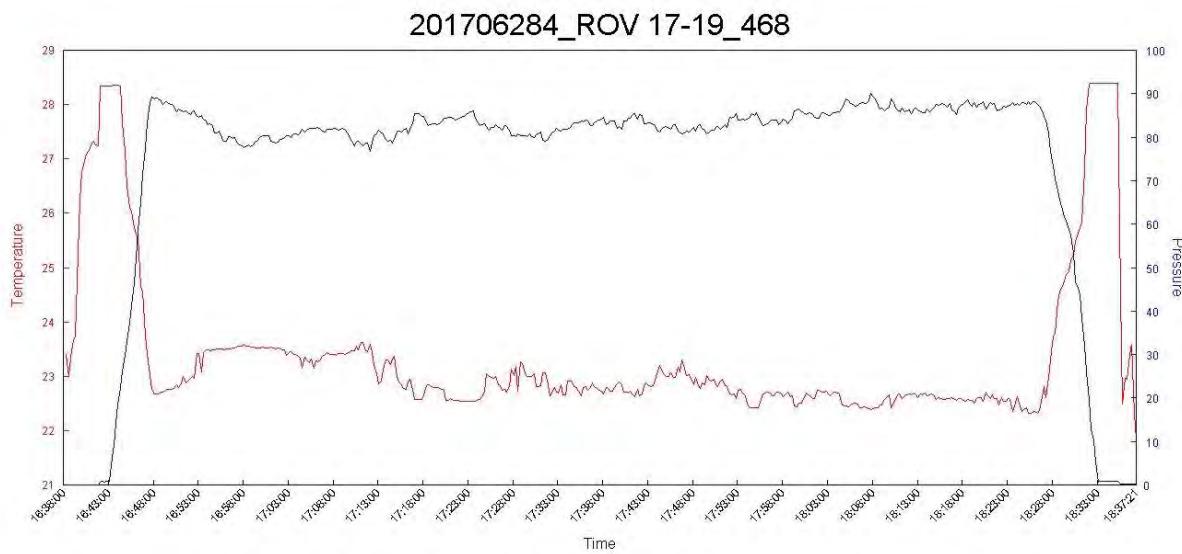
Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	82	Total Transect Length (km):	0.850
Maximum Bottom Depth (m):	91.2	Surface Current (kn):	0.3
On Bottom (Time- EDST):	16:45	On Bottom (Lat/Long):	33.2315°N; -77.2719°W
Off Bottom (Time- EDST):	18:24	Off Bottom (Lat/Long):	33.2275°N; -77.266°W
Physical (bottom); Temp (°C):	25.7	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-19 are as follows: Depth Maximum: 90.1 m, Temperature: 22.3-25.7 °C

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

Dive Imagery:



Figure 1: -82.5 m
Oculina (purple) and red solitary cup corals on rock wall.



Figure 2: -81 m
Oculina coral were abundant at this site from 10-30 cm diameter up to several meters.



Figure 3: -81.2 m
Clusters of *Oculina* coral on jumble of rock boulders.



Figure 4: -80.5 m
School of striped grunt (*Haemulon striatum*) at reef edge.



Figure 5: -79 m
Rock pavement at top of ridge with scamp grouper (*Mycteroperca phenax*), sponges, gorgonians, and algae.



Figure 6: -82.5 m
Rocky escarpment with dense *Oculina* coral.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706284

Site/Objectives:

Site #- 28-VI-17-4; ROV 17-19, UNCW Dive 468; North Carolina, 13 nmi SW of Snowy Wreck MPA, Site NC-1, 90 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- depth appeared close to MB depth; xy offset incorrect: ROV depth 84 m, edge of dropoff, MB shows ROV at 85 m, but 20 m east of dropoff on top of mound.

Site Description/Habitat/Biota:

Depth range: 82- 90 m.

MB map (Pisces 2013 Southern NC Outside NC MPA, 5 m resolution) shows irregular shaped, flat topped mounds; 85 top, 112 m base. Transect heading SE along west facing slope of mound.

Previous dive- 2012.

16:49- Launch; Pt/cloudy, air- 27.7, wind- 13 kn from 52 dg, seas- 2 ft from NE, current- 0.3 kn to 330 dg, water- 25.98 dg C, salinity- 36.624.

16:46- On bottom; depth- 90 m , visibility- 5 m, current- 0.25 kts.

On bottom at base of mound, 30 m S of WP on top edge of mound. Flat, coarse sand, shell

Base of west face of the mound, MB shows the same position. 10-30 dg slope, 1/2- 1 m diameter boulders, ½ m relief. Biota- dense biota, Stichopathes 5-6 spp of gorgonians, sponges, *Antipathes furcata*.

85 m- base of vertical escarpment, 2-3 m relief, top 81 m, rugged boulders, high rugosity, dense gorgonians 10- 30 cm, Oculina- several 15-30 cm purple, 15 cm; Bebryce, fishing line, solitary cup coral, Spirastrellidae, *Antipatharia*.

81 m- 1-2 m escarpment, top flatter rugged rock, 1-2 m rugged boulders. Biota- Oculina- 6, 15-50 cm, purple and white (81 m); 50 cm *Geodia*, Oculina- 4, dense cup coral, *Antipathes atlantica*, fractured rock slabs, *Oculina*- 1 m linear, 2 m linear; Tanacetipathes, CCA, encrusting orange and yellow sponges.

17:03- 83 m, 4 m relief escarpment, rugged, jumble of 1-3 m boulders. Dense cup corals, *Astrangia*?, 30 cm bushy Antipatharia; *Oculina*-7, abundant (not all counted); Oculina.

17:08- 81 m, MB- top of mound, flat rock, 1 m ledges, 100% hard bottom; heading S. *Tanacetipathes*, fishing line, cable or anchor line. 2-3 m ledge, smooth rock face.

17:13- 82 m, photo transect across face of vertical rock, covered with purple, white Oculina, individual colonies 15-20 cm, entire colony 3 m diameter.

17:16- 85 m, 3-4 m vertical, eroded rugged, dense *Oculina*, gorgonians, on vertical facies; oysters, buttress covered with *Oculina*.

17:38- 85 m, top edge of mound, heading SE. 3-4 m escarpment, rugged eroded rock. Abundant *Oculina* dominant biota, *Stichopathes*, *Tanacetipathes*, gorgonacea, gorgonian covered with Parazoanthid, dense CCA, cup corals.

17:44- 84 m, edge of dropoff. MB shows ROV at 85 m, 20 m east of dropoff on top of mound.

Dense cover of biota- CCA, gorgonacea, coral, encrusting sponges. *Auletta* yellow sponge, dense 10 cm

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

orange and yellow gorgonians, numerous *Oculina*, 30 cm; dense cup corals, 3-4 m relief, 30 cm *Erylus*. Base of escarpment 89 m, 5 m relief. Dense 30 cm *Oculina*, possible *Discodermia* finger sponge, fishing line.

17:56- 85 m, photo of 50 cm *Oculina* wrapped in fishing line, vertical escarpment, rugged eroded. 25 cm gorgonians common, *Tanacetipathes*, lionfish, fishing line, *Discodermia* fingers.

18:01- 86 m, dense *Oculina* on wall, still 3-5 m escarpment. Every buttress covered with *Oculina*, fishing line.

18:10- 86 m, top edge, same rugged escarpment, 3-5 m relief. Dense coral, fishing line, 30 cm *Geodia*, 1 m *Oculina*, dense *Oculina*.

18:14- 87 m top edge of wall, base of wall 4-5 m relief. Dense schools of roughtongue bass on top.

18:24- 88 m, near south tip of mound. End dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa*, abundant 10-30 cm and up to 3 m diameter on vertical rock wall; greatest density of any MPAs north of *Oculina* HAPC.

Antipatharia- *Stichopathes*, *Tanacetipathes*, *Antipathes atlantica*, *Antipathes furcata*

Gorgonacea- 10 cm orange and yellow spp., 30 cm dead covered with Parazoanthidae (common)

Porifera- encrusting yellow and orange, Spirastrellidae, 30-50 cm *Geodia*, 30 cm lobate hemispherical *Erylus*? *Discodermia*? fingers

Algae- CCA

Dominant Fish:

Lionfish- 43

Scamp- 32, spanish flag- 20, red snapper- 2, roughtongue bass- abundant, bank butterfly, amberjack, sandbar shark, tomtate, cubbyu, soapfish, stripped grunt, wrasse bass, spotfin hogfish, new spp? Spotfin hogfish (different color).

Human Debris:

Numerous piles of fishing line. Fishing line wrapped around *Oculina* coral.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

CPCe Percent Cover Analysis:

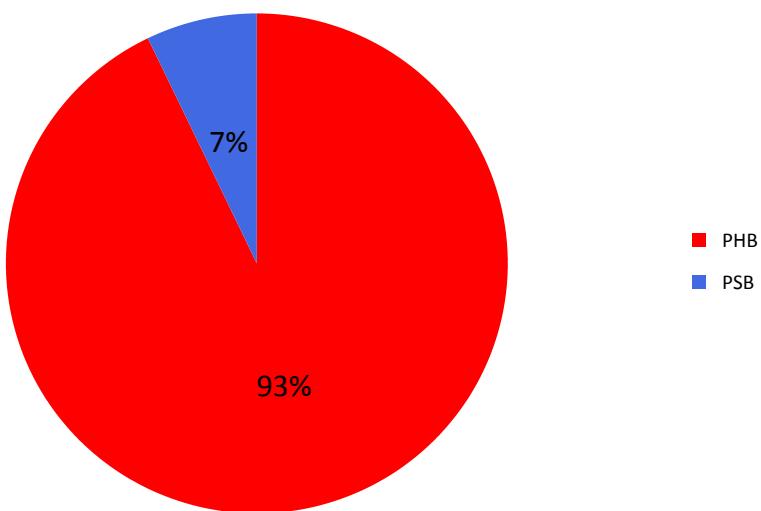
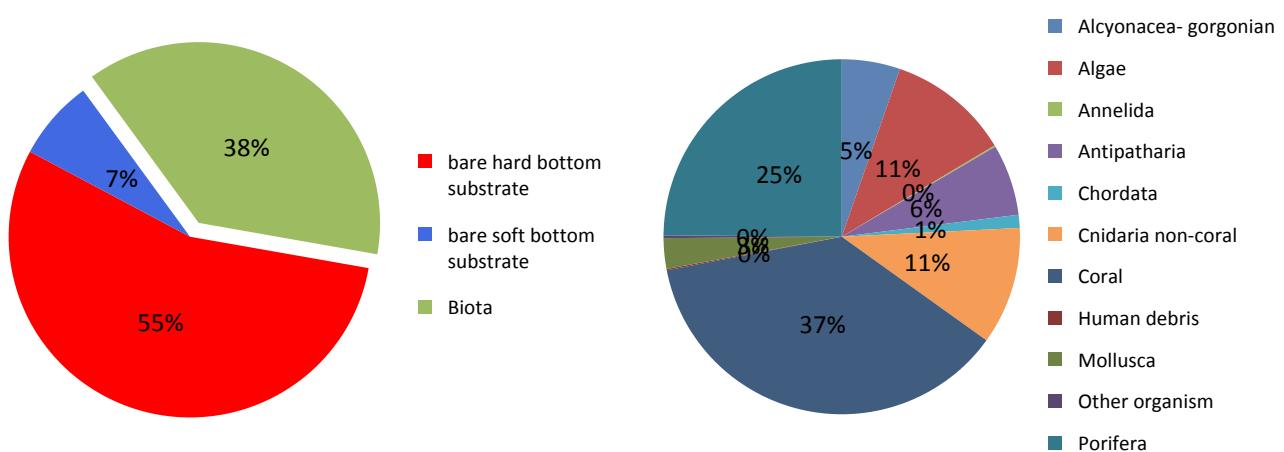


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-19. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-19.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-19.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-19 dive notes
Biota	37.73%	X
Algae	4.20%	X
Ochrophyta	0.30%	
Rhodophyta	3.90%	X
Corallinales	3.75%	X
Rhodophyta	0.15%	
Porifera	9.40%	X
Demospongiae	9.40%	X
<i>Auletta</i> sp.		X
<i>Demospongiae unid.</i> sp.	8.00%	X
<i>Discodermia</i> sp.		X
<i>Erylus</i> - PR2		X
<i>Erylus</i> sp.	0.20%	
<i>Geodia</i> sp.	0.80%	X
<i>Ircinia</i> sp.	0.05%	
<i>Poecilosclerida</i>	0.05%	
<i>Scopalina</i> sp.	0.10%	
<i>Spirastrellidae</i>	0.20%	X
Cnidaria	22.49%	X
Alcyonacea - gorgonian	2.00%	X
Alcyonacea- gorgonian	1.20%	X
<i>Bebryce</i> sp.		X
<i>Nicella</i> sp.	0.80%	
Anthozoa - Non Coral	2.70%	X
<i>Zoanthidae</i>	2.70%	X
Antipatharia	2.45%	X
<i>Antipathes atlantica</i> Gray, 1857	0.40%	
<i>Antipathes furcata</i> Gray, 1857	0.30%	X
<i>Antipathidae</i>	0.30%	X
<i>Stichopathes lutkeni</i> Brook, 1889	0.40%	X
<i>Tanacetipathes</i> sp.	1.05%	X
Hydrozoa	1.35%	
<i>Hydroidolina</i>	1.35%	
Scleractinia	13.99%	X

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

<i>Astrangia</i> sp.		X
<i>Oculina varicosa</i> Lesueur, 1821	11.74%	X
Scleractinia- unid cup	2.25%	X
Annelida	0.05%	
Polychaeta	0.05%	
<i>Hermodice carunculata</i> (Pallas, 1766)	0.05%	
Mollusca	1.05%	
Bivalvia	1.05%	
Chordata - Vertebrate	0.45%	
Chordata	0.45%	
Actinopterygii	0.45%	
UNKNOWN	0.10%	
Human Debris	0.05%	X
Non-Fauna	0.05%	X
Human debris	0.05%	X
Human debris- fish line/gear	0.05%	X
Human debris- anchor line		X
Bare Substrate	62.22%	
Non-Fauna	62.22%	
Habitat	62.22%	
Bare coral rubble	0.75%	
Bare rock, pavement, boulder, ledge	53.92%	
Bare rubble/cobble	0.10%	
Bare soft bottom	7.20%	
dead standing Scleractinia	0.25%	
Grand Total	100.00%	X

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-19.

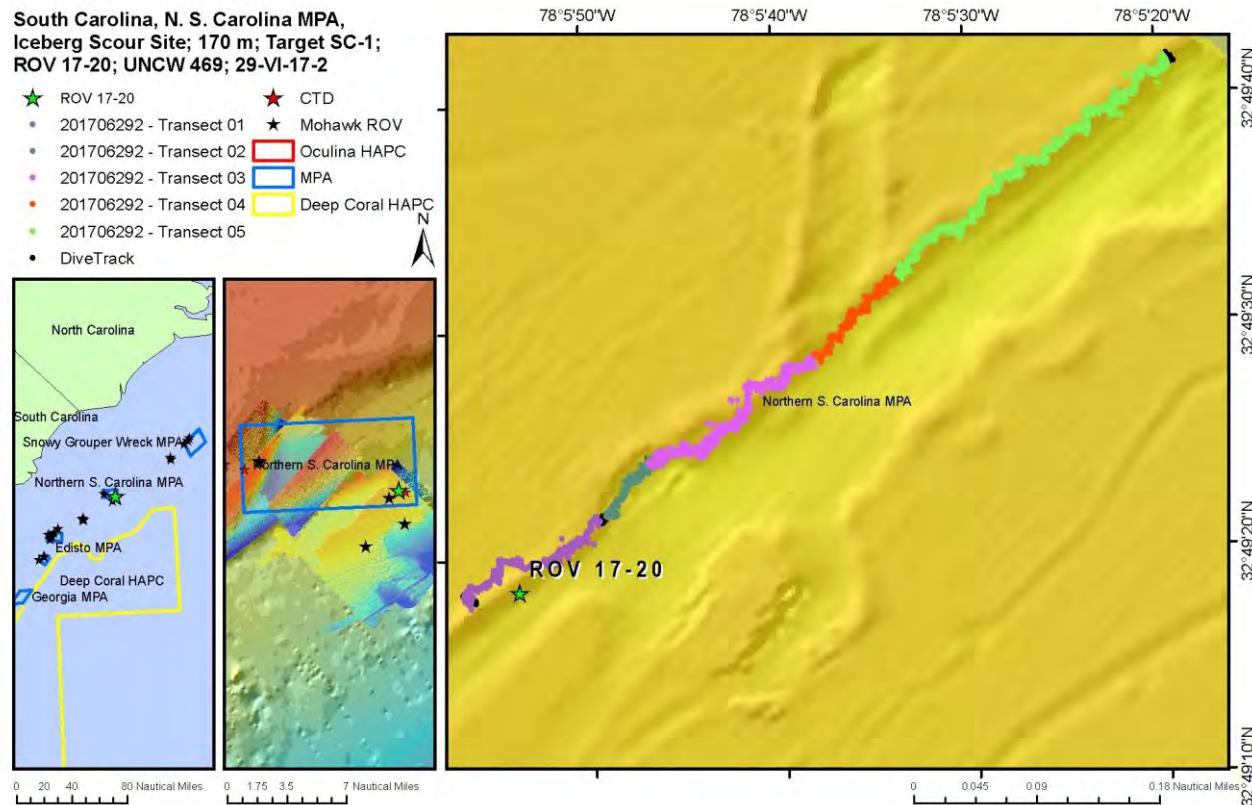
Class/Scientific Name- Common Name	17-19
Actinopterygii	
Beryciformes	
<i>Holocentridae</i> - Soldierfish/Squirrfish	0.3200
<i>Holocentridae</i> - Squirrfish	3.6800
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	0.3200
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	4.4800
Perciformes	
<i>Anthiinae</i> - Anthiid	377.6000
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	12.9600
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.1600
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.9600
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	13.1200
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	0.9600
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	7.5200
<i>Clepticus parrae</i> (Bloch & Schneider, 1801)- Creole Wrasse	2.5600
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)- Spanish Flag	4.3200
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	46.0800
<i>Haemulon</i> sp.- Grunt	284.8000
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	696.0000
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.4800
<i>Halichoeres</i> sp.- Wrasse	1.6000
<i>Hemanthias vivanus</i> (Jordan & Swain, 1885)- Red Barbier	30.4000
<i>Holacanthus</i> sp.- Angelfish	0.3200
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	2.7200
<i>Liopropoma aberrans</i> (Poey, 1860)- Eyestripe Bass	0.9600
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	5.7600
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	1.2800
<i>Lutjanus</i> sp.- Snapper	0.1600
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.1600
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	4.6400
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	1.6000
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.1600
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.8000
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	5.2800
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	131.2000
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.3200
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	123.2000
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	6.5600

Dive Site: North Carolina, 13 nmi Outside Snowy Wreck MPA; Reef Site; 90 m; Target NC-1; ROV 17-19; UNCW 468; 28-VI-17-4

<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.6400
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.7600
<i>Seriola</i> sp.- Amberjack	2.7200
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.4800
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.1600
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	6.8800
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.1600
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	8.9600
<i>Chilomycterus antillarum</i> Jordan & Rutter, 1897- Web Burrfish	0.1600
<i>Chilomycterus</i> sp.- Burrfish	0.1600
Elasmobranchii	
Carcharhiniformes	
<i>Carcharhinus plumbeus</i> (Nardo, 1827)- Sandbar Shark	0.1600
UNKNOWN	
	0.3200

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock2_5m_UT M17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/29/2017
Specimens:	0
Digital Photos:	340
No. DVD:	2
Hard Drive No.:	1

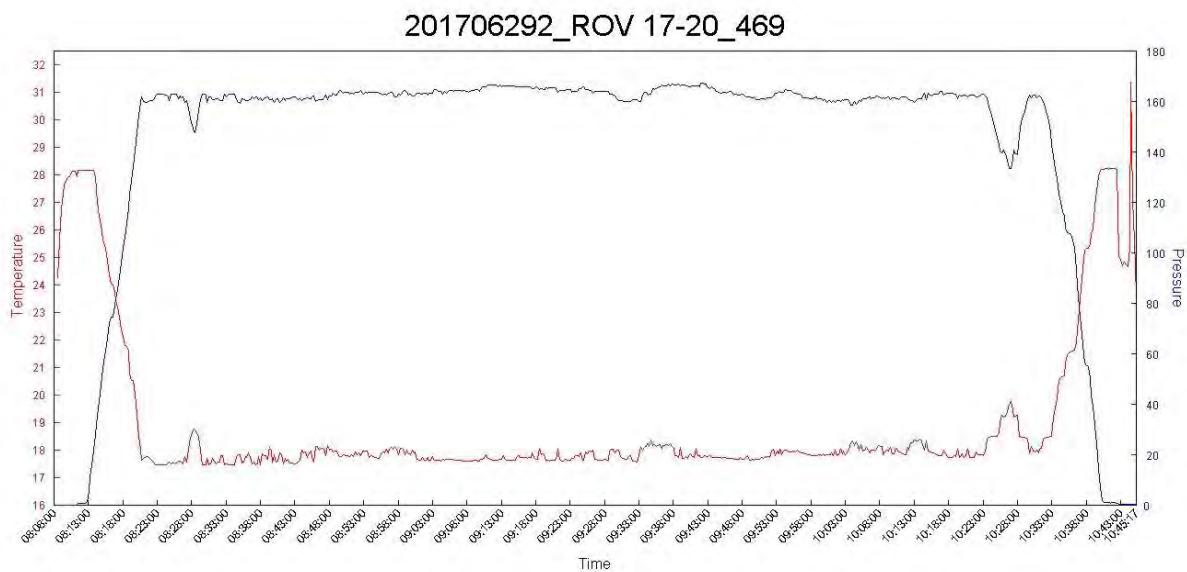
Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	148.1	Total Transect Length (km):	1.317
Maximum Bottom Depth (m):	167.4	Surface Current (kn):	0.7
On Bottom (Time- EDST):	8:19	On Bottom (Lat/Long):	32.8219°N; -78.0991°W
Off Bottom (Time- EDST):	10:21	Off Bottom (Lat/Long):	32.8282°N; -78.0885°W
Physical (bottom); Temp (°C):	20.5	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-20 are as follows: Depth Maximum: 167.2 m, Temperature: 17.5-20.5 °C

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

Dive Imagery:

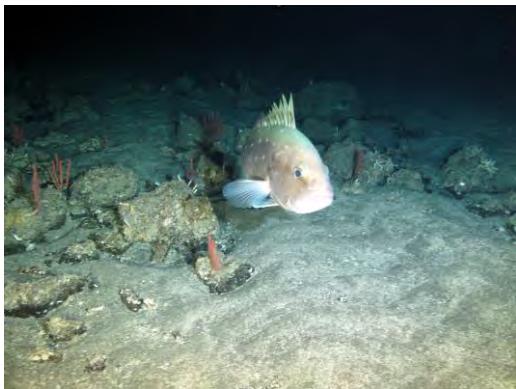


Figure 1: -161.4 m

Snowy grouper (*Hyporthodus niveatus*) were common at ice berg scour site.



Figure 2: -164.1 m

Slitshell mollusk- *Perotrochus maureri*.



Figure 3: -162.6 m

Snowy grouper (*Mycteroperca phenax*).



Figure 4: -164.4 m

Blueline tilefish (*Caulolatilus microps*).



Figure 5: -163.2 m

Rock hard, deepwater *Lithistid* sponges are common- *Leiodermatium*.



Figure 6: -164.4 m

Parthenope decapod crab.

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706292

Site/Objectives:

Site #- 29-VI-17-2; ROV 17-20, UNCW Dive 469; Northern South Carolina MPA, Ice Berg Scour Site, Site SC-1, 160 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization. XS Images stop at 8:58 AM.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- depth appeared close to MB depth; xy appeared close to MB position on rim of scour.

Site Description/Habitat/Biota:

Depth range: 161- 167 m

MB map (Pisces 2012 Northern South Carolina, 5 m resolution). Iceberg scar, 2000 m long, 50 m wide, oriented NE- SW. MB depths- base- 170, plateau top- 163 m. Transect heading NE along scour. Previous dive 14-12, in same scour but further SW.

08:09- Launch; Sunny, air- 27.7, wind- 8 kn from 77 dg, seas- 1-2 ft from NE, current- 0.7 kn to 230 dg, water- 25.80 dg C, salinity- 36.568.

08:19- On bottom, near WP 1; depth- 163 m , visibility- 5 m, current- 0.1.

On bottom, plateau north of scour. 100% soft bottom, coarse sand, grey and black grains, rubble, cm sand ripples. Black granitic (?) sand and rubble.

08:33- 161.5 m. ROV at north rim, 5 m wide, 25 cm to 50 cm boulders, some larger 1-2 m diameter, flat topped boulders, <1/2 m relief, appear black, granitic. Biota: 3-4 spp 15 cm white and orange gorgonians (abundant), *Leiodermatium* (common), *Paracolochirus mysticus*, snowy grouper, school boarfish, blueline tilefish, roughy, hermit crab, serpulid worm tubes all over rocks. Wider field of 25-50 cm boulders, 162 m. Cerianthid, slit shell 3-4" turbon top- *Paratrochus quoyanus*?

08:58, 163 m, west rim of scour. Flat, 25-50 cm boulders, some flat topped boulders 1 m. Blue encrusting sponge *Desmacella*, yellow encrusting sponge, decapod long arms *Parthenope*, thick walled wavy plate Corallistidae, cup coral.

09:16-165 m, north rim of scour, small boulders; haven't seen the steep wall or large build up of boulders at top like other scour sites, 5 dg slope, flat on top. *Murex*, reticulate eel, *Holothuria lentigenosa enodis*.

09:29- 161 m, top of plateau, sand. 161 m – top edge, 100% boulders 25 cm to 1 m, <1/2 m relief. Same biota. Field of 25 cm boulders, interspersed with sand areas. 165- 168 m- 100% sand, asymmetrical ripples. MB- in a valley where another scar intersects from the west.

09:44- 167 m, west rim, top. MB- shows same position. 25 cm to 50 cm boulders, undercut ledge ½ m, slope <10 dg. Fishing line pile, same biota, sparse fish, orange and yellow gorgonians, *Leiodermatium*, *Paracolochirus*, fishing line pile, hydroid, long spined sea urchin *Stylocidaris*?

10:05- intersecting dive 2012-30 still on northern rim of scour, same habitat same biota, 125 m to end, *Majidae*, the fuzzy hair under the rocks is likely hairy hydrooids.

10:19- 163 m, end WP, top north rim. Flat, 25-50 cm boulders. Same biota.

10:21- 163 m. End of dive.

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

Dominant Benthic Macrobiota:

Scleractinia- cup coral- 1

Antipatharia- none

Gorgonacea- 2 spp abundant 15 cm white, orange fans

Cerianthidae

Hydroida

Porifera- *Leiodermatium* (abundant), blue Dercitus, thin encrusting spp.

Decapoda- *Parthenope*, hermit crabs, Majidae

Holothuroidea- *Holothuria lentigenosa enodis*, *Paracolochirus mysticus* (abundant)

Echinoidea- Cidaroid

Mollusca- *Paratrochus quoyanus?*, *Murex*

Dominant Fish:

Snowy grouper- 19, yellowedge grouper-1, hake, reticulate morays, roughy- 7, red hogfish, apricot bass, short bigeye, scorpion fish, saddle fish, yellow fin bass, boarfish (large schools), baracuda

Human Debris:

Several piles fishing line.

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

CPCe Percent Cover Analysis:

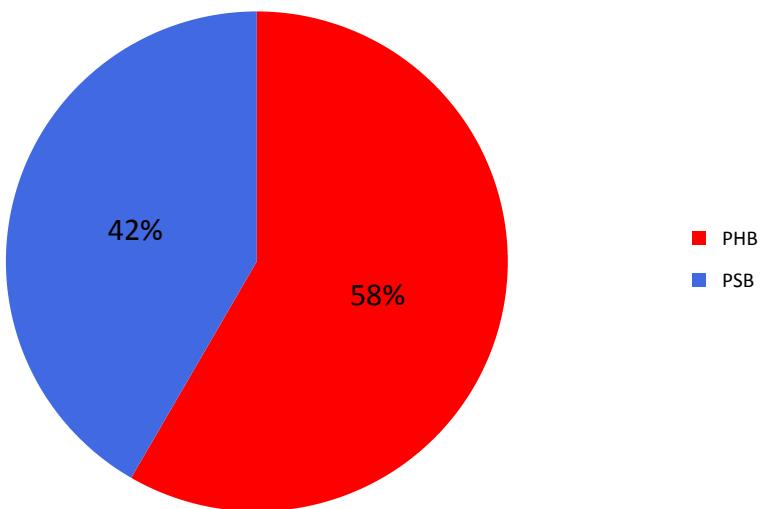
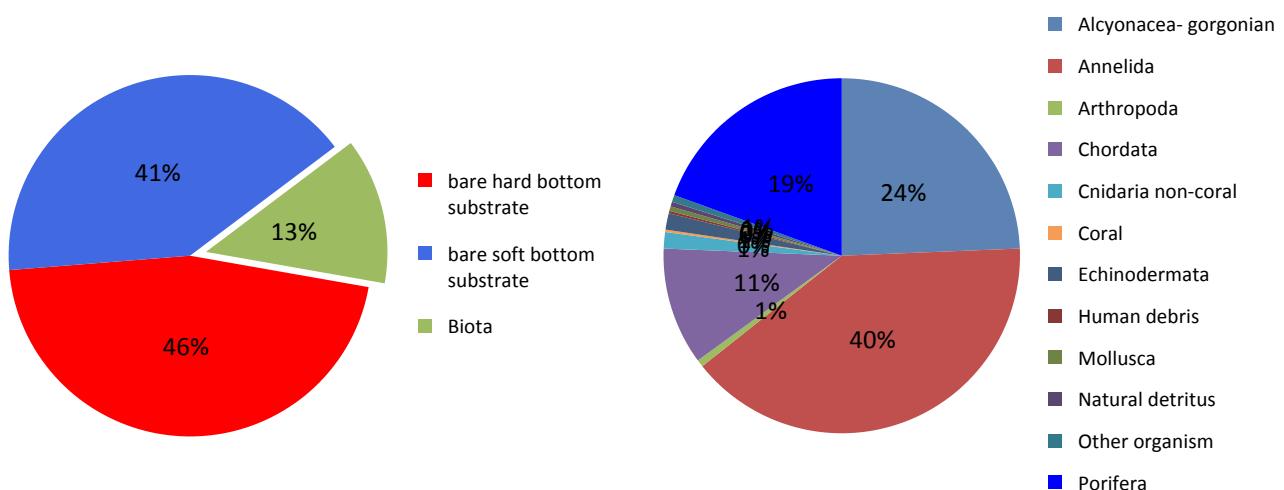


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-20. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-20.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-20.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-20 dive notes
Biota	13.04%	X
Porifera	2.54%	X
<i>Demospongiae</i>	2.54%	X
<i>Auletta</i> sp.	0.03%	
<i>Corallistes</i> sp.		X
Corallistidae	0.22%	
<i>Demospongiae</i> unid. sp.	0.56%	X
<i>Desmacella</i> sp.		X
<i>Leiodermatium</i> sp.	1.65%	X
Pachastrellidae	0.08%	
<i>Spongisorites</i> sp.		X
Cnidaria	3.41%	X
Alcyonacea - gorgonian	3.18%	X
Alcyonacea- gorgonian	0.95%	X
<i>Nicella</i> sp.	2.23%	
Anthozoa - Non Coral		X
Cerianthidae		X
Antipatharia		X
Antipathidae		X
Hydrozoa	0.20%	X
Hydroidolina	0.20%	X
Scleractinia	0.03%	X
Scleractinia- unid cup	0.03%	X
Annelida	5.22%	X
Annelida	2.60%	
Polychaeta	2.62%	X
<i>Filograna</i> sp.	0.06%	
Sabellidae	0.11%	
Serpulidae	2.46%	X
Arthropoda	0.08%	X
Decapoda	0.08%	X
Anomura		X
Majidae	0.03%	X
Paguroidea	0.06%	

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

<i>Parthenope</i> sp.		X
Echinodermata	0.20%	X
Echinoidea	0.06%	X
Cidaroida		X
<i>Eucidaris tribuloides</i> (Lamarck, 1816)	0.06%	
Holothuroidea	0.14%	X
<i>Holothuria lentiginosa enodis</i> Miller & Pawson, 1979		X
<i>Paracolochirus mysticus</i> (Deichmann, 1930)	0.14%	X
Mollusca	0.06%	X
Gastropoda	0.06%	X
<i>Bayerotrochus midas</i> (Bayer, 1965)		X
Gastropoda	0.06%	
<i>Perotrochus</i> sp.		X
Chordata - Vertebrate	1.40%	
Chordata	1.40%	
Actinopterygii	1.40%	
Non-Fauna	0.06%	
Detritus	0.06%	
Natural Detritus	0.06%	
UNKNOWN	0.08%	
Human Debris	0.03%	X
Non-Fauna	0.03%	X
Human debris	0.03%	X
Human debris- fish line/gear	0.03%	X
Human debris- other		X
Human debris- trawl net		X
Bare Substrate	86.93%	
Non-Fauna	86.93%	
Habitat	86.93%	
Bare rock, pavement, boulder, ledge	45.81%	
Bare rubble/cobble	0.14%	
Bare soft bottom	40.98%	
Grand Total	100.00%	

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 170 m; Target SC-1; ROV 17-20; UNCW 469; 29-VI-17-2

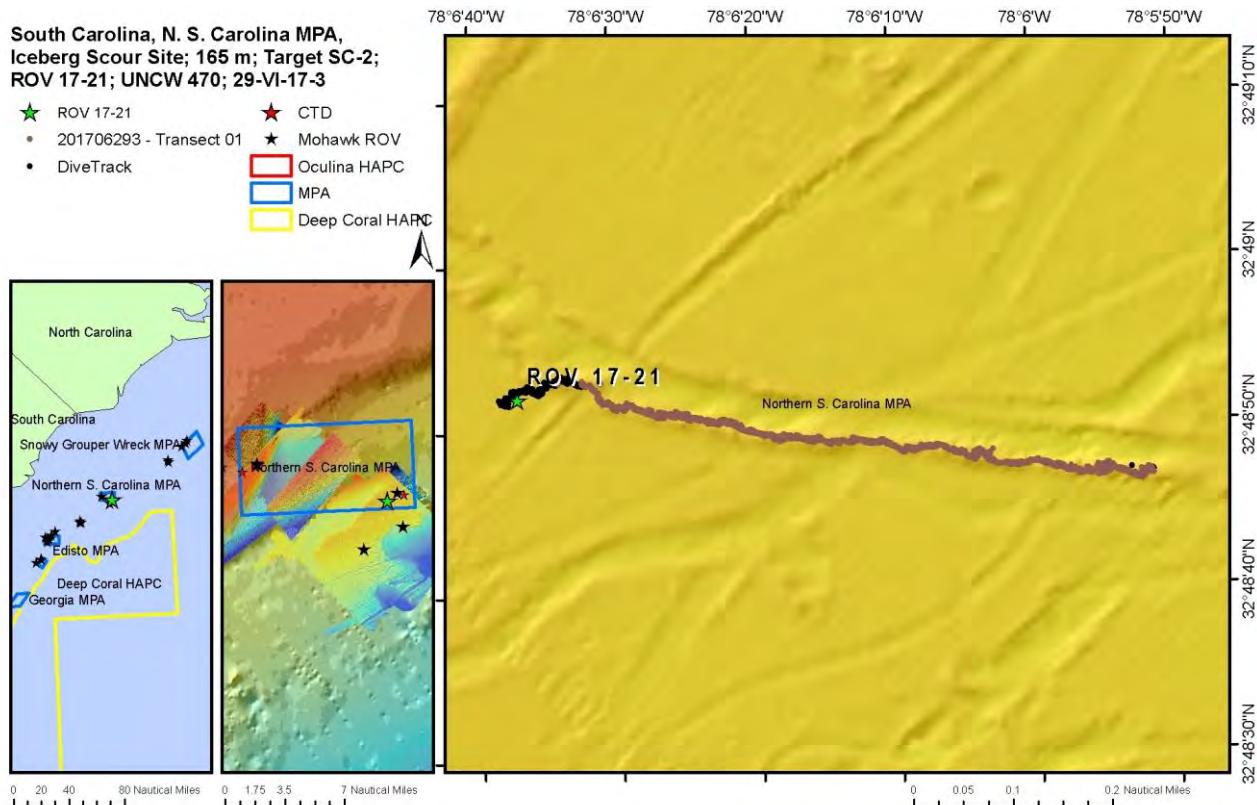
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-20.

Class/Scientific Name- Common Name	17-20
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.2586
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.1293
Beryciformes	
<i>Gephyroberyx darwinii</i> (Johnson, 1866)- Darwin'S Slimehead	1.0343
<i>Ostichthys trachypoma</i> (Günther, 1859)- Bigeye Soldierfish	1.5514
Gadiformes	
<i>Laemonema</i> sp.- Mora Cod	0.9050
Lophiiformes	
<i>Ogcocephalus</i> sp.- Batfish	0.1293
Perciformes	
<i>Anthias nicholsi</i> Firth, 1933- Yellowfin Bass	5.4299
Anthiinae- Anthiid	113.8979
<i>Antigonia</i> sp.- Boarfish	30.6399
<i>Caulolatilus microps</i> Goode & Bean, 1878- Blueline Tilefish	0.5171
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	11.7647
<i>Halichoeres</i> sp.- Wrasse	0.3878
<i>Hyporthodus flavolimbatus</i> (Poey, 1865)- Yellowedge Grouper	0.1293
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper	1.9392
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.3878
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.5171
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	1.1635
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	0.9050
<i>Plectranthias garrupellus</i> Robins & Starck, 1961- Apricot Bass	11.1183
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	3.7492
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.7757
<i>Prognathodes guyanensis</i> (Durand, 1960)- French Butterflyfish	0.5171
<i>Seriola</i> sp.- Amberjack	0.1293
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	2.9735
Scorpaeniformes	
Scorpaenidae- Scorpionfish	6.8520
UNKNOWN	1.2928

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock2_5m_UT M17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/29/2017
Specimens:	0
Digital Photos:	295
No. DVD:	2
Hard Drive No.:	1

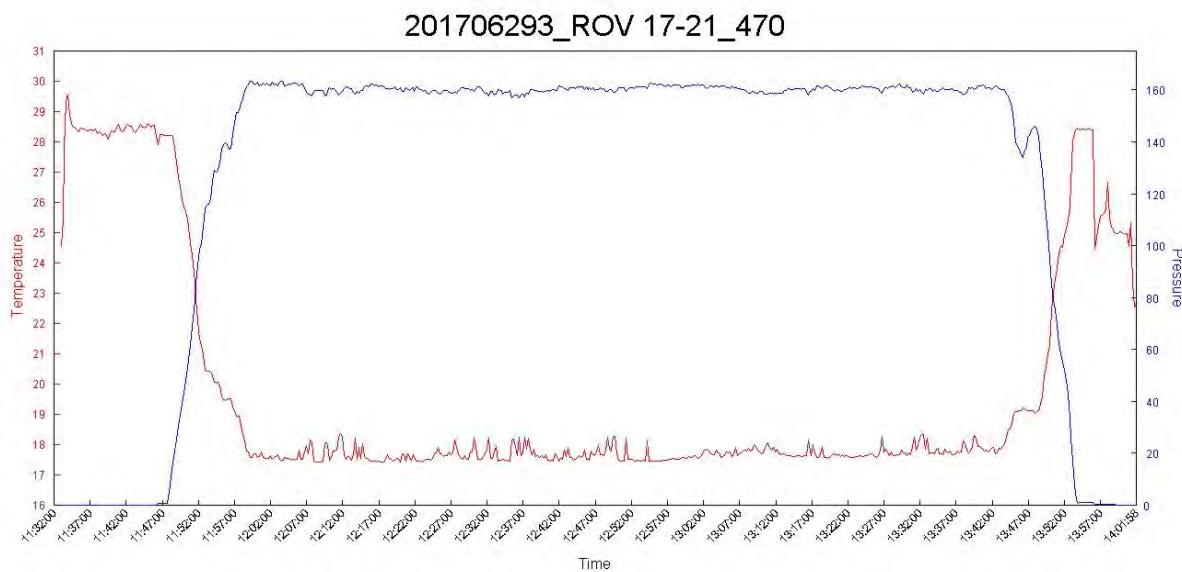
Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Dive Data:

Minimum Bottom Depth (m):	160	Total Transect Length (km):	1.299
Maximum Bottom Depth (m):	164	Surface Current (kn):	0.6
On Bottom (Time- EDST):	11:57	On Bottom (Lat/Long):	32.8145°N; -78.1106°W
Off Bottom (Time- EDST):	13:41	Off Bottom (Lat/Long):	32.8132°N; -78.0977°W
Physical (bottom); Temp (°C):	19	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-21 are as follows: Depth Maximum: 163.4 m, Temperature: 17.4-19 °C

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Dive Imagery:



Figure 1: -160.2 m
Slit shell- *Perotrochus maureri*.



Figure 2: -160.8 m
Reticulate moray eel (*Muraena retifera*).



Figure 3: -160.1 m
Rugged boulders on edge of ancient glacial scour covered with sponges and gorgonians and a red hogfish (*Decodon puellaris*).



Figure 4: -159.5 m
Blueline tilefish (*Caulolatilus microps*) at edge of scour.



Figure 5: -160.6 m
Scamp grouper (*Mycteroperca phenax*).



Figure 6: -162.5 m
Large Lithistid sponge with snowy grouper (*Hyporthodus niveatus*) which were common at this site.

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706293

Site/Objectives:

Site #- 29-VI-17-3; ROV 17-21, UNCW Dive 470; Northern South Carolina MPA, Ice Berg Scour Site, Site SC-2, 165 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS offset is incorrect, relative to accurate MB positions. ROV GPS- 160 m, ROV video shows us at top of south rim; MB position shows us 20 m to N at bottom of slope; ship's heading is NE. Lance thinks the new ROV tracking is not taking depth of hydrophone pole in account which would affect the algorithm calculating ROV position.

Site Description/Habitat/Biota:

Depth range: 160- 164 m

MB map (Pisces 2012 Northern South Carolina, 5 m resolution). Ice berg scar, E-W oriented scour, 4000 m long, 81 m wide; MB depths: base- 165 m, plateau top- 162 m. Transect heading E along south rim of scour, 1 km from WP 1 to 2. Previous dive 14-11 in the same scour but east of this dive site.

11:44- Launch; sunny, air- 27.9, wind- 10 kn from 92 dg, seas- 1 ft from E, current- 0.7 kn to 259 dg, water- 25.88 dg C, salinity- 36.603.

11:56- On bottom, depth- 164 m , visibility- 10 m, current- 0.25 from N.

On bottom- 260 m west of WP 1, flat top plateau. Flat sand, grey and black grains, sand ripples, rubble black-granitic?, 1 m flat topped boulders, <1/2 m relief. MB shows featureless bottom; ROV shows patches of 25-50 cm boulders, interspersed with sand. Biota- same as am dive on rocks: yellow and orange gorgonians, *Paracorochirus mysticus*, yellow lobate sponges, *Paratrochus quoyanus?*, snowy grouper.

12:03- 163 m, south rim of scour, but 150 m to WP. 25-50 m boulders, flat. Biota- dense cover, *Leiodermatium* (abundant, 20-75 cm), 2-4 spp of gorgonians, mostly red-orange, serpulid tubes, school of boarfish, roughtongue, red barbier, hydroids, slit shell, hermit crab, *Holothuria lentigenosa enodis*, Cidaroid urchin Cidaris. 12:12- 161 m- on rim crest, rugose, boulders, 50 cm- 1 m relief. *Leioderatium* to 50 cm.

12:14- 163 m, at WP 1, south rim. Mostly 25-50 cm boulders, <1/2 m relief, few 1 m diameter flat top boulders, interspersed with sand areas, slope 10 dg. No obvious drop off or ledge. Majidae.

12:22- 160 m, ROV video shows us at top of south rim; MB position shows us 20 m to N at bottom of slope; ship's heading is NE. Flat plate Corallistidae, thick walled cup Corallistidae.

12:49- 162 m, top rim, same habitat, biota. ROV tracking off 20 m north. Cluster of fingers, 3 mm apical oscules, light yellow demosponge; 30 cm thick plate Astrophorida, yellow thick encrusting sponges.

13:04- 161 m, top edge of rim, 25-50 cm boulders, sand. Same biota- slit shell, slit shell, slit shell.

13:28- 161 m, top edge. *Parthenope*.

13:40- 162 m, top edge in video; MB shows at base of slope to N. End of dive.

Dominant Benthic Macrobiota:

Gorgonacea- 2 spp abundant 15 cm white, red-orange fans

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Hydroida

Porifera- *Leiodermatium* (abundant), yellow cluster fingers, plate Corallistidae, thick cup Corallistidae, thick plate *Astrophorida*, yellow thick encrusting *Spongisorites*?

Decapoda- Parthenope, hermit crabs, Majidae

Holothuroidea- *Holothuria lentigenosa enodis*, *Paracolochirus mysticus* (abundant)

Echinoidea- Cidaroid

Mollusca- *Paratrochus quoyanus*?, Murex

Dominant Fish:

Blueline tilefish-12, snowy grouper- 16, scamp-2, Darwin slimehead roughy-numerous, french butterfly, red porgy, yellow fin bass, scorpion, red hog, apricot bass, *Laemonema*, bigeye soldier, red barbier, roughtongue bass

Human Debris:

none

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21;
UNCW 470; 29-VI-17-3

CPCe Percent Cover Analysis:

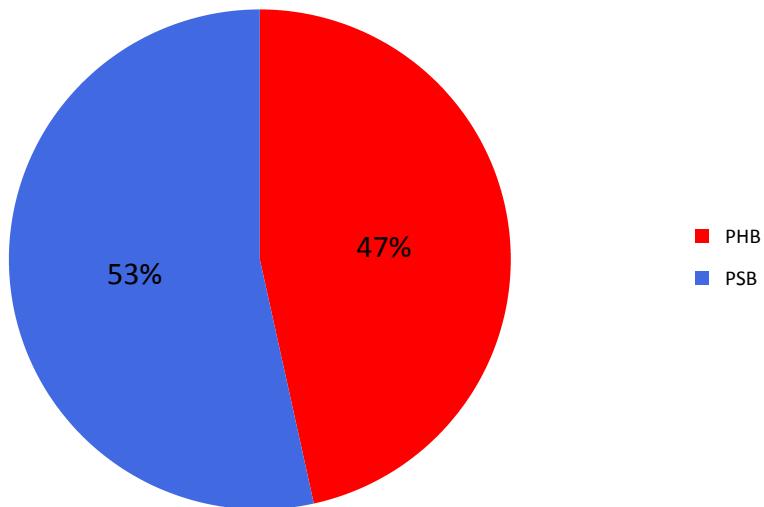


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-21. CPCe® points on organisms were scored as the underlying substrate (hard or soft).

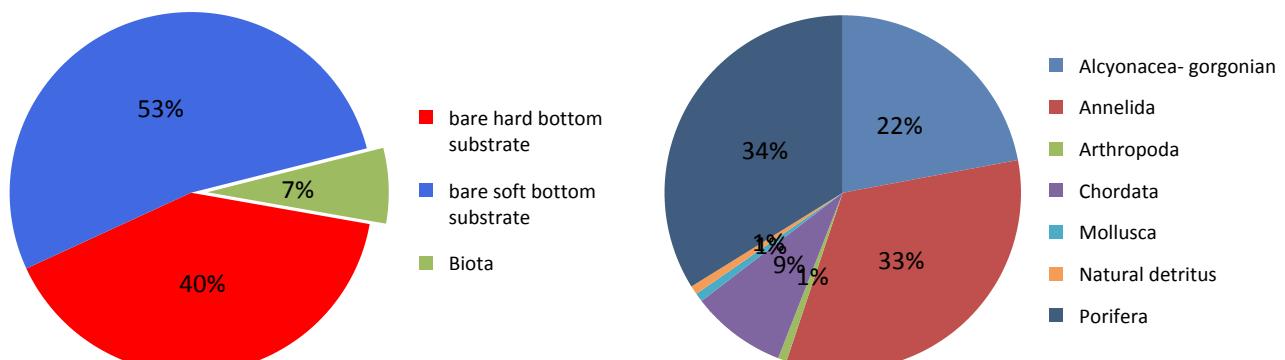


Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-21.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects at dive site ROV 17-21.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-21 dive notes
Biota	6.73%	X
Porifera	2.28%	X
<i>Demospongiae</i>	2.28%	X
<i>Corallistes</i> sp.	0.05%	X
<i>Demospongiae unid.</i> sp.	0.74%	X
<i>Leiodermatium</i> sp.	1.48%	X
Tetractinellida (syn. Astrophorida)		X
Cnidaria	1.48%	X
Alcyonacea - gorgonian	1.48%	X
Alcyonacea- gorgonian	0.37%	X
<i>Nicella</i> sp.	1.11%	
Annelida	2.23%	X
Annelida	0.05%	
Polychaeta	2.17%	X
Sabellidae	0.21%	
Serpulidae	1.96%	X
Arthropoda	0.05%	X
Decapoda	0.05%	X
Anomura		X
Majidae		X
Paguroidea	0.05%	
<i>Parthenope</i> sp.		X
Echinodermata		X
Echinoidea		X
Cidaroida		X
Holothuroidea		X
<i>Holothuria lentiginosa enodis</i> Miller & Pawson, 1979		X
<i>Paracolochirus mysticus</i> (Deichmann, 1930)		X
Mollusca	0.05%	X
Gastropoda	0.05%	X
<i>Perotrochus amabilis</i> Rios, 2003	0.05%	
<i>Perotrochus quoyanus quoyanus</i> (P. Fischer & Bernardi, 1856)		X
<i>Perotrochus</i> sp.		X
Chordata - Vertebrate	0.58%	

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

Chordata	0.58%
Actinopterygii	0.58%
Non-Fauna	0.05%
Detritus	0.05%
Natural Detritus	0.05%
Bare Substrate	93.27%
Non-Fauna	93.27%
Habitat	93.27%
Bare rock, pavement, boulder, ledge	39.53%
Bare rubble/cobble	0.79%
Bare soft bottom	52.94%
Grand Total	100.00%

Dive Site: South Carolina, N. S. Carolina MPA, Iceberg Scour Site; 165 m; Target SC-2; ROV 17-21; UNCW 470; 29-VI-17-3

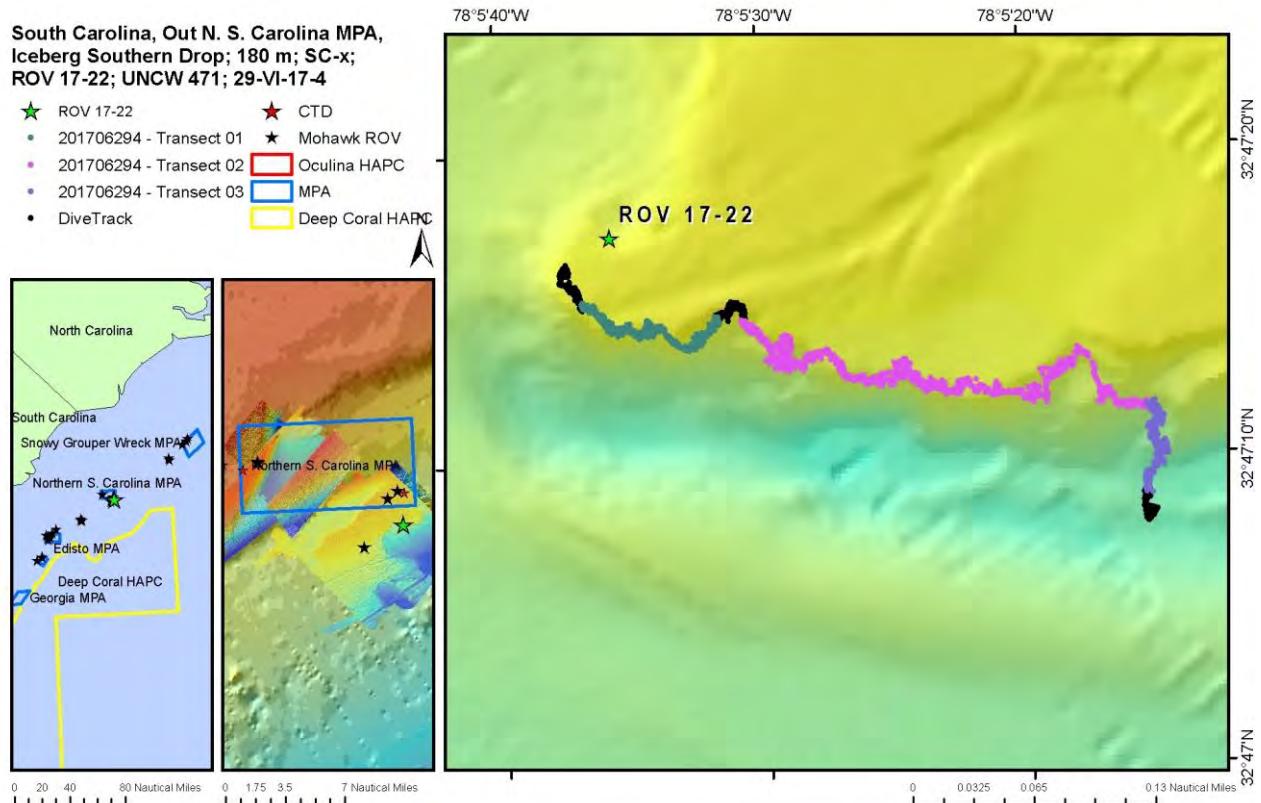
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-21.

Class/Scientific Name- Common Name	17-21
Actinopterygii	
Anguilliformes	
<i>Gymnothorax funebris</i> Ranzani, 1839- Green Moray	0.1425
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.1425
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.4274
Beryciformes	
<i>Gephyroberyx darwinii</i> (Johnson, 1866)- Darwin'S Slimehead	2.5641
<i>Ostichthys trachypoma</i> (Günther, 1859)- Bigeye Soldierfish	2.1368
Gadiformes	
<i>Laemonema</i> sp.- Mora Cod	1.4245
Perciformes	
Anthiinae- Anthiid	259.2593
<i>Antigonia</i> sp.- Boarfish	72.7920
<i>Caulolatilus microps</i> Goode & Bean, 1878- Blueline Tilefish	2.1368
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	14.6724
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	1.2821
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper	2.1368
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.5698
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.2849
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	1.8519
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	1.7094
<i>Plectranthias garrupellus</i> Robins & Starck, 1961- Apricot Bass	9.8291
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	1.1396
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.5698
<i>Prognathodes guyanensis</i> (Durand, 1960)- French Butterflyfish	0.5698
Serranidae- Grouper	0.1425
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	2.7066
Scorpaeniformes	
Scorpaenidae- Scorpionfish	10.3989
UNKNOWN	0.7123

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock2_5m_UT M17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/29/2017
Specimens:	0
Digital Photos:	266
No. DVD:	2
Hard Drive No.:	1

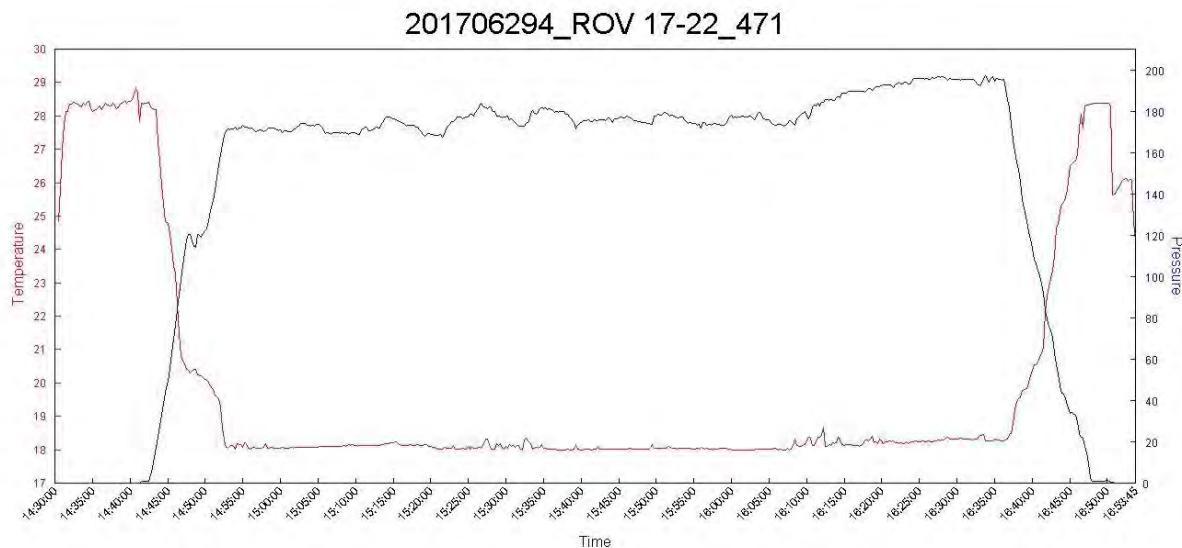
Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Dive Data:

Minimum Bottom Depth (m):	167.1	Total Transect Length (km):	0.881
Maximum Bottom Depth (m):	197.3	Surface Current (kn):	0.6
On Bottom (Time- EDST):	14:50	On Bottom (Lat/Long):	32.788°N; -78.0937°W
Off Bottom (Time- EDST):	16:33	Off Bottom (Lat/Long):	32.7859°N; -78.0876°W
Physical (bottom); Temp (°C):	19.8	Salinity:	N/A
		Visibility (m):	18
		Current (kn):	N/A

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-22 are as follows: Depth Maximum: 196.5 m, Temperature: 18-19.8 °C

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Dive Imagery:



Figure 1: -173.8 m

Big roughy (*Gephyroberyx darwinii*) at edge of glacial scour boulder zone.



Figure 2: -180.5 m

Large snowy grouper (*Hyporthodus niveatus*) were common at this site.



Figure 3: -180.1 m

Vase sponge- *Auleta*?, and sea urchin sitting on top of rock. This holothurian (*Paracolochirus mysticus*) has potent chemical properties.



Figure 4: -195.7 m

Anemone



Figure 5: -179.4 m

Snowy grouper (*Hyporthodus niveatus*)



Figure 6: -177.5 m

Moray eel (Muraenidae)

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706294

Site/Objectives:

Site #- 29-VI-17-4; ROV 17-22, UNCW Dive 471; Northern South Carolina Ice Berg Scour Site, southern dropoff, outside MPA, 180 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS offset is incorrect, relative to accurate MB positions. ROV GPS- Lance thinks the new ROV tracking is not taking depth of hydrophone pole in account which would affect the algorithm calculating ROV position. ROV at 170 m, near top of escarpment; MB shows ROV 20 m to the N of the edge, depth 170 m; heading of ship ENE.

Site Description/Habitat/Biota:

Depth range: 170- 197 m

MB map (Pisces 2012 Northern South Carolina, 5 m resolution). South of iceberg scour site, E-W oriented dropoff, 2000 m long, along south face of plateau; base of slope is scoured valley with rim along south side of valley; top plateau- 170 m, valley- 197 m, rim- 188 m. Transect heading E along south facing slope.

14:39- Launch; sunny, air- 27.9, wind- 14 kn from 104 dg, seas- 1 ft, current- 0.6 kn to 235 dg, water- 25.98 dg C, salinity- 36.595.

14:50- On bottom, depth- 172 m , visibility- 18 m, current- x

On bottom, flat top of plateau, 45 m to dropoff in MB. Pavement on top, sharp escarpment to W. Face of escarpment, rugged eroded rock, 60 dg slope, 45-60 dg slope, relief < 1m, 100% hard bottom. Dominant biota- *Leiodermatium*, thick plate *Astrophorida*, vase shaped *Astrophorida*, serpulid polychaete tubes, several spp of *Astrophorida*, dense anhiids. Slope 45-60 dg slope, relief < 1m, 100% hard bottom. Hermit crab, Majidae, blue *Desmacella*, *Coelopleurus floridanus*. 175 m- upper slope, 45 dg slope, low relief, <1m, some areas rugose with 1 m boulders. Dense *Leiodermatium*.

15:05- ROV at 170 m, near top of escarpment; MB shows ROV 20 m to the N of the edge, depth 170 m; heading of ship ENE. ROV heading E along top of escarpment slope. Flat rock slabs, 1-2 m diameter, up to 3-4 m diameter, 25 cm thick, <1 m relief ledges, high rugosity. 175 m- further down slope is lower relief rock pavement. Cidaroid, snowy grouper, roughie, *Paracolochirus mysticus*.

15:20- heading south down the wall. 175 m- rock pavement, small boulders, low relief, low rugosity, 177 m- 15 cm Primnoidae fans *Plumarella pourtalesii*, flat rock pavement, rubble, cobble, fishing line. 180 m- fractured rock slabs, 30 dg slope. Series of stair step escarpments, then pavement slope. 185 m- 1 m ledge. MB shows us on top of mound- incorrect. Biota- *Leiodermatium*, *Astrophorids*, serpulids, fishing line, primnoid, vertical curtain sponge 1 m long *Raspailiidae?*, *Aulettia*.

15:30- Back up to 173 m, trouble going deeper. Heading back down slope. 180 m- 4 large snowy, fishing line, pavement, rubble, cobble, 30 dg slope, low relief, low rugosity, *Holothuria lentigenosa*, *Aulettia*.

15:36- 175 m, can't get to bottom. Top of plateau. Asteroid, no black coral, no stylaster, may be due to the rock appear granitic, not carbonate.

16:00- 178 m, upper slope, near end of wall. Rugged rock and rock slabs near top, lower relief rock below.

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Same biota.

16:06- 178 m, head south down slope. 183 m- <10 dg slope, rock pavement, rubble, cobble, primoids, *Astrophorida*, *Aulettia*, slit shell. 188 m- 20 cm cobble, sponges common, *Paracolochirus*, brittlestar. 190 m- flat sediment, rubble, cobble 10-20 cm, 80% hard bottom, *Aulettia*, blue *Desmacella*. 193 m- Euretidae glass sponge, *Plumarella pourtalessii*, blueline tilefish, snowy, irregular branching plate sponge, Euretidae.

16:25- 197 m, base of escarpment on MB. Rock pavement, rubble, cobble, sponges, primoids common, *Paracorochirus* common. Vase sponge with rugose surface, *Astrophorida*. Cush ball anemone *Liponema*. Trawl net.

16:33. End dive.

Dominant Benthic Macrobiota:

Gorgonacea- *Plumarella pourtalessi*

Actiniaria- *Liponema* cushion ball

Hydroids

Porifera- *Leiodermatium* (abundant), plate Corallistidae, thick cup Corallistidae, thick plate *Astrophorida*, vase *Astrophorida*, blue *Desmacella*, vertical curtain sponge Raspalliidae?, *Aulettia* tubes, Euritidae

Decapoda- hermit crabs, Majidae

Holothuroidea- *Holothuria lentigenosa enodis*, *Paracolochirus mysticus* (abundant)

Echinoidea- Cidaroid

Asterioidea

Serpulidae

Mollusca- *Paratrochus quoyanus*?

Dominant Fish:

Snowy grouper- 24, blueline tilefish- 4, darwin slimehead- 14, yellowfin bass, red porgy, scorpion fish, red barbier, apricot bass, red hog, boar fish, moray, bull eye, bladefin basslet

Human debris:

Fishing lines, trawl net

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22;
UNCW 471; 29-VI-17-4

CPCe Percent Cover Analysis:

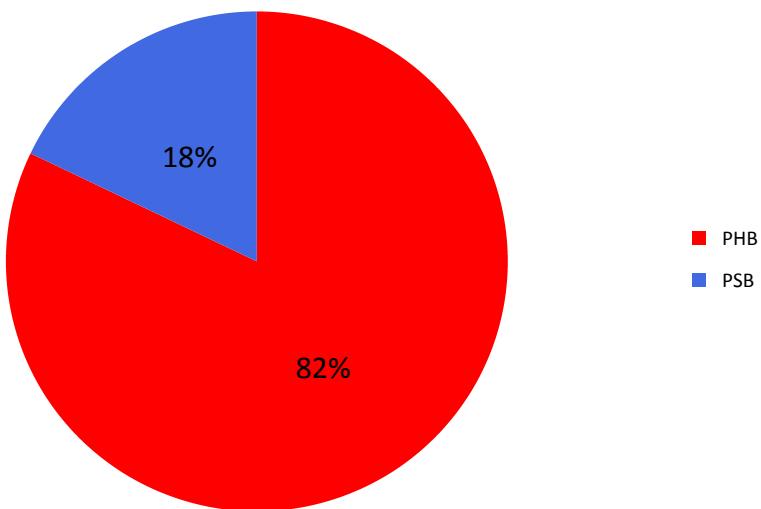
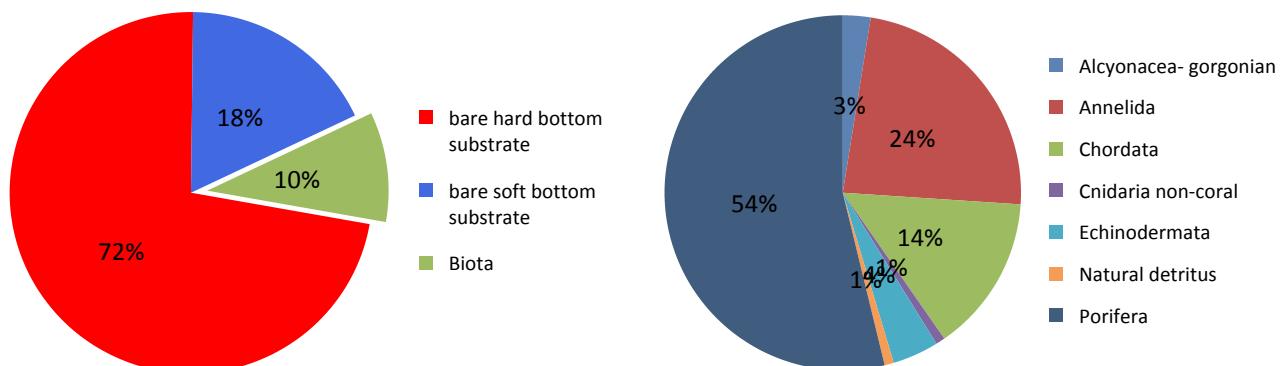


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-22. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-22.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-22.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-22 dive notes
Biota	9.80%	X
Porifera	5.27%	X
Demospongiae	4.94%	X
<i>Auletta</i> sp.		X
<i>Corallistes</i> sp.		X
Corallistidae	0.66%	
Demospongiae unid. sp.	2.39%	X
<i>Desmacella</i> sp.		X
<i>Leiodermatium</i> sp.	1.48%	X
Pachastrellidae	0.08%	
Raspailiidae		X
Tetractinellida (syn. Astrophorida)		X
<i>Zyzya</i> sp.	0.33%	
Hexactinellida	0.33%	X
Euretidae		X
Hexactinellida	0.33%	
Cnidaria	0.33%	X
Alcyonacea - gorgonian	0.25%	X
<i>Plumarella pourtalesii</i> (Verrill, 1883)		X
<i>Plumarella</i> sp.	0.25%	
Anthozoa - Non Coral		X
<i>Liponema</i> sp.		X
Hydrozoa	0.08%	
Hydroidolina	0.08%	
Annelida	2.31%	X
Annelida	0.08%	
Polychaeta	2.22%	X
Sabellidae	0.41%	
Serpulidae	1.81%	X
Arthropoda		X
Decapoda		X
Anomura		X
Majidae		X

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

Echinodermata	0.41%	X
Echinoidea	0.25%	X
<i>Coelopleurus floridanus</i> A. Agassiz, 1872	0.16%	X
<i>Stylocidaris</i> sp.	0.08%	X
Holothuroidea	0.08%	X
<i>Holothuria lentiginosa enodus</i> Miller & Pawson, 1979		X
<i>Paracolochirus mysticus</i> (Deichmann, 1930)	0.08%	X
Ophiuroidae	0.08%	X
Ophiuroidae	0.08%	X
Mollusca		X
Gastropoda		X
<i>Perotrochus quoyanus quoyanus</i> (P. Fischer & Bernardi, 1856)		X
Chordata - Vertebrate	1.40%	
Chordata	1.40%	
Actinopterygii	1.40%	
Non-Fauna	0.08%	
Detritus	0.08%	
Natural Detritus	0.08%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Human debris- other		X
Human debris- trawl net		X
Bare Substrate	90.20%	
Non-Fauna	90.20%	
Habitat	90.20%	
Bare rock, pavement, boulder, ledge	72.32%	
Bare rubble/cobble	0.08%	
Bare soft bottom	17.79%	
Grand Total	100.00%	

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Southern Drop; 180 m; SC-x; ROV 17-22; UNCW 471; 29-VI-17-4

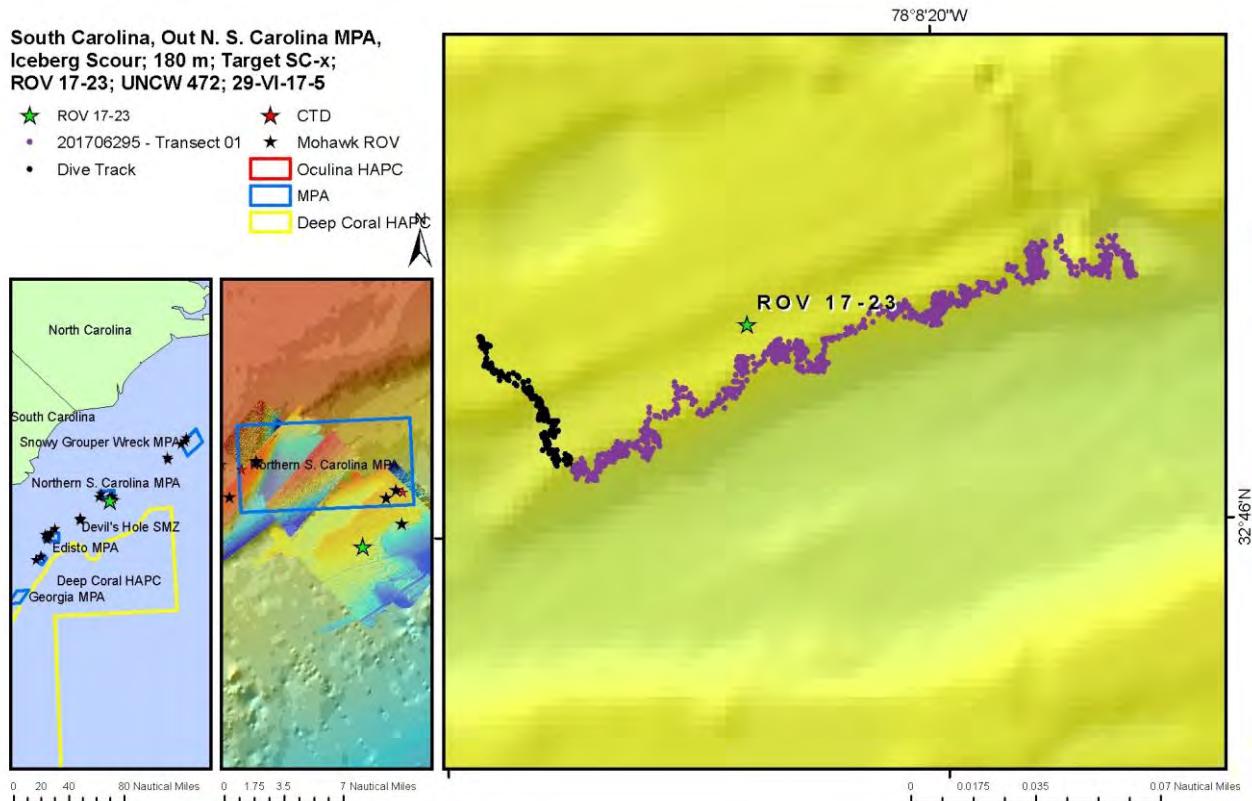
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-22.

Class/Scientific Name- Common Name	17-22
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.3241
Beryciformes	
<i>Gephyroberyx darwinii</i> (Johnson, 1866)- Darwin'S Slimehead	34.1977
Gadiformes	
<i>Laemonema</i> sp.- Mora Cod	0.8104
Perciformes	
Anthiinae- Anthiid	956.2399
<i>Antigonia</i> sp.- Boarfish	2.7553
<i>Caulolatilus microps</i> Goode & Bean, 1878- Blueline Tilefish	0.6483
<i>Cookeolus japonicus</i> (Cuvier, 1829)- Bulleye	0.3241
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	5.6726
<i>Hyporthodus niveatus</i> (Valenciennes, 1828)- Snowy Grouper	1.2966
<i>Jeboehlkia gladifer</i> Robins, 1967- Bladefin Basslet	0.8104
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	1.4587
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	0.3241
<i>Plectranthias garrupellus</i> Robins & Starck, 1961- Apricot Bass	4.3760
<i>Seriola fasciata</i> (Bloch, 1793)- Lesser Amberjack	0.4862
<i>Seriola</i> sp.- Amberjack	0.1621
Scorpaeniformes	
Scorpaenidae- Scorpionfish	5.1864
UNKNOWN	0.3241

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock2_5m_UT M17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/29/2017
Specimens:	0
Digital Photos:	122
No. DVD:	1
Hard Drive No.:	1

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

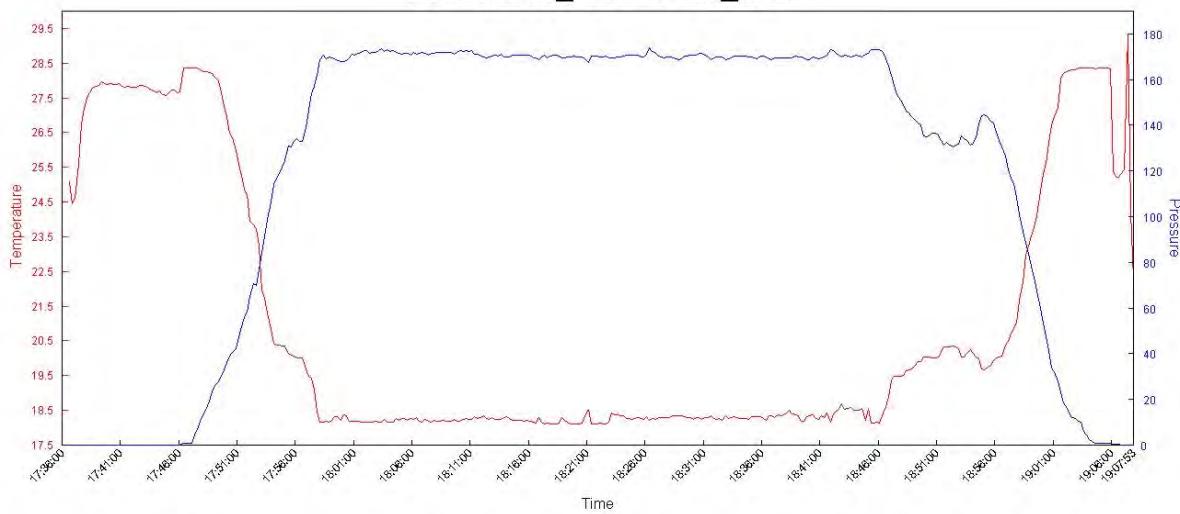
Dive Data:

Minimum Bottom Depth (m):	170	Total Transect Length (km):	0.442
Maximum Bottom Depth (m):	173	Surface Current (kn):	0.6
On Bottom (Time- EDST):	17:56	On Bottom (Lat/Long):	32.7678°N; -78.1414°W
Off Bottom (Time- EDST):	18:44	Off Bottom (Lat/Long):	32.7678°N; -78.1376°W
Physical (bottom); Temp (°C):	20	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00

201706295_ROV 17-23_472



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-23 are as follows: Depth Maximum: 173.8 m, Temperature: 18.1-20 °C

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

Dive Imagery:



Figure 1: -172.4 m
Cluster of a glass sponge- Euretidae.



Figure 2: -170.9 m
Apricot bass (*Plectranthias garrupellus*).



Figure 3: -169.9 m
Blueline tilefish (*Caulolatilus microps*) on rocky boulders of glacial scour.



Figure 4: -170.7 m
Unidentified starfish.



Figure 5: -170.1 m
Slit shell- *Perotrochus maureri*?



Figure 6: -171.2 m
Rock boulder habitat at edge of glacial scour with dense Lithistid and Hexactinellid sponges.

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

201706295

Site/Objectives:

Site #- 29-VI-17-5; ROV 17-23, UNCW Dive 472; Northern South Carolina Ice Berg Scour Site, Site SC-3, outside MPA, 170 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS offset is incorrect, relative to accurate MB positions. ROV GPS- Lance thinks the new ROV tracking is not taking depth of hydrophone pole in account which would affect the algorithm calculating ROV position. ROV position fairly close to MB.

Site Description/Habitat/Biota:

Depth range: 170-173 m.

MB map (Pisces 2012 Northern South Carolina, 5 m resolution). Ice berg scour site, E-W oriented scour, 8000 m long, 150 m wide at east end; depth on plateau- 170 m, base of scour- 179 m. Transect heading east along the north rim.

17:44- Launch; sunny, air- 28.2, wind- 15 kn from 117 dg, seas- 1 ft, current- 0.6 kn to 253 dg, water- 25.98 dg C, salinity- 36.558.

17:56- On bottom, depth- 171 m , visibility- 5 m, current- 0.25 from E.

On bottom, 50 m north of WP, on top of plateau. Flat, 25-50 cm boulders, <50 cm relief; mostly coarse sand, grey and black grains, with ripples.

18:02- 173 m, top of rim, 0.25- 50 cm boulders, < ½ m relief, in narrow zone 5 m from drop off. Ledge at upper edge, <1/2 m, 10-20 dg slope. Heading east along N rim. Biota- *Leiodermatium* (abundant), yellow encrusting sponge, white thick walled tube sponge, red-orange and yellow gorgonian, *Paracorochirus mysticus* (abundant), 15 cm Euritidae, boarfish, cardinal, filmy thin white encrusting sponge on vertical surfaces. 171 m- top, flat, mostly 25 cm boulders and sand. 1-2 m 45 dg slope at top of edge, then more gradual slope and cobble and small boulders. Serpulidae tubes.

18:15- 170 m, top edge, 25-50 cm boulders, some 1-2 m flat slabs <1/2 m relief near edge. Plate Astrophorida, *Paratrochus quoyana*? (red stripes, concave slope), hermit crab, blueline tilefish, Asteroidea.

18:30- 170 m, top edge. Same habitat, 25-50 cm boulders, occassional flat top 1 m diameter boulder. Same biota- 2 cm tan smooth knobs on rock- *Theonella*? (abundant), Cidaroid.

18:44- 171 m, top edge, rugged area of ½ - 1 m boulders, 45% slope on upper slope. Same biota. Slit shell, *Leiodermatium*, Cidaroid. End dive.

Dominant Benthic Macrobiota:

Porifera- *Leiodermatium* (abundant), thick plate *Astrophorida*, thick tube *Astrophorida*, blue *Desmacella*, Euritidae, filmy thin encrusting white sponge, *Theonella*?

Decapoda- hermit crabs

Holothuroidea- *Paracolochirus mysticus* (abundant)

Echinoidea- Cidaroid

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

Asteroidea

Serpulidae

Mollusca- *Paratrochus quoyanus*?

Dominant Fish:

Boarfish, blueline tilefish- 1, no snowy, yellowfin bass, red porgy, apricot bass, scorpion, soldier fish, mora codling, black bar drum, darwin slimehead/roughy.

Human Debris:

None.

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23;
UNCW 472; 29-VI-17-5

CPCe Percent Cover Analysis:

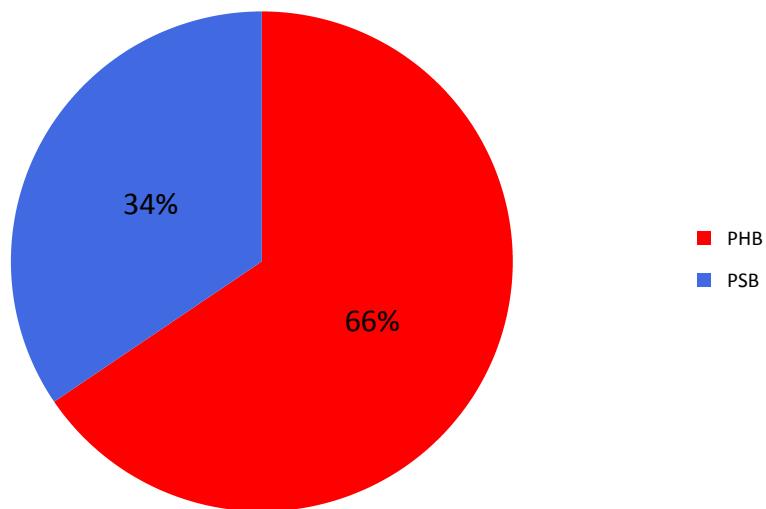
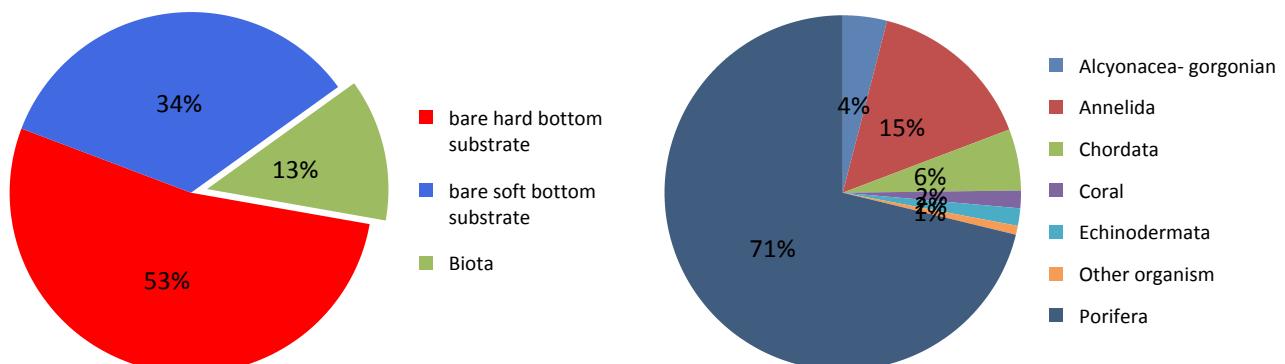


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-23. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-23.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23; UNCW 472; 29-VI-17-5

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-23.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-23 dive notes
Biota	12.74%	X
Porifera	9.07%	X
Demospongiae	8.87%	X
<i>Demospongiae unid. sp.</i>	6.22%	X
<i>Leiodermatium sp.</i>	1.73%	X
Pachastrellidae	0.41%	
Tetractinellida (syn. Astrophorida)		X
<i>Theonella sp.</i>	0.10%	
<i>Zyzya sp.</i>	0.41%	
Hexactinellida	0.20%	X
Euretidae		X
Hexactinellida	0.20%	
Cnidaria	0.71%	X
Alcyonacea - gorgonian	0.51%	X
Ellisellidae		X
<i>Nicella sp.</i>	0.51%	
Scleractinia	0.20%	
Scleractinia- unid colonial	0.10%	
Scleractinia- unid cup	0.10%	
Annelida	1.94%	
Polychaeta	1.94%	
Sabellidae	0.10%	
Serpulidae	1.83%	
Arthropoda		X
Decapoda		X
Anomura		X
Echinodermata	0.20%	X
Asteroidea		X
Asteroidea		X
Holothuroidea	0.20%	X
<i>Paracolochirus mysticus</i> (Deichmann, 1930)	0.20%	X
Ophiuroidea		X
Mollusca		X

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23;
UNCW 472; 29-VI-17-5

Gastropoda	X
<i>Perotrochus quoyanus quoyanus</i> (P. Fischer & Bernardi, 1856)	X
Chordata - Vertebrate	0.71%
Chordata	0.71%
Actinopterygii	0.71%
UNKNOWN	0.10%
Bare Substrate	87.26%
Non-Fauna	87.26%
Habitat	87.26%
Bare rock, pavement, boulder, ledge	52.60%
Bare rubble/cobble	0.41%
Bare soft bottom	34.25%
Grand Total	100.00%

Dive Site: South Carolina, Out N. S. Carolina MPA, Iceberg Scour; 180 m; Target SC-x; ROV 17-23;
UNCW 472; 29-VI-17-5

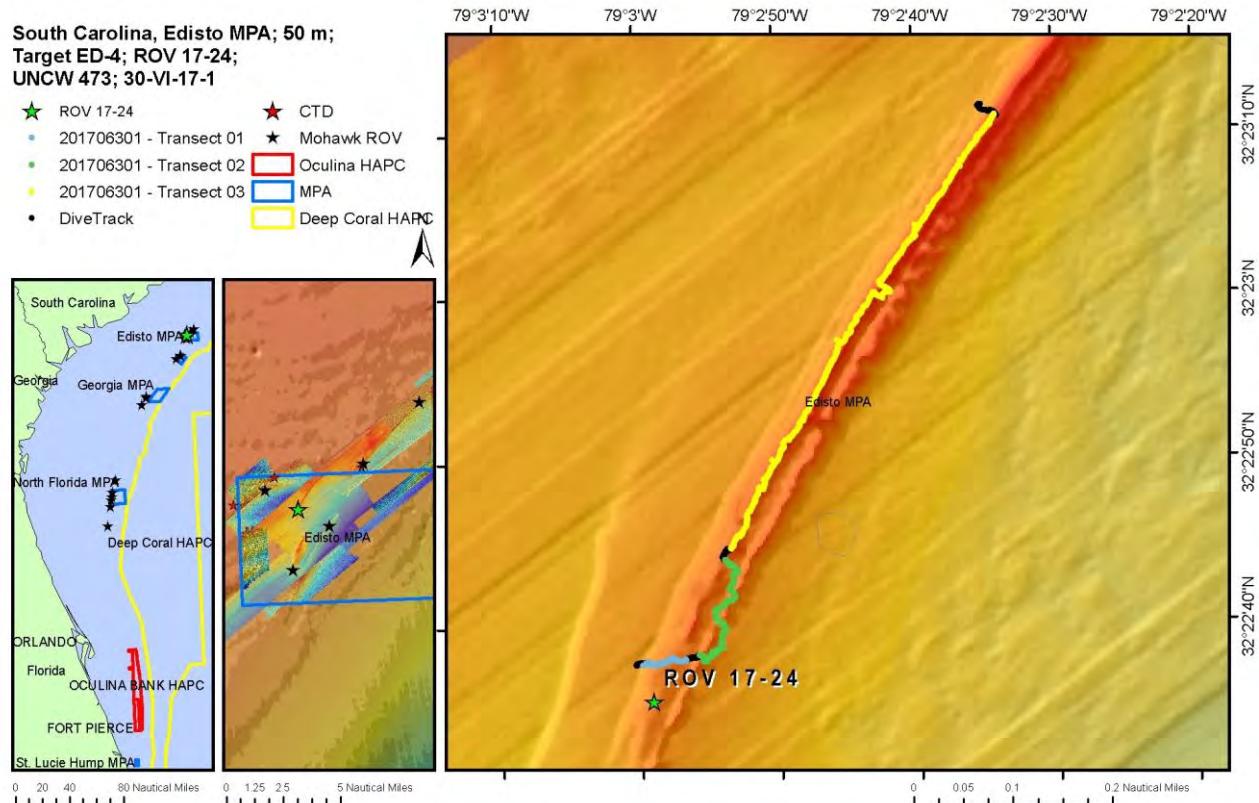
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-23.

Class/Scientific Name- Common Name	17-23
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.2874
Beryciformes	
Holocentridae- Soldierfish	0.2874
<i>Ostichthys trachypoma</i> (Günther, 1859)- Bigeye Soldierfish	3.7356
Gadiformes	
<i>Laemonema</i> sp.- Mora Cod	2.0115
Perciformes	
<i>Anthias nicholsi</i> Firth, 1933- Yellowfin Bass	112.0690
Anthiinae- Anthiid	64.6552
<i>Antigonia</i> sp.- Boarfish	16.6667
<i>Caulolatilus microps</i> Goode & Bean, 1878- Blueline Tilefish	0.2874
<i>Cookeolus japonicus</i> (Cuvier, 1829)- Bulleye	0.5747
<i>Decodon puellaris</i> (Poey, 1860)- Red Hogfish	8.0460
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	1.7241
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	1.1494
<i>Plectranthias garrupellus</i> Robins & Starck, 1961- Apricot Bass	5.4598
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.5747
<i>Prognathodes guyanensis</i> (Durand, 1960)- French Butterflyfish	0.5747
<i>Serranus notospilus</i> Longley, 1935- Saddle Bass	0.5747
Scorpaeniformes	
Scorpaenidae- Scorpionfish	9.4828

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock345_5m_U TM17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/30/2017
Specimens:	0
Digital Photos:	654
No. DVD:	3
Hard Drive No.:	1

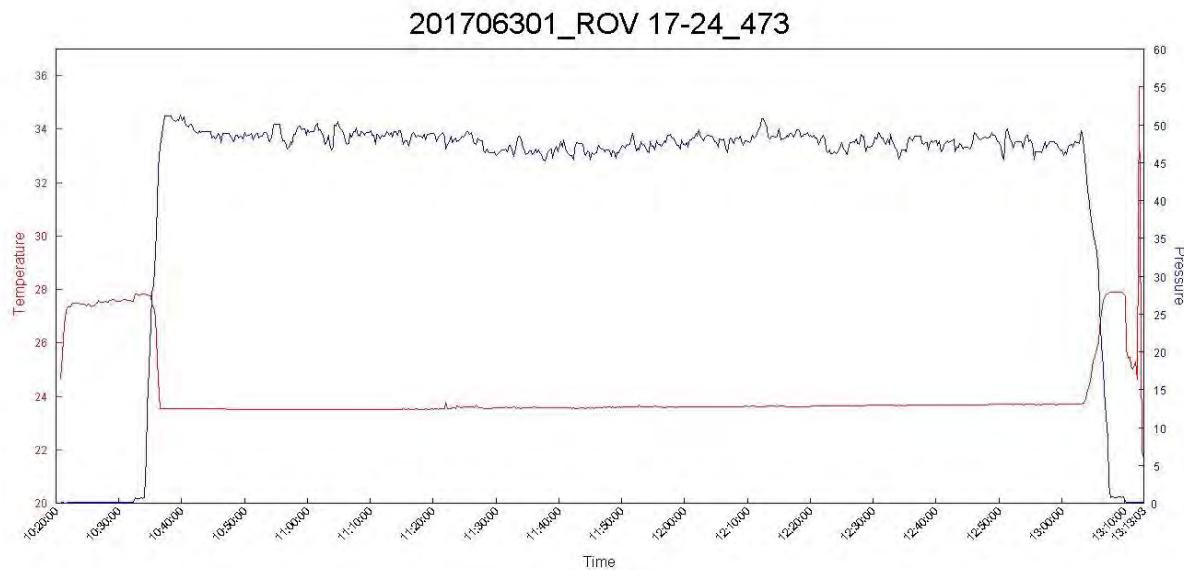
Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

Dive Data:

Minimum Bottom Depth (m):	46	Total Transect Length (km):	1.395
Maximum Bottom Depth (m):	52.8	Surface Current (kn):	0.4
On Bottom (Time- EDST):	10:35	On Bottom (Lat/Long):	32.3771°N; -79.0499°W
Off Bottom (Time- EDST):	13:10	Off Bottom (Lat/Long):	32.3864°N; -79.0426°W
Physical (bottom); Temp (°C):	27.3	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-24 are as follows: Depth Maximum: 51.3 m, Temperature: 23.5-27.9 °C

Dive Imagery:



Figure 1: -50.6 m

Rock boulders and ledges at edge of ridge.
Gorgonians- *Swiftia exserta*, Diodogorgia; black coral-
Antipathes atlantica.



Figure 2: -50.3 m

Unid. octocoral (left), and *Swiftia exserta* (rt).



Figure 3: -50 m

Corallimorpharia anemone-like Cnidarians.



Figure 4: -51.4 m

Scorpionfish (Scorpaenidae), on rock covered with macrobiota.

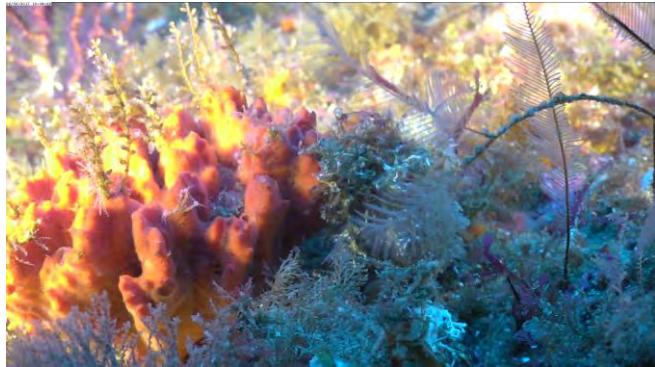


Figure 5: -50.1 m

Unid. sponge and hydroids.



Figure 6: -47.6 m

School of vermilion snapper (*Rhomboplites aurorubens*) and tomatte (*Haemulon aurolineatum*).

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 30-VI-17-1; ROV 17-24, UNCW Dive 473; South Carolina, Edisto MPA, Site EB-4, 50 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- XYZ ROV Nav offset revised. XY position incorrect by 40 m, depth ok. Test: 14:59- 51.7 m, ROV at base of slope, flat sand. MB shows ROV 40 m east of actual position, depth 51.6 m. Ship heading SE.

Site Description/Habitat/Biota:

Depth range: 46- 53 m.

MB map (Sedberry OE Block 345, 5 m resolution) shows arc shaped narrow ridge, oriented NE-SW, 3 nmi long; 46 m top, 52 m base, 90 m wide. Transect headed NE along ridge. Previous dives 2012-07.

10:30- Launch; sunny, air- 28.1, wind- 7 kn from 190 dg, seas- 1-2 ft from S, current- 0.4 kn to N, water- 25.35 dg C, salinity- 36.631.

10:35- On bottom, depth- 53 m , visibility- 10 m, current- 0.25 from NNE.

On bottom, 75 m NW of WP 1, west side of ridge flat pavement, sediment veneer, flat rock , slabs, 1 m relief.

Biota: dense cover biota 100% cover, dense *Diodogorgia*, hydroids, *Swiftia exserta*, *Antipathes atlantica*, *Dictyota* (green), spherical orange sponges. 1-2 m ledges, *Muricea*, *Tanacetipathes* bushes.

10:41- 50.4 m. MB shows middle of top of ridge. Rock slabs 1-2 m diameter, ½-1 m relief. Biota- DMST sponges, *Swiftia* 10-25 cm abundant, *Ircinia campana*. Headed to east slope of ridge. Corallimorpharia, *Filograna*.

10:52- 51 m. ROV at east base of wall. MB- 51 m, 10-20 m east of base of ridge. Heading N along east slope of ridge. 10-30 dg slope, square boulders, flat top boulders, 1-3 m diameter, 1-3 m relief, high rugosity. Biota- near 100% cover biota, *Diodogorgia*, *Tanacetipathes*, *A. atlantica*, hydroids, *Dictyota*, Rhodophyata flat bladed EB, *Filograna*, fishing line, *Muricea*, *Callyspongia vaginalis*, encrusting orange and yellow sponges.

14:59- 51.7 m. Base of slope, flat sand. MB shows ROV 40 m east of actual position, depth 51.6 m. Ship heading SE.

11:04- 50 m, top edge. Heading N along east ridge. Biota- *Phyllangia americana*, *Stichopathes*, bushy *Tanacetipathes*, orange Axinellid sponges, DMST sponges, *Erylus*, Clathriidae orange, 25 cm spherical yellow sponges, *I. campana*, hairy white hydroid, fishing line, purple tube *Aplysina*.

11:20- 50 m, may be on west slope, not sure, tracking off, same habitat, biota.

11:41- 46 m, top edge of west slope of ridge, 51 m at base in sand, 4-5 m total relief, 30-45 dg slope extending 20 m wide, large rock slabs, flat topped, 2-4 m diameter, 1-2 m relief, high rugosity, undercut rock slabs along top edge, horizontal layering of flat rock slabs. ROV tracking shifted 40 m east of actual position. Biota- 100% cover, same biota, *Carijoa*, Didemnidae white knobs, dense tomtates, slipper lobsters.

12:03- 49 m, west slope, same habitat, biota. Top edge, 47m. Slipper lobster out on top of rock. 50 cm *Swiftia*.

12:15- 50 m, west slope, same habitat, biota.

12:20- change heading, to East across the top. 48 m- top, flat rock pavement, 100% cover biota. Got to east slope of west ridge- ROV tracking offset 30 m to east. Head back to west slope.

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

12:26-49 m, back at west slope of west ridge. Same habitat and biota, 4-5 m total relief, horizontal layering of rock slabs, undercut ledges, high rugosity. Red snapper, spiny lobster, *Callyspongia vaginalis*, *Geodia neptuni* white, Spirastrellidae, *Agelas clathrodes*.

12:47- 49 m, continue along upper slope, same habitat, biota. Upper slope vertical, 2-3 m relief, with 2-3 horizontal undercut rock layers; lower slope 30-45 dg slope of jumble of rock slabs and boulders. Horizontal distance to sand base about 20 m. Dominant large biota- *Diodogorgia*, *Antipathes atlantica*, *Swiftia*. Top edge, flat rock, 47.5 m. 50 cm fan antipatharia.

13:00- 48 m, End of dive.

Dominant Benthic Macrobiota:

Scleractinia- solitary cup corals

Antipatharia- *Tanacetipathes*, *Stichopathes*, *Antipathes atlantica*, large fan Antipatharia.

Gorgonacea- *Muricea*, *Swiftia exserta* (abundant), *Carjоia*, *Diodogorgia* (abundant)

Hydroida- stinging black hydroid, white hairy hydroid

Corallimorpharia

Porifera- *Ircinia campana*, Clathriidae, *Callyspongia vaginalis*, purple tube Aplysina, Spirastrellidae, encrusting yellow and orange sponges, *Agelas clathrodes*, *Geodia neptuni*

Decapoda- *Panularis argus*, *Scyllarus* slipper lobster

Annelida- *Filograna*

Ascideacea- Didemnidae

Algae- *Dictyota* (green), Rhodophyta branching

Dominant Fish:

Lionfish- 241

Scamp- 34, graysby- 29, red snapper- 15, gag- 1, soapfish, sharpnose puffer, spotfin hog, tomtate, reef butterfly, blue angel, purple reef fish, squirrel fish, blackbar soldier, vermillion snapper, amberjack, calamus porgy, sunshine fish, trumpet fish, spotted scorpion, honeycomb cowfish.

Human Debris:

Fishing lines

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

CPCe Percent Cover Analysis:

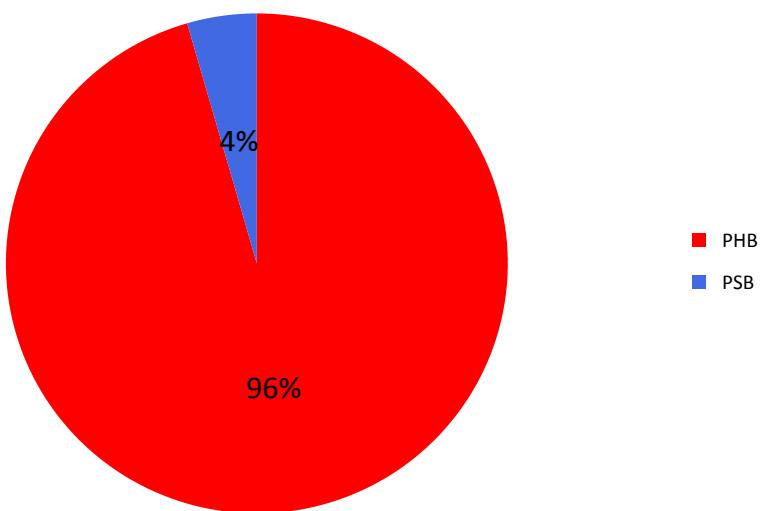
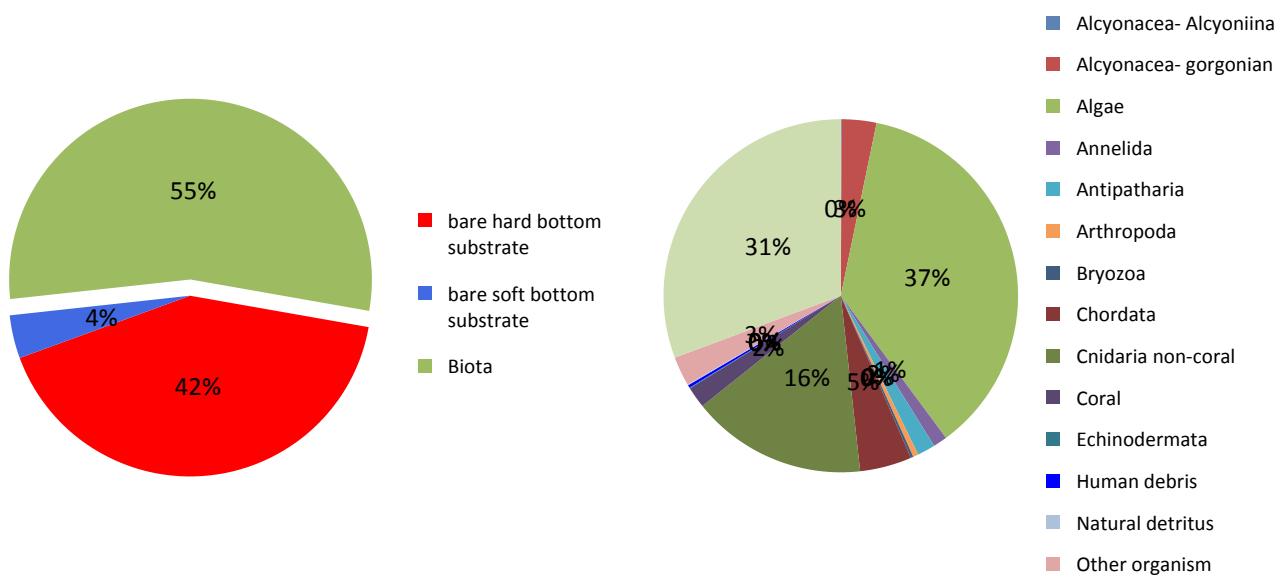


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-24. CPCe© points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-24.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-24.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-24 dive notes
Biota	54.38%	X
Algae	19.97%	X
Cyanobacteria	1.28%	
Chlorophyta	0.22%	
Ochrophyta	9.96%	X
<i>Dictyota</i> sp.	2.83%	X
Ochrophyta	7.09%	
<i>Sargassum</i> sp.	0.04%	
Rhodophyta	8.50%	
Corallinales	4.16%	
Rhodophyta	4.34%	
Porifera	16.74%	X
Demospongiae	16.74%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)	0.04%	X
<i>Agelas</i> sp.	0.09%	
<i>Aplysina</i> sp.	0.04%	X
Axinellidae		X
<i>Callyspongia vaginalis</i> (Lamarck, 1814)	0.18%	X
<i>Chondrilla</i> sp.	0.18%	
Chondrillida	0.62%	
<i>Chondrosia</i> sp.	0.09%	
<i>Clathria</i> sp.	0.04%	
Demospongiae- tan starlet thick encrusting	0.35%	X
Demospongiae- Ye sphere	0.09%	
Demospongiae unid. sp.	12.22%	X
<i>Erylus</i> sp.		X
<i>Geodia neptuni</i> complex (Sollas, 1886)		X
<i>Ircinia campana</i> (Lamarck, 1814)	0.18%	X
<i>Ircinia</i> sp.	0.93%	
Microcionidae		X
Spirastrellidae	1.68%	X
Cnidaria	12.44%	X
Alcyonacea - Alcyoniina	0.04%	

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

Alcyoniina	0.04%	
Alcyonacea - gorgonian	1.73%	X
Alcyonacea- gorgonian	0.13%	X
<i>Carijoa</i> sp.	0.49%	X
<i>Diogorgia</i> sp.	0.62%	X
<i>Muricea</i> sp.	0.31%	X
<i>Nicella</i> sp.	0.09%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)	0.09%	X
Anthozoa - Non Coral	0.04%	X
Corallimorpharia		X
Zoanthidae	0.04%	X
Antipatharia	0.89%	X
<i>Antipathes atlantica</i> Gray, 1857	0.44%	X
<i>Antipathes furcata</i> Gray, 1857	0.04%	
Antipathidae	0.13%	X
<i>Stichopathes lutkeni</i> Brook, 1889	0.13%	X
<i>Tanacetipathes</i> sp.	0.13%	X
Hydrozoa	8.68%	X
Hydroidolina	8.68%	X
Scleractinia	1.06%	X
<i>Phyllangia americana</i> Milne Edwards & Haime, 1849		X
Scleractinia- unid cup	1.06%	
Annelida	0.71%	X
Annelida	0.04%	
Polychaeta	0.66%	X
<i>Filograna</i> sp.	0.58%	X
Sabellidae	0.04%	
Serpulidae	0.04%	
Arthropoda	0.27%	X
Decapoda	0.22%	X
<i>Panulirus argus</i> (Latreille, 1804)		X
<i>Scyllarides</i> sp.	0.13%	X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)	0.09%	
Pycnogonida	0.04%	
Bryozoa	0.13%	
Bryozoa	0.13%	
Bryozoa	0.04%	
<i>Schizoporella</i> sp.	0.09%	
Echinodermata	0.04%	X
Crinoidea	0.04%	X
Crinoidea	0.04%	
<i>Davidaster</i> sp.		X

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

Mollusca		X
Bivalvia		X
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	1.15%	X
Tunicata	1.15%	X
Asciidiacea	0.13%	
Didemnidae	1.02%	X
Chordata - Vertebrate	1.42%	
Chordata	1.42%	
Actinopterygii	1.42%	
Non-Fauna	0.04%	
Detritus	0.04%	
Natural Detritus	0.04%	
UNKNOWN	1.46%	
Human Debris	0.13%	X
Non-Fauna	0.13%	X
Human debris	0.13%	X
Human debris- fish line/gear		X
Human debris- anchor line	0.13%	X
Bare Substrate	45.48%	
Non-Fauna	45.48%	
Habitat	45.48%	
Bare rock, pavement, boulder, ledge	40.57%	
Bare rubble/cobble	1.06%	
Bare soft bottom	3.85%	
Grand Total	100.00%	

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-24.

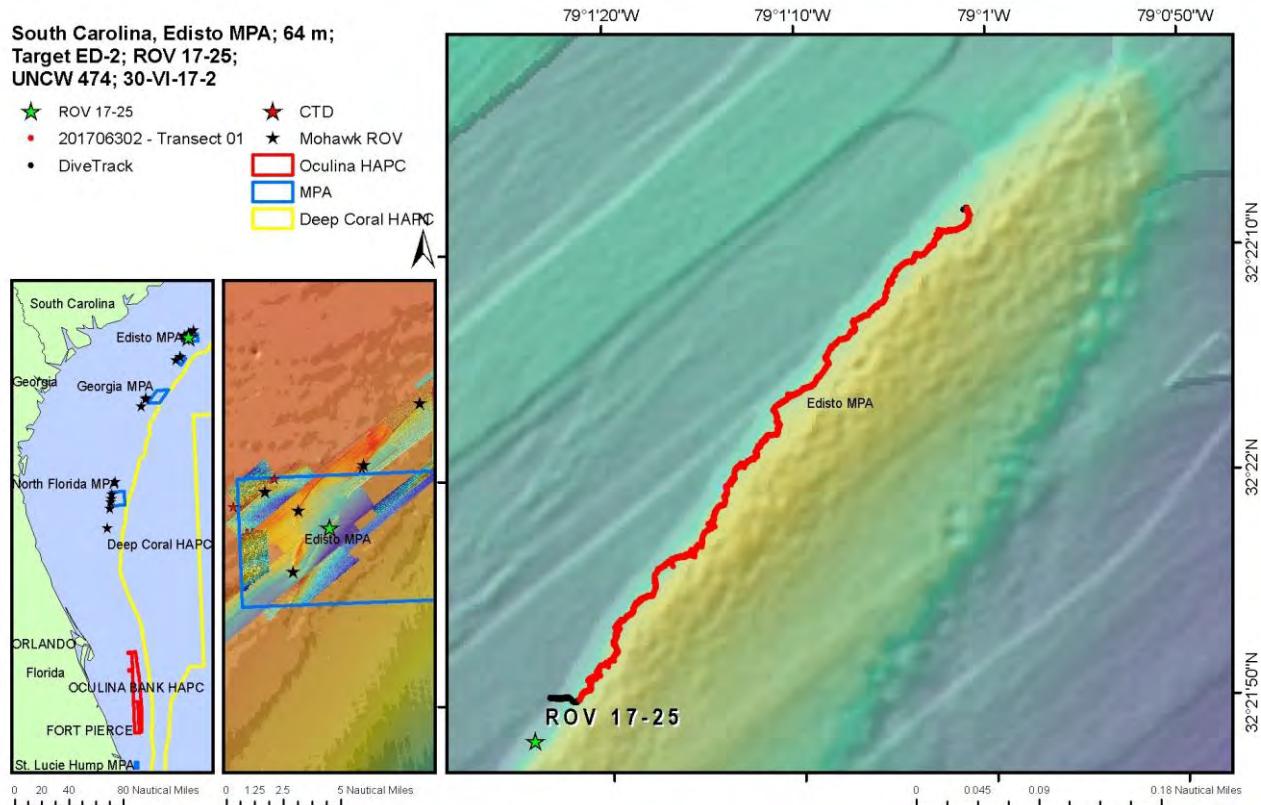
Class/Scientific Name- Common Name	17-24
Actinopterygii	
Beryciformes	
Holocentridae- Squirrelfish	3.8585
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	6.2165
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	12.8617
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	0.8574
Perciformes	
Acanthurus sp.- Doctorfish	1.0718
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.2144
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	19.0782
<i>Bodianus rufus</i> (Linnaeus, 1758)- Spanish Hogfish	0.4287
<i>Calamus</i> sp.- Porgy	4.2872
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	8.7889
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.3580
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	17.7921
<i>Chaetodon</i> sp.- Butterflyfish	1.0718
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	0.8574
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	5.5734
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	41.3719
<i>Chromis</i> sp.- Damselfish	15.6484
<i>Diplodus holbrookii</i> (Bean, 1878)- Spottail Pinfish	0.2144
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	1100.7503
<i>Haemulon</i> sp.- Grunt	107.1811
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	53.5906
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	6.0021
<i>Halichoeres</i> sp.- Wrasse	15.0054
<i>Holacanthus</i> sp.- Angelfish	12.6474
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.2144
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.2144
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.9293
<i>Lutjanus apodus</i> (Walbaum, 1792)- Schoolmaster	0.2144
<i>Lutjanus griseus</i> (Linnaeus, 1758)- Grey Snapper	0.6431
<i>Mulloidichthys martinicus</i> (Cuvier, 1829)- Yellow Goatfish	0.4287
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.2144
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	4.2872
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.2144
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	8.3601
<i>Pomacanthus arcuatus</i> (Linnaeus, 1758)- Gray Angelfish	0.6431

Dive Site: South Carolina, Edisto MPA; 50 m; Target ED-4; ROV 17-24; UNCW 473; 30-VI-17-1

<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.4287
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	1.0718
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	0.6431
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.2154
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	4.2872
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	592.7117
<i>Rypticus maculatus</i> Holbrook, 1855- Whitespotted Soapfish	0.6431
<i>Rypticus</i> sp.- Soapfish	0.2144
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.2144
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	3.0011
<i>Seriola</i> sp.- Amberjack	2.7867
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	1.7149
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.6431
<i>Serranus tigrinus</i> (Bloch, 1790)- Harlequin Bass	0.6431
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	1.9293
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.2144
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.8574
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	57.0204
<i>Scorpaena plumieri</i> Bloch, 1789- Spotted Scorpionfish	0.6431
Scorpaenidae- Scorpionfish	1.7149
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	1.5005
<i>Fistularia</i> sp.- Cornetfish	0.4287
Tetraodontiformes	
<i>Acanthostracion polygonius</i> Poey, 1876- Honeycomb Cowfish	0.4287
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.8574
<i>Canthigaster</i> sp.- Puffer	51.4469
<i>Lactophrys</i> sp.- Cowfish	0.4287
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.8574
Tetraodontidae- Puffer	0.4287
UNKNOWN	3.0011

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock345_5m_U TM17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	6/30/2017
Specimens:	0
Digital Photos:	365
No. DVD:	
Hard Drive No.:	

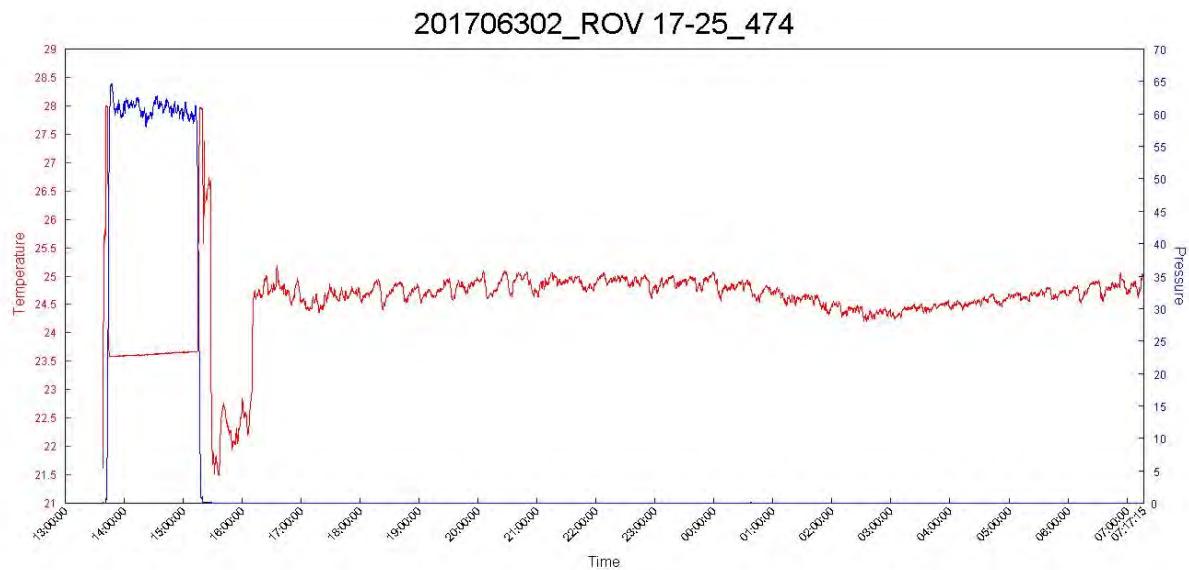
Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

Dive Data:

Minimum Bottom Depth (m):	60	Total Transect Length (km):	0.922
Maximum Bottom Depth (m):	66.3	Surface Current (kn):	0.3
On Bottom (Time- EDST):	13:43	On Bottom (Lat/Long):	32.3639°N; -79.0229°W
Off Bottom (Time- EDST):	15:11	Off Bottom (Lat/Long):	32.3698°N; -79.0169°W
Physical (bottom); Temp (°C):	26.2	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.25

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-25 are as follows: Depth Maximum: 64.7 m, Temperature: 23.6-26.2 °C

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

Dive Imagery:



Figure 1: -61.1 m
School of tomtate (*Haemulon aurolineatum*) at edge of reef.



Figure 2: -62.4 m
Pipefish (Syngnathidae) hiding in black coral-*Tanacetipathes*.



Figure 3: -63.1 m
Greenblotch parrotfish (*Sparisoma atomarium*).



Figure 4: -61.4 m
Rock beauty (*Holacanthus tricolor*) on boulder zone at reef edge.



Figure 5: -62.3 m
Scorpionfish (Scorpaenidae).



Figure 6: -61.5 m
Scamp grouper (*Mycteroperca phenax*), squirrelfish (*Holocentrus adscensionis*), and schooling tomtate (*Haemulon aurolineatum*).

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 30-VI-17-2; ROV 17-25, UNCW Dive 474; South Carolina, Edisto MPA, Site EB-2, 60 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect; appears closer than previous dive.

Site Description/Habitat/Biota:

Depth range: 60-66 m.

MB map (Sedberry OE Block 345, 5 m resolution) shows narrow ridge 2.6 nmi long, oriented NE-SW, 350 m wide, top- 57 m, base- 64 m. Previous dives- 2014-24, further to west on ledge. Transect heading NE along ridge at northern end.

13:39- Launch; pt/cloudy, air- 27.2, wind- 6 kn from 228 dg, seas- calm, current- 0.3 kn to 006 dg, water- 25.62 dg C, salinity- 36.558.

13:43- On bottom, depth- 66 m , visibility- 10 m, current- 0.25 from SW.

On bottom, near WP 1, west base of ridge. 100% soft bottom, flat sand. Top of ridge- 63 m.

Lower slope, low relief rock 25 cm relief, 10 dg slope; narrow upper slope 30 dg, $\frac{1}{2}$ - 1 m relief boulders, ledges, low to moderate rugosity. Biota- Diodogorgia, Swiftia, Filograna, Stichopathes, hydroids. Slope 10-20 m wide. Position on MB looks ok. Heading NE along west slope of ridge.

13:51- 62 m, on slope. Scattered boulders, eroded rock, 1-2 m relief, areas of high rugosity. Biota- schools of tomate, gag, CCA, encrusting yellow and orange sponges, Swiftia, Stichopathes, Filograna, hydroids, Geodia neptuni, Antipathes atlantica, Spirastrellidae, Tanacetipathes bushes, Ircinia campana, Axinellidae, scamp.

14:10- 62 m, west slope, transect mostly over low relief, low rugosity flat rock boulders. Upper slope with jumble of 1-2 m boulders, high rugosity in narrow band. Top of wall 60.7 m. Filograna, small orange Plexauridae.

14:25- 63 m, base of wall, flat sand. 2-3 m vertical rock ledge, undercut. Crinoid, Clathriidae, Peyssonnelia, fishing line, fishing line, bushy Antipatharia.

14:46- 61 m, west slope. Same habitat, same biota. Narcissia trigonaria, Tanacetipathes single stalk.

14:52- 62 m, low rugosity, low relief, low slope, at base of slope. Upper slope, 1-2 m relief, high rugosity, top flat 60 m. Anchor. DMST sponge.

15:10- 62 m, west slope. Spongisorites? End of dive.

Dominant Benthic Macrobiota:

Scleractinia- none

Antipatharia- Tanacetipathes single stalk, bushy Antipatharia, Antipathes atlantica, Stichopathes

Gorgonacea- Diodogorgia, Swiftia exserta (common, not abundant), 10 cm orange plexaurids abundant

Porifera- Spirastrellidae, Geodia neptuni (30 cm), Clathriidae, Axinellidae, DMST, Spongisorites?, Ircinia campana

Annelida- Filograna

Crinoidea

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

Asteroidea- *Narcissia trigonaria*

Algae- CCA (abundant), *Peyssonnelia*

Dominant Fish:

Lionfish- 61

Scamp- 22, vermilion snapper- 13, gag- 5, graysby- 4, sunshine fish, sharpnose puffer, tomtate, bank butterfly, blue angel, reef butterfly, squirrel, purple reef fish, cubbyu, spotted goat, amberjack, striped grunt, calamus porgy, short bigeye, spotfin hog

Human Debris:

Fishing line, large anchor

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

CPCe Percent Cover Analysis:

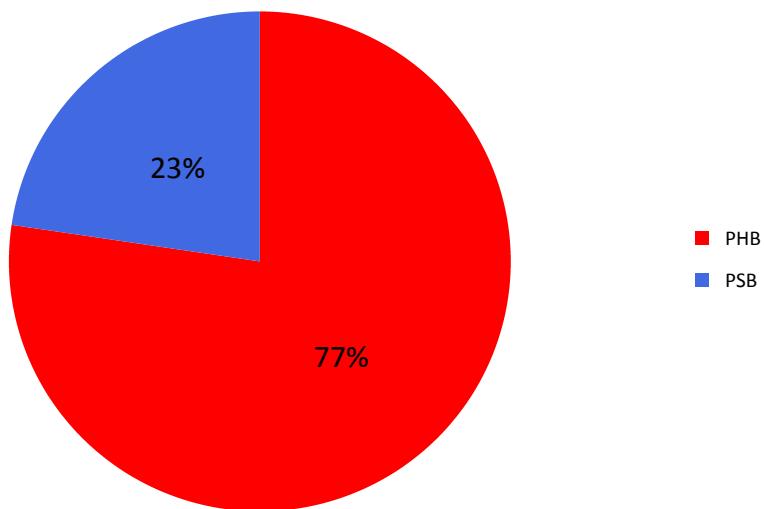
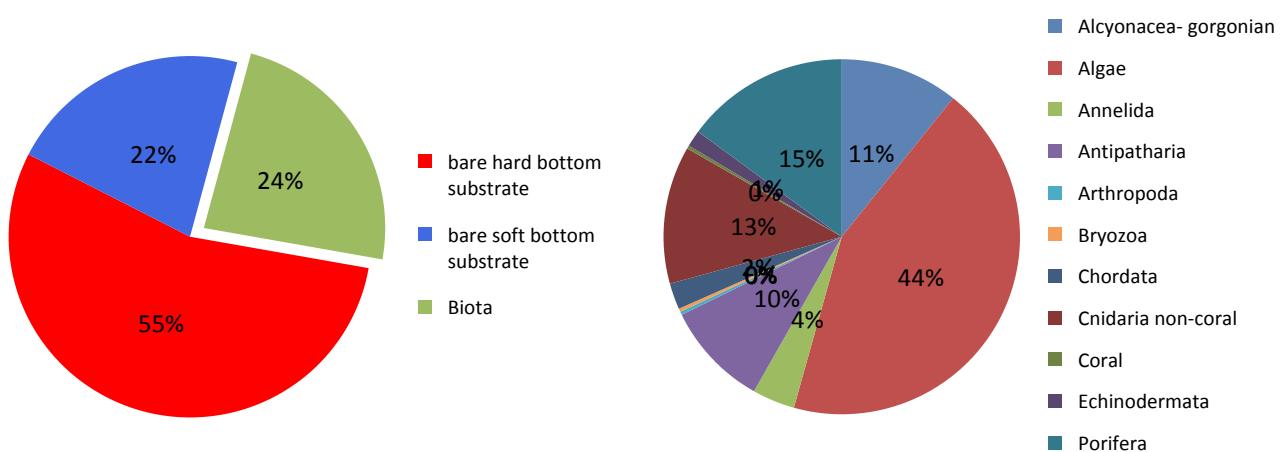


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-25. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-25.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-25.

Group/Phylum/Scientific Name - Authority	ROV 17-25 CPCe	dive notes
Biota	23.57%	X
Algae	10.27%	X
Cyanobacteria	0.70%	
Ochrophyta	1.41%	
<i>Dictyota</i> sp.	0.07%	
Ochrophyta	1.34%	
Rhodophyta	8.16%	X
Corallinales	6.76%	X
Rhodophyta	1.41%	
Porifera	3.52%	X
Demospongiae	3.52%	X
Axinellidae		X
Demospongiae- tan starlet thick encrusting	0.07%	X
Demospongiae unid. sp.	3.10%	X
<i>Geodia neptuni</i> complex (Sollas, 1886)		X
<i>Geodia</i> sp.		X
<i>Ircinia</i> sp.		X
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.07%	
Spirastrellidae	0.21%	
<i>Spongisorites siliquaria</i> van Soest & Stentoft, 1988		X
<i>Xestospongia</i> sp.	0.07%	
Cnidaria	7.81%	X
Alcyonacea - gorgonian	2.53%	X
Alcyonacea- gorgonian	0.91%	X
<i>Diodogorgia</i> sp.	0.07%	X
<i>Ellisella</i> sp.	0.49%	
<i>Nicella</i> sp.	1.06%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Antipatharia	2.25%	X
<i>Antipathes atlantica</i> Gray, 1857	0.21%	X
<i>Antipathes furcata</i> Gray, 1857	0.28%	
Antipathidae	0.07%	

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

<i>Stichopathes lutkeni</i> Brook, 1889	1.62%	X
<i>Tanacetipathes</i> sp.	0.07%	X
Hydrozoa	2.96%	
Hydroidolina	2.96%	
Scleractinia	0.07%	
Scleractinia- unid cup	0.07%	
Annelida	0.91%	X
Polychaeta	0.91%	X
<i>Filograna</i> sp.	0.91%	X
Arthropoda	0.07%	
Decapoda	0.07%	
<i>Scyllarides</i> sp.	0.07%	
Bryozoa	0.07%	X
Bryozoa	0.07%	X
<i>Schizoporella</i> sp.	0.07%	X
Echinodermata	0.35%	X
Asteroidea	0.07%	X
<i>Narcissia trigonaria</i> Sladen, 1889	0.07%	X
Crinoidea	0.28%	X
Crinoidea	0.28%	
<i>Davidaster</i> sp.		X
Chordata - Invertebrate		X
Tunicata		X
Didemnidae		X
Chordata - Vertebrate	0.56%	
Chordata	0.56%	
Actinopterygii	0.56%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Human debris- other		X
Bare Substrate	76.43%	
Non-Fauna	76.43%	
Habitat	76.43%	
Bare coral rubble	0.07%	
Bare rock, pavement, boulder, ledge	53.06%	
Bare rubble/cobble	1.62%	
Bare soft bottom	21.67%	
Grand Total	100.00%	

Density of Fish:Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-25.

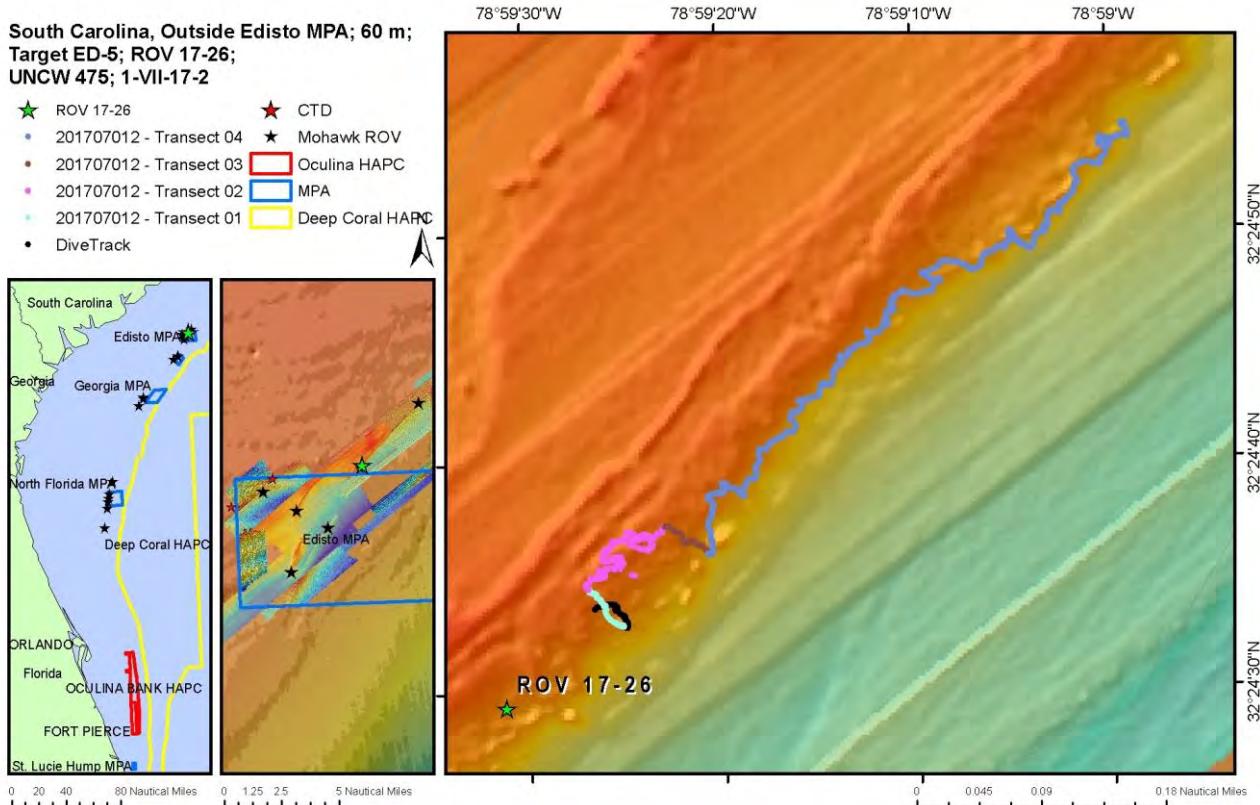
Class/Scientific Name- Common Name	17-25
Actinopterygii	
Beryciformes	
<i>Holocentridae</i> - Squirrelfish	10.8652
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	6.6398
Perciformes	
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	9.6579
<i>Calamus</i> sp.- Porgy	2.6157
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	1.0060
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.4145
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	13.4809
<i>Chromis enchraysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	2.0121
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	34.6076
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	15.2918
<i>Chromis</i> sp.- Damselfish	9.4567
<i>Epinephelus</i> sp.- Hind	0.2012
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	598.5915
<i>Haemulon</i> sp.- Grunt	20.1207
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	1006.0362
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.8048
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	0.4024
<i>Halichoeres</i> sp.- Wrasse	6.0362
<i>Holacanthus</i> sp.- Angelfish	5.6338
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	1.4085
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.2012
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	2.2133
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	1.2072
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	2.6157
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	5.4326
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	23.5412
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	4.2254
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	1.0060
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	7.2435
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	9.2555
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	115.6942
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.4024
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.6036
<i>Seriola</i> sp.- Amberjack	0.4024
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	4.6278

Dive Site: South Carolina, Edisto MPA; 64 m; Target ED-2; ROV 17-25; UNCW 474; 30-VI-17-2

<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.6036
<i>Serranus phoebe</i> Poey, 1851- Tattler	3.6217
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	1.2072
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	15.2918
<i>Scorpaena plumieri</i> Bloch, 1789- Spotted Scorpionfish	0.2012
Scorpaenidae- Scorpionfish	0.6036
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.8048
<i>Fistularia</i> sp.- Cornetfish	0.2012
Tetraodontiformes	
<i>Aluterus scriptus</i> (Osbeck, 1765)- Scrawled Filefish	0.2012
<i>Aluterus</i> sp.- Filefish	0.2012
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.2012
<i>Canthigaster</i> sp.- Puffer	15.2918
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.2012
UNKNOWN	4.2254

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock345_5m_U TM17N_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/1/2017
Specimens:	0
Digital Photos:	254
No. DVD:	3
Hard Drive No.:	1

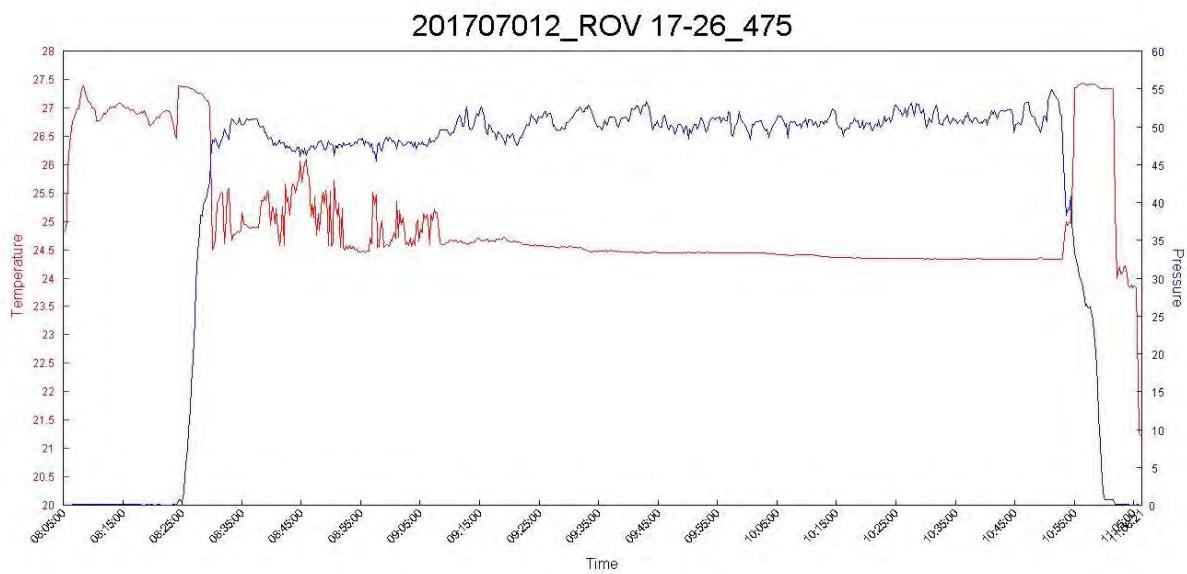
Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

Dive Data:

Minimum Bottom Depth (m):	49	Total Transect Length (km):	1.377
Maximum Bottom Depth (m):	56	Surface Current (kn):	0.1
On Bottom (Time- EDST):	8:29	On Bottom (Lat/Long):	32.4092°N; -78.9906°W
Off Bottom (Time- EDST):	10:50	Off Bottom (Lat/Long):	32.415°N; -78.9831°W
Physical (bottom); Temp (°C):	27.1	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-26 are as follows: Depth Maximum: 54.2 m, Temperature: 24.3-27.1 °C

Dive Imagery:



Figure 1: -49.7 m
Sharptail eel (*Myrichthys acuminatus*) on low relief boulders.



Figure 2: -53 m
Hogfish (*Lachnolaimus maximus*).



Figure 3: -52.3 m
High relief boulder and ledge habitat with lionfish.
115 were counted during the ROV dive.



Figure 4: -51.4 m
Swiftia exserta gorgonians were common.



Figure 5: -51.8 m
Tomtate (*Haemulon aurolineatum*).



Figure 6: -53.5 m
Graysby (*Cephalopholis cincta*) peeking out of hole.

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 1-VII-17-2; ROV 17-26, UNCW Dive 475, South Carolina, outside Edisto MPA, Site ED-5, 50 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. Test: placed ROV transducer on CTD. Replaced ROV transducer. Not sure where we are on the MB, ROV navigation appears shifted 40 m to east. Ship heading SW.

Site Description/Habitat/Biota:

Depth range: 49- 55 m.

MB map (Sedberry OE Block 345, 5 m resolution) shows NE-SW oriented ridge, 10 nmi long, 150 m wide at south end; 46 m on top, east base- 55 m. Transect at south end along east face of slope, heading NE. Previous dives on same ridge but north of this dive site.

08:22- Launch; cloudy, rain, air- 27.6, wind- 18- 27 kn from 214 dg, seas- 2-3' from SW, current- 0.1 kn to N, water- 24.99 dg C, salinity- 36.540.

08:26- On bottom, depth- 50 m , visibility- 5-10 m, current- 0.5 kn from E.

On bottom, east slope, 175 m NE of WP. MB shows ROV on mid slope. Flat, rock pavement, 1 m relief flat topped rock, no ledges, low rugosity, areas of sand. Top of flat rock 51 m, 1-2 m relief to sand. Biota- dense small biota, *Stichopathes*, *Ellisella barbadensis*, *Filograna*, *Ircinia campana*, *Diodogorgia*, *Ircinia* sp., 10 cm yellow orange gorgonian, *Didemnidae*, *Swiftia*.

08:36, 51 m. MB shows us near base of drop off, 1 m relief, smooth rock boulders. 1-2 m relief, undercut rock ledge. Mostly pavement and 1 m rock without ledges. No definitive escarpment. Low slope <5 dg. Nearly 100% biota cover cover on rock. 50 cm *Geodia neptuni*, 30-50 cm *Swiftia* common.

08:43- 49 m, near top edge, flat rock pavement and sand. Biota- DMST sponges, *Muricea*, purple tube *Aplysina*, *Callyspongia vaginalis*, *Dictyota* (green), *Antipathes atlantica*, *Corallimorpharia*, *Spirastrellidae*, encrusting yellow and orange sponges, hydroids.

09:00- 50 m, heading W, low relief pavement, occassional areas of 1 m outcrops and ledge. Not sure where we are on the MB, ROV navigation appears shifted 40 m to east (ship heading SW). Heading back east to find east escarpment. Biota- *Carijoa*. 51 m, flat topped rock, region of 1-2 m outcrops, undercut ledges, high rugosity. Dense biota. Heading E, flat, series of 1-2 m outcrops, undercut ledges.

09:13- 54 m, in sand, Near east base of ridge. Top 51 m flat pavement. East edge, wide zone of 1-3 m relief outcrops, flat rock slabs, undercut ledges, low slope 10 dg. Still no definite edge or escarpment. Biota- same, Rhodophyta thin branching.

09:30- 53 m, somewhere on east slope of ridge, heading NE. Same habitat, biota. Gaggle of 18 lionfish. Edge more defined, jumble of flat rock slabs, undercut ledge, high rugosity, 1-3 m relief.

09:43- 51 m. same.

09:58- 51 m, east slope. Low relief rock ledges, pavement, <1 m relief, low rugosity. Same biota- *Ptilocaulis* yellow chicken foot *Axinellidae*, *Schizoporella*, CCA.

10:14- 50 m, east slope, undercut flat top rock, boulders, 1-2 m relief, high rugosity; *Tanacetipathes* bush.

10:21- 51 m, 3-5 m dropoff, rugged, undercut ledges, boulders, horizontal layers, high rugosity; 55.5 m at

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

base.

10:43- 51 m, east slope, rugged, undercut rock slabs, 1-2 m relief, areas of high rugosity; other areas of smooth, rounded rock mounds, low rugosity. Same biota. Dense *Carijoa* along edges of rocks.

10:51- 55 m, east base of ridge. End dive.

Dominant Benthic Macrobiota:

Scleractinia- none

Antipatharia- Stichopathes, *Tanacetipathes* bushy, *Antipathes atlantica*

Gorgonacea- Diodogorgia, 10 cm yellow-orange plexaurids, *Muricea*, *Swiftia exserta*- common

Carijoa, *Ellisella barbadensis*

Corallimorpharia

Porifera- *Ircinia campana*, 30 cm spherical *Geodia neptuni*, Axinellidae Ptilocaulis?, Spirastrellidae, encrusting yellow and orange sponges, purple tube *Aplysina*, *Callyspongia vaginalis*, DMST sponges

Algae- *Dictyota* (green)

Dominant Fish:

Lionfish- 115

Vermilion snapper, graysby, scamp- 12, black fin snapper, sharptail eel, sharpnose puffer, tomtate (dense), reef butterfly, spotfin hog, squirrel, purple reef, blue angel, calamus porgy, sunshine, blackbar soldier, amberjack, yellow head wrasse, cornet, gag- 1.

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

CPCe Percent Cover Analysis:

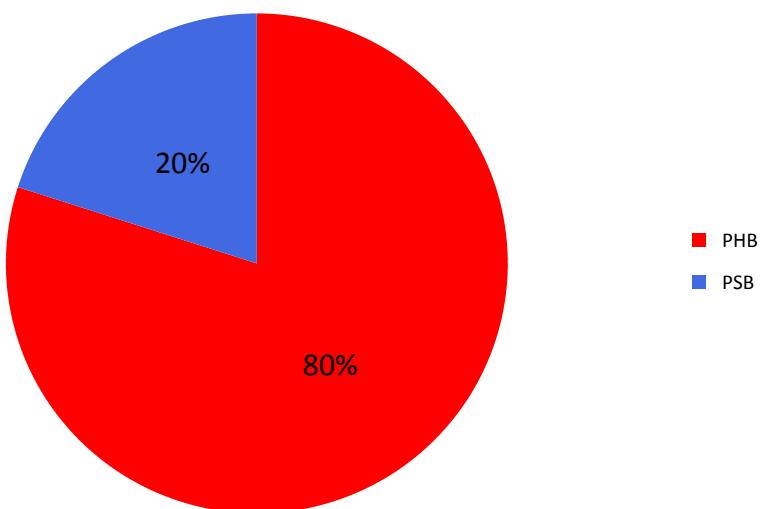
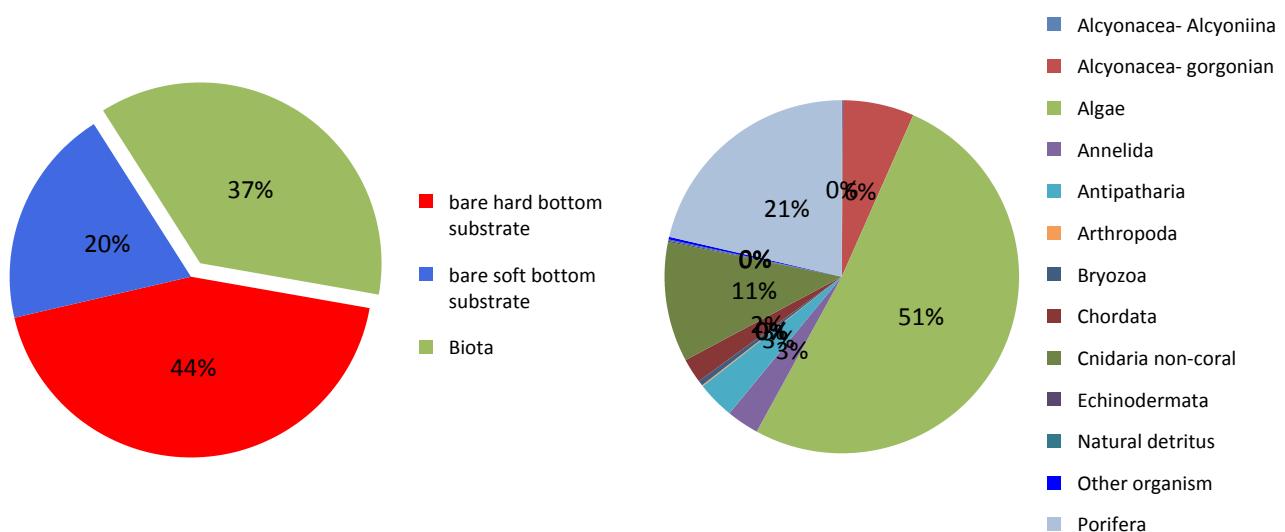


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-26. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-26.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-26.

Group/Phylum/Scientific Name - Authority	ROV 17-26 CPCe	dive notes
Biota	36.76%	X
Algae	18.88%	X
Cyanobacteria	1.17%	
Chlorophyta		X
Ochrophyta	8.94%	X
<i>Dictyota</i> sp.	4.64%	X
Ochrophyta	4.30%	
Rhodophyta	8.77%	X
Corallinales	2.47%	X
<i>Peyssonnelia</i> sp.		X
Rhodophyta	6.29%	X
Porifera	7.86%	X
Demospongiae	7.86%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)		X
<i>Agelas</i> sp.	0.04%	
<i>Aiolochroia crassa</i> (Hyatt, 1875)	0.04%	
<i>Aplysina</i> sp.	0.09%	X
<i>Aulettia</i> sp.	0.04%	
<i>Callyspongia vaginalis</i> (Lamarck, 1814)		X
Chondrillida	0.17%	
Chondrosia- lobate gray	0.04%	
Demospongiae- tan starlet thick encrusting	0.26%	X
Demospongiae unid. sp.	5.64%	
<i>Geodia neptuni</i> complex (Sollas, 1886)	0.26%	X
<i>Geodia</i> sp.		X
<i>Ircinia campana</i> (Lamarck, 1814)	0.26%	X
<i>Ircinia</i> sp.	0.56%	
<i>Ptilocaulis</i> sp.		X
Spirastrellidae	0.43%	
Cnidaria	7.73%	X
Alcyonacea - Alcyoniina	0.04%	
<i>Nidalia occidentalis</i> Gray, 1835	0.04%	
Alcyonacea - gorgonian	2.39%	X
Alcyonacea- gorgonian	0.35%	X

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

<i>Carijoa</i> sp.		X
<i>Diodogorgia</i> sp.	1.30%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.	0.09%	X
Ellisellidae		X
<i>Muricea</i> sp.		X
<i>Nicella</i> sp.	0.13%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)	0.52%	X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)		X
Anthozoa - Non Coral		X
Corallimorpharia		X
Antipatharia	1.26%	X
<i>Antipathes atlantica</i> Gray, 1857	0.65%	X
Antipathidae	0.13%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.39%	X
<i>Tanacetipathes</i> sp.	0.09%	X
Hydrozoa	4.04%	X
Hydroidolina	4.04%	X
Annelida	1.09%	X
Polychaeta	1.09%	X
<i>Filograna</i> sp.	1.09%	X
Arthropoda	0.04%	
Decapoda	0.04%	
<i>Stenorhynchus seticornis</i> (Herbst, 1788)	0.04%	
Bryozoa	0.17%	X
Bryozoa	0.17%	X
<i>Schizoporella</i> sp.	0.17%	X
Echinodermata	0.04%	
Crinoidea	0.04%	
Chordata - Invertebrate	0.35%	X
Tunicata	0.35%	X
Didemnidae	0.35%	X
Chordata - Vertebrate	0.48%	
Chordata	0.48%	
Actinopterygii	0.48%	
Non-Fauna	0.04%	
Detritus	0.04%	
Natural Detritus	0.04%	
UNKNOWN	0.09%	
Bare Substrate	63.24%	
Non-Fauna	63.24%	
Habitat	63.24%	

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

Bare coral rubble	0.04%
Bare rock, pavement, boulder, ledge	41.97%
Bare rubble/cobble	1.56%
Bare soft bottom	19.66%
Grand Total	100.00%

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-26.

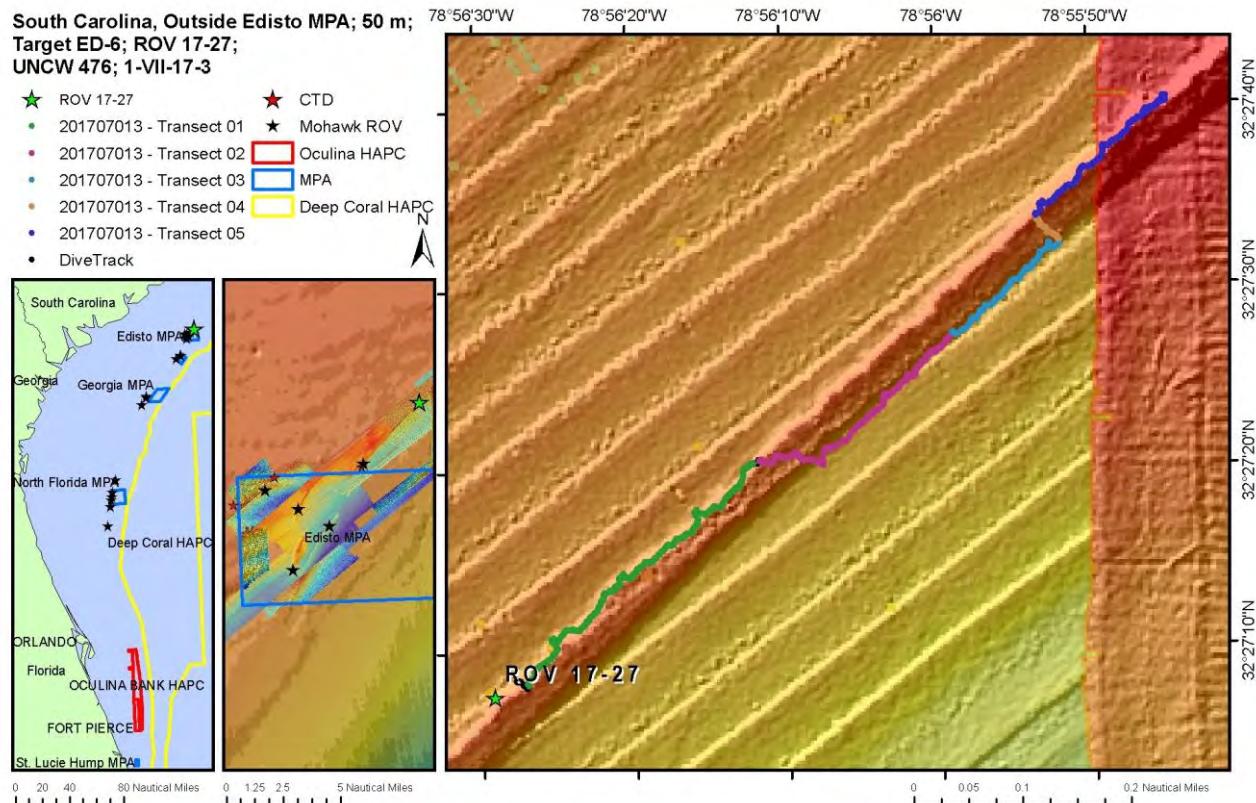
Class/Scientific Name- Common Name	17-26
Actinopterygii	
-	
schooling fish-	22.5806
Anguilliformes	
<i>Myrichthys breviceps</i> (Richardson, 1848)- Sharptail Eel	0.1290
Beryciformes	
<i>Holocentridae</i> - Squirrfish	1.5484
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	7.0968
<i>Holocentrus rufus</i> (Walbaum, 1792)- Longspine Squirrfish	0.1290
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	8.7742
Perciformes	
<i>Acanthurus chirurgus</i> (Bloch, 1787)- Doctorfish	0.2581
<i>Acanthurus</i> sp.- Doctorfish	0.6452
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	10.1935
<i>Calamus</i> sp.- Porgy	3.7419
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.3871
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	2.1935
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.4516
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	18.3226
<i>Chaetodon</i> sp.- Butterflyfish	0.3871
<i>Chaetodontidae</i> - Butterflyfish	0.1290
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	3.2258
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	11.3548
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	23.7419
<i>Chromis</i> sp.- Damselfish	1.6774
<i>Clepticus parrae</i> (Bloch & Schneider, 1801)- Creole Wrasse	1.2903
<i>Diplodus holbrookii</i> (Bean, 1878)- Spottail Pinfish	0.1290
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	129.8065
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	140.0000
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.2581
<i>Halichoeres cyancephalus</i> (Bloch, 1791)- Yellowcheek Wrasse	0.5161
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	4.0000
<i>Halichoeres</i> sp.- Wrasse	9.8065
<i>Holacanthus</i> sp.- Angelfish	7.4839
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.3871
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.1290
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.2903
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	0.2581

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-5; ROV 17-26; UNCW 475; 1-VII-17-2

<i>Mulloidichthys martinicus</i> (Cuvier, 1829)- Yellow Goatfish	1.5484
<i>Mycteroperca interstitialis</i> (Poey, 1860)- Yellowmouth Grouper	0.1290
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	1.9355
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	0.6452
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	10.8387
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	0.5161
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.3871
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	1.2903
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.7419
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	1.4194
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	62.5806
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	0.2581
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.6452
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	1.2903
<i>Seriola</i> sp.- Amberjack	0.3871
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	2.1935
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	1.4194
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.2581
<i>Serranus</i> sp.- Sea Bass	0.1290
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.5161
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.5161
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.5161
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	17.1613
Scorpaenidae- Scorpionfish	0.3871
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.6452
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.1290
Tetraodontiformes	
<i>Acanthostracion polygonius</i> Poey, 1876- Honeycomb Cowfish	0.1290
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1290
<i>Acanthostracion</i> sp.- Cowfish	0.1290
<i>Aluterus scriptus</i> (Osbeck, 1765)- Scrawled Filefish	0.1290
<i>Balistes</i> sp.- Triggerfish	0.1290
Balistidae- Filefish	0.1290
Balistidae- Filefish/Triggerfish	0.2581
<i>Canthigaster</i> sp.- Puffer	29.9355
Diodontidae- Spiny Puffer	0.3871
Ostraciidae- Cowfish	0.5161
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.6452
UNKNOWN	5.4194

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2012_EdistoMPA_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/1/2017
Specimens:	0
Digital Photos:	383
No. DVD:	3
Hard Drive No.:	1

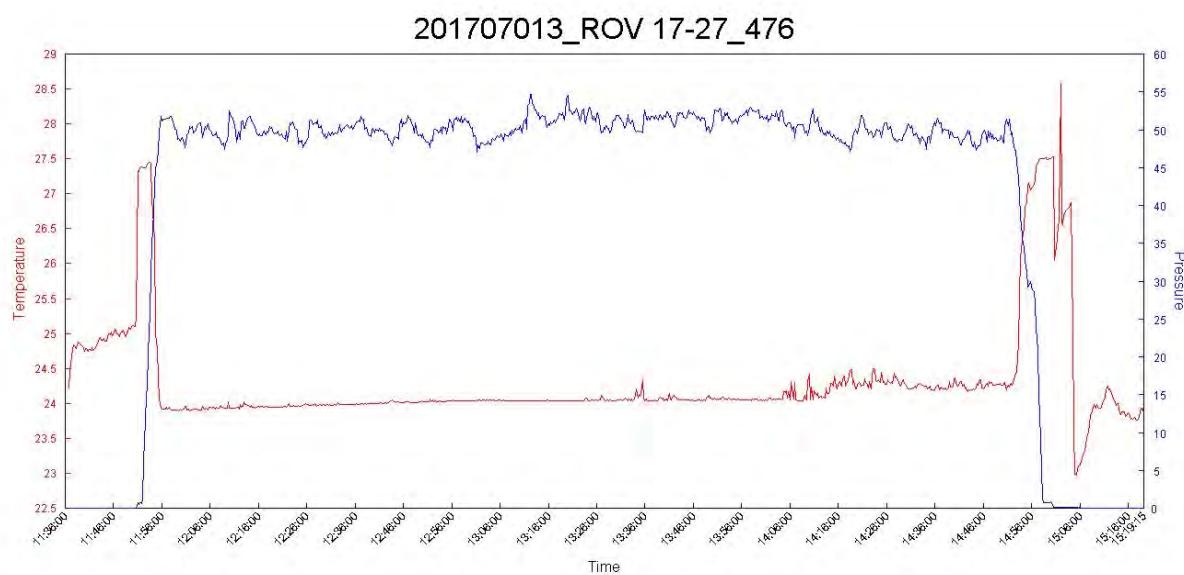
Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

Dive Data:

Minimum Bottom Depth (m):	49	Total Transect Length (km):	1.662
Maximum Bottom Depth (m):	54	Surface Current (kn):	0.4
On Bottom (Time- EDST):	11:54	On Bottom (Lat/Long):	32.4522°N; -78.9409°W
Off Bottom (Time- EDST):	14:50	Off Bottom (Lat/Long):	32.4611°N; -78.929°W
Physical (bottom); Temp (°C):	24.8	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.5

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-27 are as follows: Depth Maximum: 54.7 m, Temperature: 23.9-24.8 °C

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

Dive Imagery:

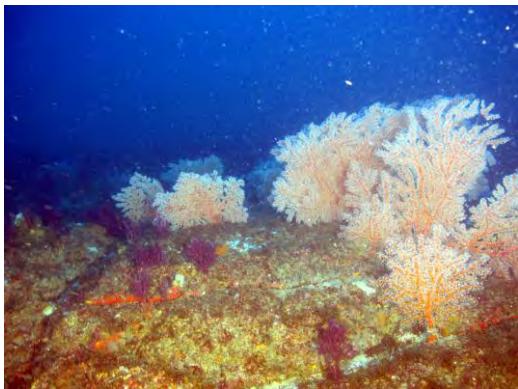


Figure 1: -50 m

Dense fields of *Swiftia exserta* were common.



Figure 2: -50.9 m

Scamp grouper (*Mycteroperca phenax*) on wall.

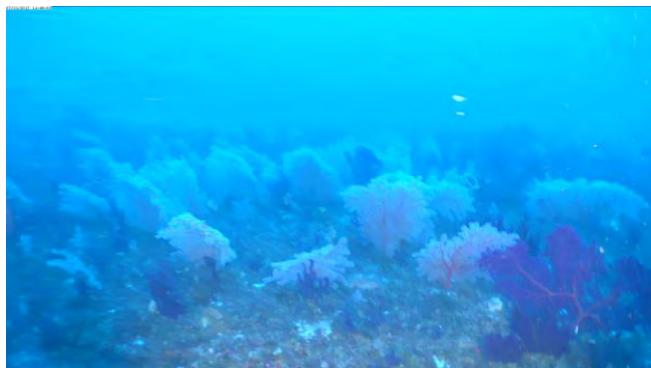


Figure 3: -49.7 m

Field of *Swiftia exserta*.

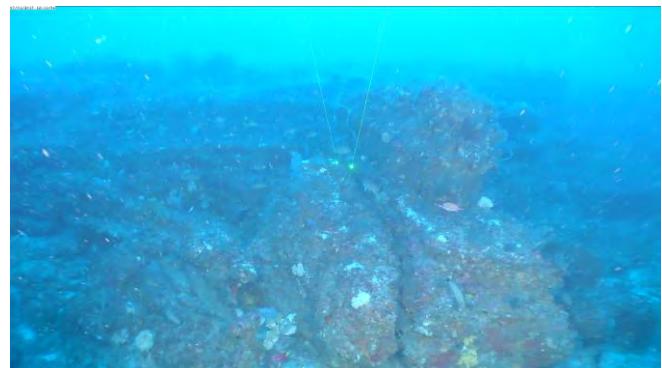


Figure 4: -53.1 m

Rugged top edge of reef.



Figure 5: -52.5 m

Bluespotted cornetfish (*Fistularia tabacaria*).



Figure 6: -52.2 m

Graysby (*Cephalopholis cruentata*).

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 1-VII-17-3; ROV 17-27, UNCW Dive 476, South Carolina, outside Edisto MPA, Site ED-6, 50 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. Test: Depth 53 m, at west dropoff, MB shows ROV nav offset to east by 20+ m (ship headed SSW). Top of east dropoff, 52 m, MB offset is about 30 m to east (ship heading SSE).

Site Description/Habitat/Biota:

Depth range: 49- 53 m.

MB map (Sedberry OE Block 345, 5 m resolution) shows NE-SW oriented ridge, 10 nmi long, 70 m wide at northern end; 50 m on top, east base- 54 m, west base- 52 m. Previous dives- none at this location. Heading NE along ridge.

11:44- Launch; cloudy, rain, air- 25.1, wind- 9 kn from 280 dg, seas- 1-2' from SW, current- 0.4 kn to 12 dg, water- 24.99 dg C, salinity- 36.350.

11:53- On bottom, depth- 53 m , visibility- 5 m, current- ½ kn from E.

On bottom, on WP, on top of ridge, dense cover 25 cm – 1 m flat top and boulders, <1/2 m relief, pavement, 80% rock. Dense biota- *Swiftia*.

11:59- 53 m, lower west slope of ridge. Vertical 2-3 m escarpment at top of slope, square boulders, undercut ledges, high rugosity. Jumble of flat top slabs, boulders 1-2 m relief on lower slope, 10 dg. Heading NE along west slope of ridge. MB shows ROV nav offset to east by 20+ m (ship headed S). Biota- *Diodogorgia*, *Antipathes atlantica*, *Cinachyrella*, *Swiftia*, *Ellisella*, hydroids, encrusting orange sponges, *Spirastrellidae*, *Filograna*, *Ircinia campana*, *Muricea*, *Spondylus*, *Stichopathes*.

12:08- 53.7 m, west base, flat sand. Top edge, 49.4 m, flat rock. Transect along face of slope, width of slope about 20 m. Biota- *Oculina varicosa*, 1 m diameter, on face of vertical rock (53 m), *Tanacetipathes* bush, hairy white hydroid, CCA, *Ellisella* whips, Clathriidae, *Agelas clathrodes*.

12:26- 52 m, west slope, same habitat, biota. *Carijoa* on edges of rock, 50 cm *Swiftia*,

12:41- 50 m, top of ledge, flat pavement, dense 20-50 *Swiftia*, dense *Carijoa*. West slope- same high rugosity habitat at upper slope, same biota.

12:50- Very dense *Swiftia* on top. MB shows us on the east slope- really on the west slope.

13:00- 50- 51 m, transect E across top of ridge, flat pavement, no ledges, no boulders. Biota- dense *Swiftia*, *Filograna*, *Diodogorgia*, *Stichopathes*, DMST sponges dominant.

13:06- 52 m, flat pavement, dense biota.

13:09- 52 m, top of east dropoff, MB offset is about 30-40 m to east (ship heading SSE). 1-2 flat rock boulders, on low slope 10 dg. Upper slope is vertical escarpment, horizontal layered rock, under cut ledges, high rugosity; lower slope jumble of flat rock slabs and boulders <10 dg slope. Horizontal width of slope about 20 m. Base- 56 m, flat sand; total relief 4 m. Head NE along face of east slope. Same biota. *Ellisella barbadensis*, Didemnidae white knobs.

13:43- 53 m, east facing slope of ridge, heading NE. Same habitat, same biota. Anchor chain. 14:07- 51 m, east side. Same. *Dictyota* (green), small Rhodophyta blades.

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

14:09- 51 m, photo transect (~25 photos) on top of ridge. 52 m, flat pavement, no ledges, no boulders. MB appears as very narrow sharp edge on top- actually a flat plateau, 61 m wide. Biota- *Diodogorgia*, *Swiftia*, *Filograna*, turf algae, DMST sponge, *Dictyota* (green), *Stichopathes*, *Ptilocaulis*, *Ellisella elongata*. Swiftia mostly near edge of plateau, not in middle so much.

14:17- end photo transect. On west face of ridge now. Same rugose rock escarpment and slope. *Solanderia* hydroid.

14:39- 50 m, west slope, same.

14:49- 51 m, west slope. Same habitat, same biota. Rugose escarpment. End dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa*, 1 m diameter (53 m)

Antipatharia- *Stichopathes*, *Tanacetipathes* bushy, *Antipathes atlantica*

Gorgonacea- *Diodogorgia*, 10 cm yellow-orange plexaurids, *Muricea*, *Swiftia exserta*- abundant (20-30 cm), *Carijoa*, *Ellisella barbadensis*

Hydroida

Hydrozoan- *Solanderia*

Porifera- *Ircinia campana*, Axinellidae *Ptilocaulis*?, Spirastrellidae, encrusting yellow and orange sponges, purple tube *Aplysina*, *Callyspongia vaginalis*, DMST sponges, *Cinachyrella*, Clathriidae, *Agelas clathrodes*

Mollusca- *Spondylus*

Asciidiacea- Didemnidae

Algae- *Dictyota* (green), Rhodophyta small blades branching

Dominant Fish:

Lionfish- 174

Graysby- 41, grey snapper, red snapper-1, scamp- 26, tomtates, vermillion, striped grunt, cubbyu, squirrel, butterfly, damsel

Human Debris:

Fishing line, anchor chain.

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

CPCe Percent Cover Analysis:

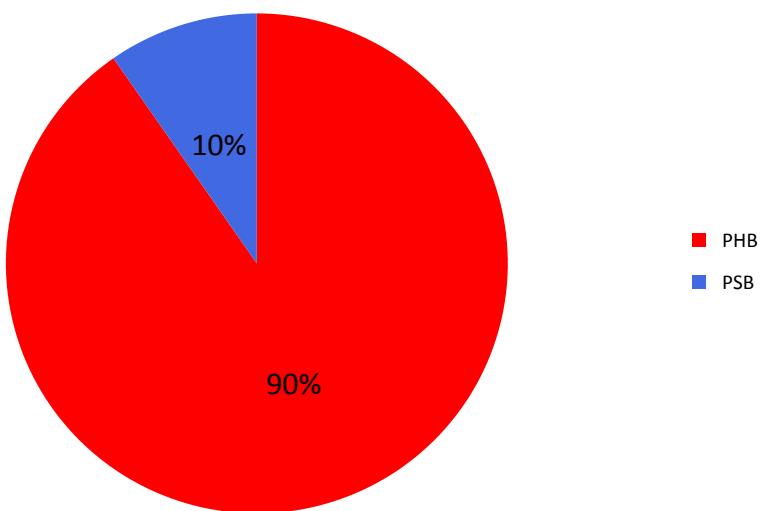
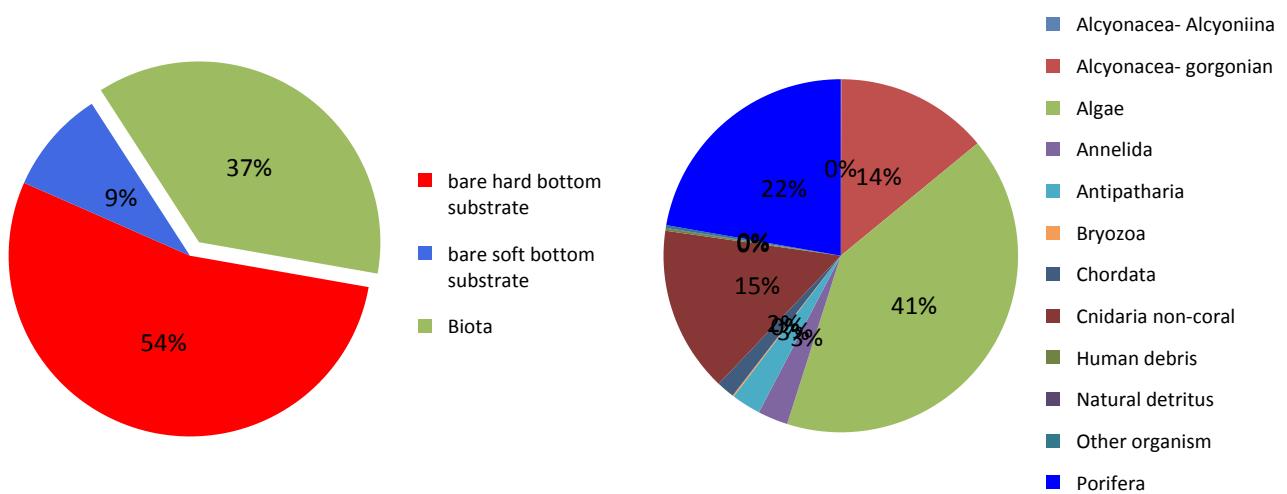


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-27. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-27.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-27.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-27 dive notes
Biota	36.81%	X
Algae	15.08%	X
Cyanobacteria	1.08%	
Chlorophyta		X
Ochrophyta	5.66%	X
<i>Dictyota</i> sp.	2.68%	X
Ochrophyta	2.98%	
Rhodophyta	8.34%	X
Corallinales	4.51%	X
Rhodophyta	3.83%	X
Porifera	8.20%	X
Demospongiae	8.20%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)		X
<i>Aiolochroia crassa</i> (Hyatt, 1875)	0.09%	X
<i>Aplysina</i> sp.		X
Chondrillida	0.26%	
<i>Cinachyrella</i> sp.		X
<i>Clathria</i> sp.	0.02%	
Demospongiae- tan starlet thick encrusting	0.52%	X
Demospongiae- Ye sphere	0.05%	
Demospongiae unid. sp.	5.80%	X
Dictyoceratida	0.02%	
<i>Erylus</i> sp.	0.05%	
<i>Geodia neptuni</i> complex (Sollas, 1886)	0.05%	
<i>Ircinia campana</i> (Lamarck, 1814)	0.12%	
<i>Ircinia</i> sp.	0.26%	
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.14%	
Microcionidae		X
<i>Ptilocaulis</i> sp.		X
Spirastrellidae	0.80%	X
<i>Zyzya</i> sp.	0.02%	
Cnidaria	11.75%	X
Alcyonacea - Alcyoniina	0.02%	

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

Alcyoniina	0.02%	
Alcyonacea - gorgonian	5.14%	X
Alcyonacea- gorgonian	0.12%	
<i>Carijoa</i> sp.	0.07%	X
<i>Diodogorgia</i> sp.	1.81%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.		X
<i>Muricea</i> sp.	0.26%	X
<i>Nicella</i> sp.	0.02%	
<i>Swiftia exserta</i> (Ellis & Solander, 1786)	2.84%	X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)	0.02%	
Antipatharia	0.99%	X
<i>Antipathes atlantica</i> Gray, 1857	0.66%	X
Antipathidae	0.02%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.26%	X
<i>Tanacetipathes</i> sp.	0.05%	X
Hydrozoa	5.59%	X
Hydroidolina	5.59%	X
<i>Solanderia gracilis</i> Duchassaing & Michelin, 1846		X
Scleractinia		X
<i>Oculina varicosa</i> Lesueur, 1821		X
Annelida	1.01%	X
Polychaeta	1.01%	X
<i>Filograna</i> sp.	1.01%	X
Bryozoa	0.05%	X
Bryozoa	0.05%	X
Bryozoa	0.02%	
<i>Schizoporella</i> sp.	0.02%	X
Mollusca		X
Bivalvia		X
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	0.16%	X
Tunicata	0.16%	X
Asciidiacea	0.02%	
Didemnidae	0.14%	X
Chordata - Vertebrate	0.45%	
Chordata	0.45%	
Actinopterygii	0.45%	
Non-Fauna	0.02%	
Detritus	0.02%	
Natural Detritus	0.02%	
UNKNOWN	0.09%	

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

Human Debris	0.07%	X
Non-Fauna	0.07%	X
Human debris	0.07%	X
Human debris- fish line/gear	0.02%	
Human debris- other		X
Human debris- net	0.05%	
Bare Substrate	63.12%	
Non-Fauna	63.12%	
Habitat	63.12%	
Bare rock, pavement, boulder, ledge	53.51%	
Bare rubble/cobble	0.33%	
Bare soft bottom	9.28%	
Grand Total	100.00%	

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-27.

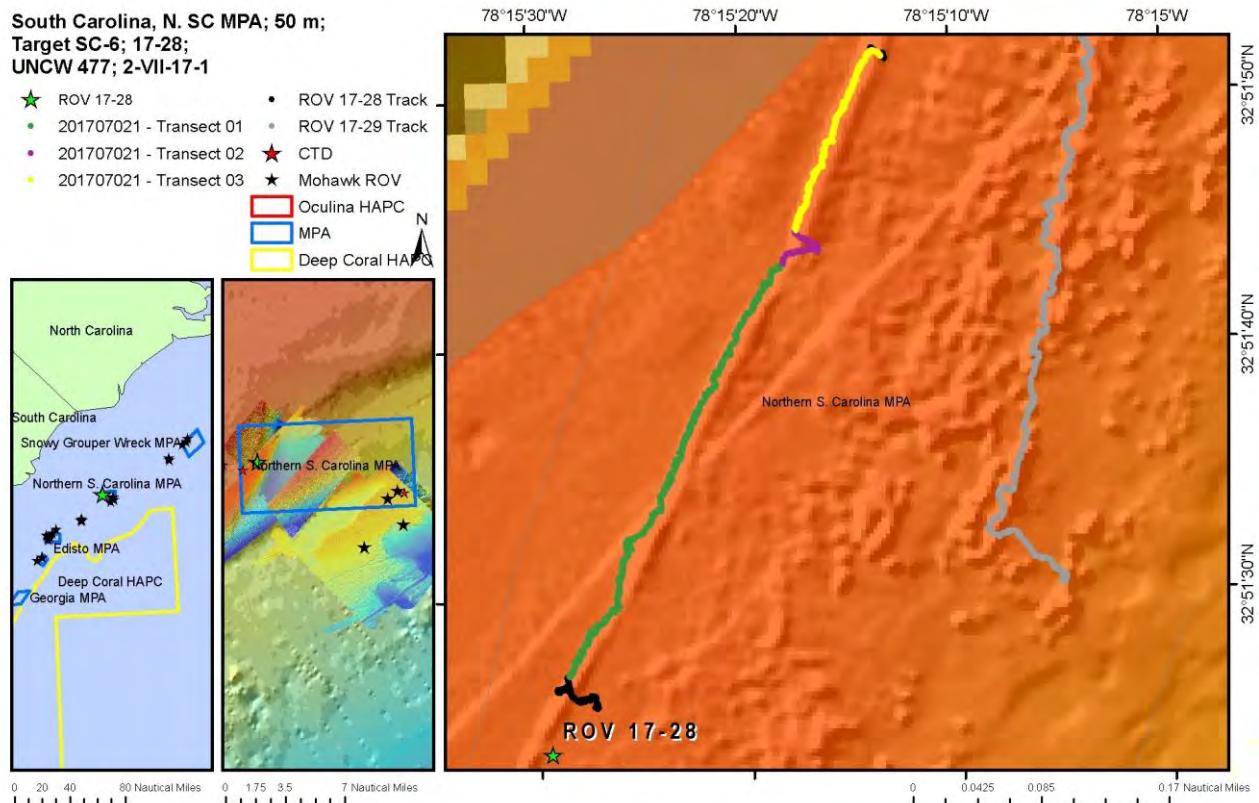
Class/Scientific Name- Common Name	17-27
Actinopterygii	
-	
schooling fish-	120.8459
Beryciformes	
Holocentridae- Squirrfish	2.4169
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	6.5257
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	1.4502
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	0.4834
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	0.2417
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	30.3323
<i>Calamus</i> sp.- Porgy	3.2628
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	0.1208
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	6.2840
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	1.3293
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	17.4018
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	0.1208
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	36.4955
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	28.3988
<i>Chromis</i> sp.- Damselfish	16.7976
<i>Clepticus parrae</i> (Bloch & Schneider, 1801)- Creole Wrasse	17.0393
<i>Haemulon album</i> Cuvier, 1830- White Margate	0.1208
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	1171.6012
<i>Haemulon</i> sp.- Grunt	154.6828
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	241.0876
<i>Halichoeres bathophilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.6042
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	4.9547
<i>Halichoeres</i> sp.- Wrasse	7.8550
<i>Holacanthus</i> sp.- Angelfish	10.7553
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.9668
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.2417
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.5710
<i>Lutjanus griseus</i> (Linnaeus, 1758)- Grey Snapper	1.0876
<i>Lutjanus</i> sp.- Snapper	0.2417
<i>Mulloidichthys martinicus</i> (Cuvier, 1829)- Yellow Goatfish	2.7795
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.2417
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	3.1420
<i>Mycteroperca</i> sp.- Grouper	0.1208

Dive Site: South Carolina, Outside Edisto MPA; 50 m; Target ED-6; ROV 17-27; UNCW 476; 1-VII-17-3

<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Gorgy	0.9668
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	0.1208
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	20.9063
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.3625
<i>Pomacanthus</i> sp.- Angelfish	0.1208
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	1.2085
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	1.4502
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	1.2085
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.1420
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	7.7341
<i>Rhomboptilus aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	138.3686
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	0.2417
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.2417
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	3.3837
<i>Seriola</i> sp.- Amberjack	0.8459
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	0.8459
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	0.7251
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.9668
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.7251
<i>Sparisoma aurofrenatum</i> (Valenciennes, 1840)- Redband Parrotfish	0.1208
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.1208
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.2417
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	25.8610
Scorpaenidae- Scorpionfish	0.2417
Syngnathiformes	
<i>Aulostomus maculatus</i> Valenciennes, 1841- Trumpetfish	0.7251
<i>Fistularia</i> sp.- Cornetfish	0.3625
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.6042
Tetraodontiformes	
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1208
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.2417
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.2417
<i>Canthigaster</i> sp.- Puffer	34.5619
Ostraciidae- Cowfish	0.1208
<i>Sphoeroides spengleri</i> (Bloch, 1785)- Bandtail Puffer	0.8459
UNKNOWN	1.0876

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock1_5m_UT M17N_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/2/2017
Specimens:	0
Digital Photos:	621
No. DVD:	2
Hard Drive No.:	1

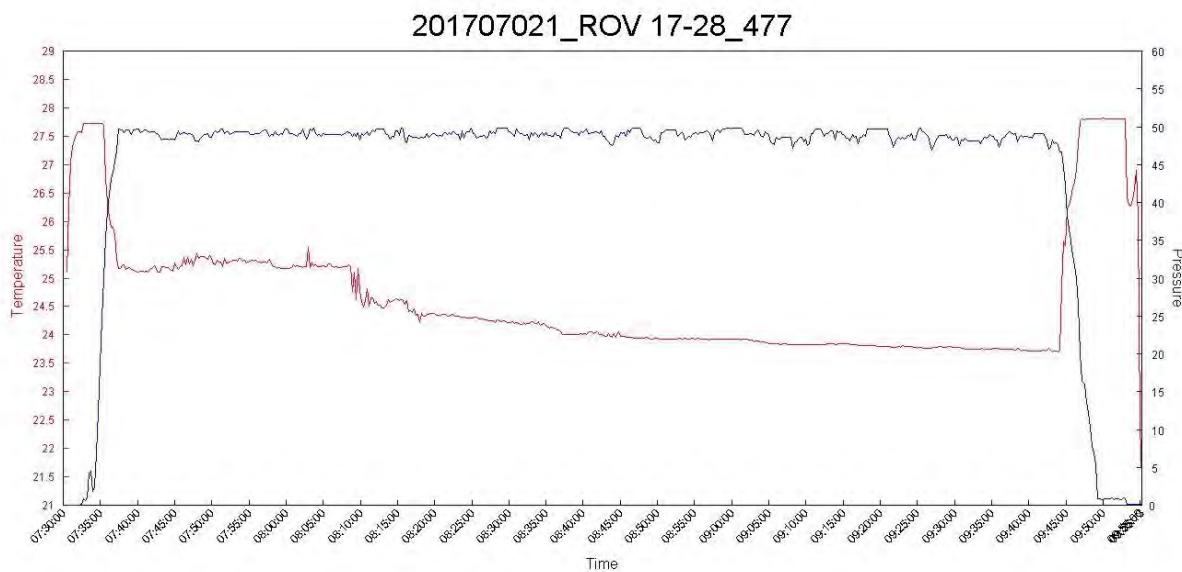
Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

Dive Data:

Minimum Bottom Depth (m):	47.6	Total Transect Length (km):	1.006
Maximum Bottom Depth (m):	51.1	Surface Current (kn):	1.0
On Bottom (Time- EDST):	7:35	On Bottom (Lat/Long):	31.8569°N; -78.2575°W
Off Bottom (Time- EDST):	9:42	Off Bottom (Lat/Long):	32.8642°N; -78.2539°W
Physical (bottom); Temp (°C):	26.8	Salinity:	N/A
		Visibility (m):	20
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-28 are as follows: Depth Maximum: 49.9 m, Temperature: 23.7-26.8 °C

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

Dive Imagery:



Figure 1: -50.4 m
Scamp grouper (*Mycteroperca phenax*) on low relief hard bottom.



Figure 2: -50.5 m
Jackknife fish (*Equeus lanceolatus*).



Figure 3: -50.3 m
Juvenile yellowhead wrasse (*Halichoeres garnoti*).



Figure 4: -50.3 m
Rock beauty (*Holacanthus tricolor*) and cubbyu (*Pareques umbrosus*).



Figure 5: -50.2 m
Hogfish (*Lachnolaimus maximus*) on boulder zone at edge of reef.

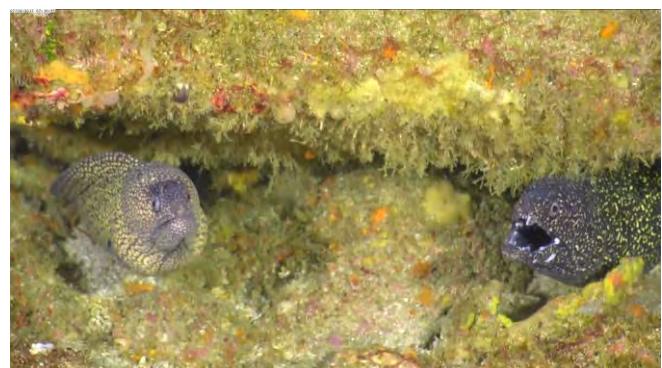


Figure 6: -50.7 m
Reticulate moray (*Muraena retifera*) on the left and spotted moray (*Gymnothorax moringa*) on the right.

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 2-VII-17-1; ROV 17-28, UNCW Dive 477, South Carolina, Northern South Carolina MPA, SC-6, 49- 51 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect. ROV nav shifted 20 m to east of actual position, depth 50 m, ship heading SW.

Site Description/Habitat/Biota:

Depth range: 49- 51 m.

MB map (Sedberry OE Block 1, 5 m resolution) shows a elongate N-S oriented mound, with narrow NNE-SSW ridge on west side, >1.7 nmi long, 47 m top, west base- 50 m, 45 m wide. Previous dive- 16-06 on southern end. Transect NE along ridge west slope.

07:29- Launch; sunny, air- 27.9, wind- 20 kn from 296 dg, seas- 3' from SW, current- 1.0 kn to 98 dg, water- 25.35 dg C, salinity- 36.580; 32 51.397, 78 15.4980.

07:35- On bottom, depth- 51 m , visibility- 20 m, current- 0.1 from SW; 32 51.414, 78 15.452.

On bottom, east of WP. Flat, rock pavement, mostly coarse sediment, no ledges, no boulders. Biota: hydroids, *Dictyota* (green), *Filgrana*, *Phaeophyta*, *Padina*.

07:40- 51 m, ridge top 50 m, smooth rock pavement, dense cover small biota, turf algae.

07:47- 51 m, west facing slope of mound, 10 dg slope, rock pavement, on upper slope; lower slope, low relief rock slabs 1-3 m diameter, <1m relief. West base, 51 m, flat sand; top of ridge- 50 m. Horizontal width of slope about 10-20 m. Biota- sparse large biota; *Dictyota*, brown algae turf, *Stichopathes*, 10 cm gorgonians, hydroids, *Didemnidae*, *Diogorgia*, *Spirastrellidae*, yellow and orange encrusting sponge, *Ellisella* whips, *Agelas clathrodes*, *Ircinia campana*.

ROV nav shifted 20 m to east of actual position, depth 50 m, ship heading SW.

08:00, 50 m top of ridge, same habitat, occasional 1 m ledge. Biota- *Stylopodium*, *Ellisella barbadensis*, *Rhodophyta* EB narrow flat blade, *Filograna*, DMST sponge, dense algae, *Muricea* purple, dense tomatte.

8:27- 51 m, west slope of ridge, heading NE along slope. Same habitat, low relief rock slabs, <1 m relief, low rugosity, pavement. Same biota.

8:42- 48.8 m, top edge of ridge, flat pavement. 2 m relief from top to base. 10-20 dg slope, flat rock slabs on slope, ledges < 1 m relief. Slope has regions of rock slabs and ledges, then areas of rock pavement and no ledges. Biota- *Schizoporella*, bryozoa bushy, fishing line, purple tube *Aplysina*, *Stylopodium*.

9:06- heading east across ridge, sand, low relief pavement. East slope- no definite ledge, low relief rock pavement, sediment. Head back to west face.

9:08- 51 m, back on west slope of ridge, heading NE along face of slope. *Ircinia strobilina*, *Codium*.

9:30- 49 m, top edge of ridge, same habitat and biota. Current 0.25 from SE. *Spondylus*.

9:39- 50 m, lower slope. 6' roughtail stingray with remoras and cobia. Second roughtail with cobias and remoras. End dive.

Dominant Benthic Macrobiota:

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

Scleractinia- none

Antipatharia- *Stichopathes*

Gorgonacea- *Diodogorgia*, 10 cm plexaurids, *Muricea*, no *Swiftia*, *Ellisella barbadensis*, *Ellisella* white whips
Hydroida

Porifera- *Ircinia campana*, *Spirastrellidae*, encrusting yellow and orange sponges, purple tube *Aplysina*, DMST
sponges, Clathriidae, *Agelas clathrodes*, *Ircinia strobilina*

Mollusca- *Spondylus*

Asciidiacea- Didemnidae

Algae- *Dictyota* (green), *Codium*, Rhodophyta small blades branching, *Peyssonnelia*, *Styropodium*

Dominant Fish:

Lionfish- 95

Scamp- 19, graysby- 11, greater soapfish, tomate (dense), baracuda, red snapper- 1, eels, roughtail stingray-
2, cobia, remora, sharpnose puffer, yellowhead wrasse, cubbyu, reef butterfly, bank butterfly, blue angel,
doctor, squirrel, white grunt, calamus porgy, rock beauty, spotted goatfish, spotfin hog, sunshine, stripped
grunt, white grunt.

Human debris:

Few fishing lines

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 uncw 477; 2-VII-17-1

CPCe Percent Cover Analysis:

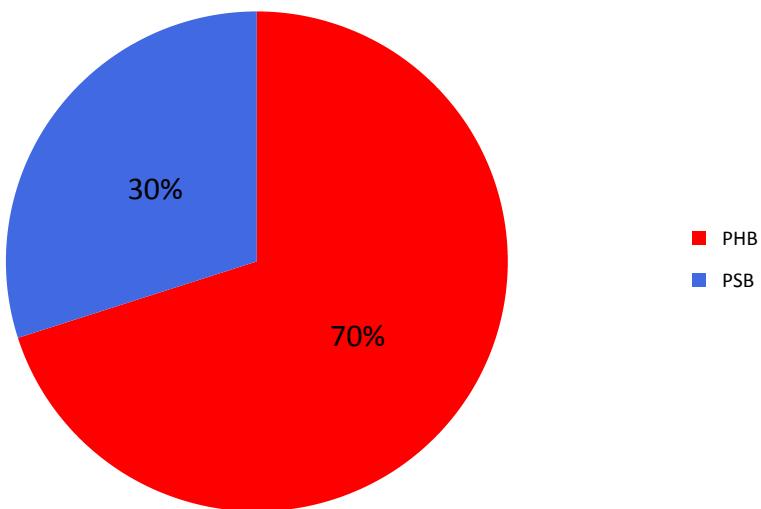
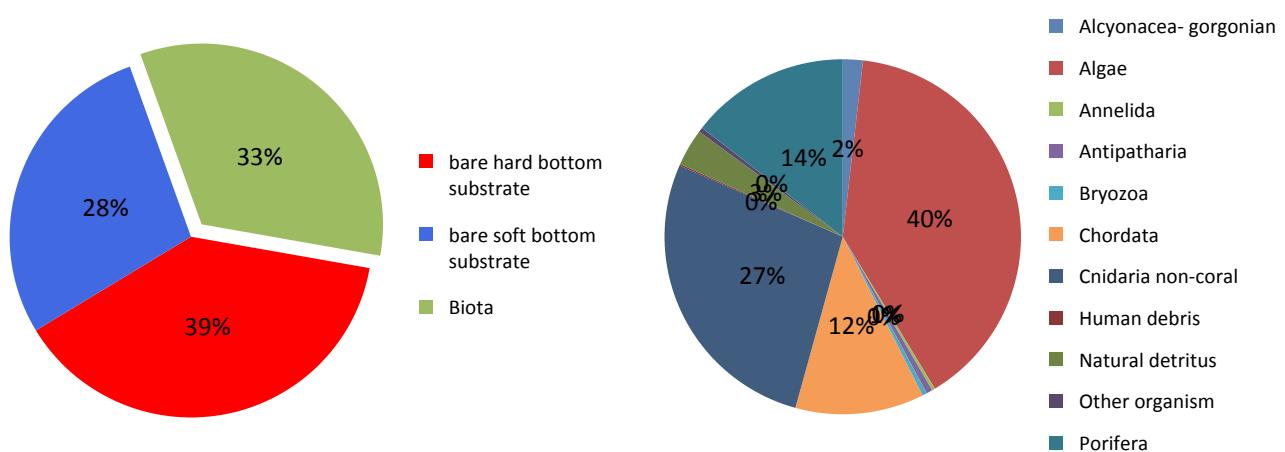


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-28. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-28.

A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site 17-28.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-28 dive notes
Biota	33.21%	X
Algae	13.14%	X
Cyanobacteria	3.65%	
Chlorophyta		X
Ochrophyta	4.35%	X
<i>Dictyota</i> sp.	0.65%	X
Ochrophyta	3.13%	
<i>Padina</i> sp.	0.56%	
Phaeophyceae		X
<i>Stylopodium</i> sp.		X
Rhodophyta	5.14%	X
Corallinales	2.57%	
<i>Peyssonnelia</i> sp.		X
Rhodophyta	2.57%	X
Porifera	4.82%	X
Demospongiae	4.82%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)	0.28%	X
<i>Agelas</i> sp.	0.37%	
<i>Aplysina</i> sp.		X
<i>Clathria</i> sp.	0.05%	
Demospongiae- tan starlet thick encrusting	0.19%	X
Demospongiae unid. sp.	3.41%	
<i>Erylus</i> sp.	0.09%	
<i>Ircinia campana</i> (Lamarck, 1814)		X
<i>Ircinia strobilina</i> (Lamarck, 1816)		X
Microcionidae		X
Poecilosclerida	0.14%	
Spirastrellidae	0.28%	X
Cnidaria	9.87%	X
Alcyonacea - gorgonian	0.61%	X
Alcyonacea- gorgonian	0.05%	X
<i>Diogorgia</i> sp.	0.51%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 UNCW 477; 2-VII-17-1

<i>Ellisella</i> sp.		X
<i>Muricea</i> sp.		X
<i>Titanideum frauenfeldii</i> (Kölliker, 1865)	0.05%	
Antipatharia	0.19%	X
<i>Antipathes atlantica</i> Gray, 1857	0.09%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.05%	X
<i>Tanacetipathes</i> sp.	0.05%	
Hydrozoa	9.07%	X
Hydroidolina	9.07%	X
Annelida	0.09%	X
Polychaeta	0.09%	X
<i>Filograna</i> sp.	0.09%	X
Arthropoda		X
Decapoda		X
Bryozoa	0.14%	X
Bryozoa	0.14%	X
Bryozoa	0.05%	X
<i>Schizoporella</i> sp.	0.09%	X
Mollusca		X
Bivalvia		X
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	0.94%	X
Tunicata	0.94%	X
Asciidiacea	0.56%	
Didemnidiae	0.37%	X
Chordata - Vertebrate	2.95%	
Chordata	2.95%	
Actinopterygii	2.95%	
Non-Fauna	1.12%	
Detritus	1.12%	
Natural Detritus	1.12%	
UNKNOWN	0.14%	
Human Debris	0.05%	X
Non-Fauna	0.05%	X
Human debris	0.05%	X
Human debris- fish line/gear		X
Human debris- anchor line	0.05%	
Bare Substrate	66.74%	
Non-Fauna	66.74%	
Habitat	66.74%	
Bare coral rubble	0.05%	
Bare rock, pavement, boulder, ledge	37.98%	

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 UNCW 477; 2-VII-17-1

Bare rubble/cobble	0.51%
Bare soft bottom	28.20%
Grand Total	100.00%

Density of Fish:Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-28.

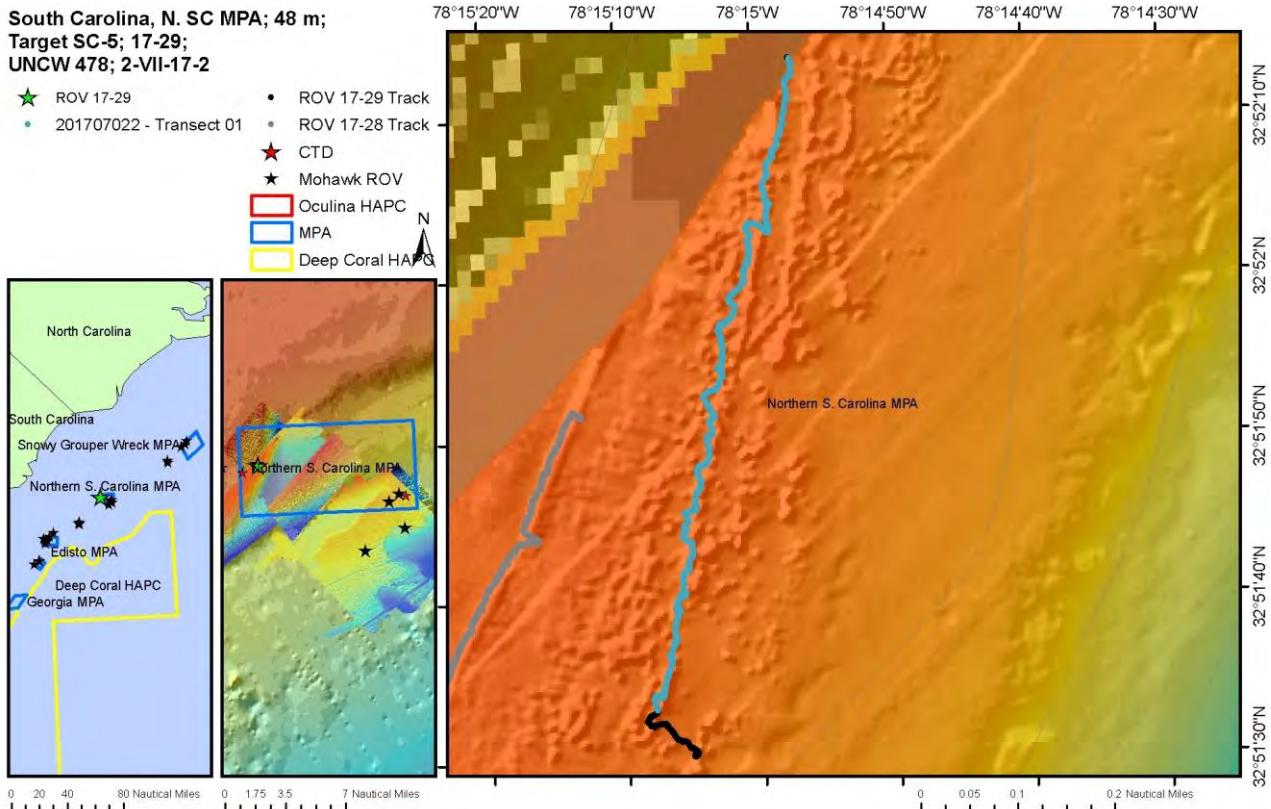
Class/Scientific Name- Common Name	17-28
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.4032
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	0.2016
<i>Muraena robusta</i> Osório, 1911- Stout Moray	0.2016
Aulopiformes	
<i>Synodus</i> sp.- Lizardfish	0.2016
Beryciformes	
Holocentridae- Squirrelfish	6.4516
<i>Holocentrus ascensionis</i> (Osbeck, 1765)- Squirrelfish	6.6532
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	3.8306
<i>Ostichthys trachypoma</i> (Günther, 1859)- Bigeye Soldierfish	0.2016
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	5.6452
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.2016
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	8.8710
<i>Bodianus rufus</i> (Linnaeus, 1758)- Spanish Hogfish	1.8145
<i>Calamus</i> sp.- Porgy	5.2419
Carangidae- Jack	0.8065
<i>Caranx ruber</i> (Bloch, 1793)- Bar Jack	0.2016
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	3.4274
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	4.0323
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	16.3306
<i>Chromis cyanea</i> (Poey, 1860)- Blue Chromis	1.8145
<i>Chromis enchrissura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	2.6210
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	26.4113
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.6210
<i>Chromis</i> sp.- Damselfish	3.6290
<i>Clepticus parrae</i> (Bloch & Schneider, 1801)- Creole Wrasse	2.0161
Clinidae- Blenny	0.2016
<i>Epinephelus guttatus</i> (Linnaeus, 1758)- Red Hind	0.4032
<i>Equetus lanceolatus</i> (Linnaeus, 1758)- Jackknife Fish	2.0161
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	1512.0968
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	6.4516
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	433.4677
<i>Halichoeres cyancephalus</i> (Bloch, 1791)- Yellowcheek Wrasse	0.8065
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	45.9677
<i>Halichoeres</i> sp.- Wrasse	14.7177
<i>Holacanthus</i> sp.- Angelfish	8.0645

Dive Site: South Carolina, N. SC MPA; 50 m; Target SC-6; 17-28 UNCW 477; 2-VII-17-1

<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	4.0323
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	1.0081
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.2097
<i>Lutjanus</i> sp.- Snapper	0.2016
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.2016
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	4.2339
<i>Pagrus pagrus</i> (Linnaeus, 1758)- Red Porgy	0.4032
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	123.9919
<i>Pomacanthus arcuatus</i> (Linnaeus, 1758)- Gray Angelfish	0.2016
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.8065
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	1.0081
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	12.5000
<i>Ptereleotris</i> sp.- Dartfish	0.2016
<i>Rachycentron canadum</i> (Linnaeus, 1766)- Cobia	1.6129
<i>Remora remora</i> (Linnaeus, 1758)- Remora	0.4032
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	1.0081
<i>Seriola</i> sp.- Amberjack	0.8065
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	1.0081
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	3.6290
<i>Serranus phoebe</i> Poey, 1851- Tattler	2.2177
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	6.6532
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.4032
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	1.2097
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	23.5887
Syngnathiformes	
<i>Fistularia tabacaria</i> Linnaeus, 1758- Bluespotted Cornetfish	0.2016
Tetraodontiformes	
<i>Acanthostracion polygonius</i> Poey, 1876- Honeycomb Cowfish	0.4032
<i>Balistes capriscus</i> Gmelin, 1789- Grey Triggerfish	0.2016
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.4032
<i>Cantherhines macrocerus</i> (Holland, 1853)- Whitespotted Filefish	0.4032
<i>Canthigaster</i> sp.- Puffer	28.8306
Elasmobranchii	
Myliobatiformes	
<i>Dasyatis centroura</i> (Mitchill, 1815)- Roughtail Stingray	0.4032
UNKNOWN	2.0161

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock1_5m_UT M17N_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/2/2017
Specimens:	0
Digital Photos:	283
No. DVD:	2
Hard Drive No.:	1

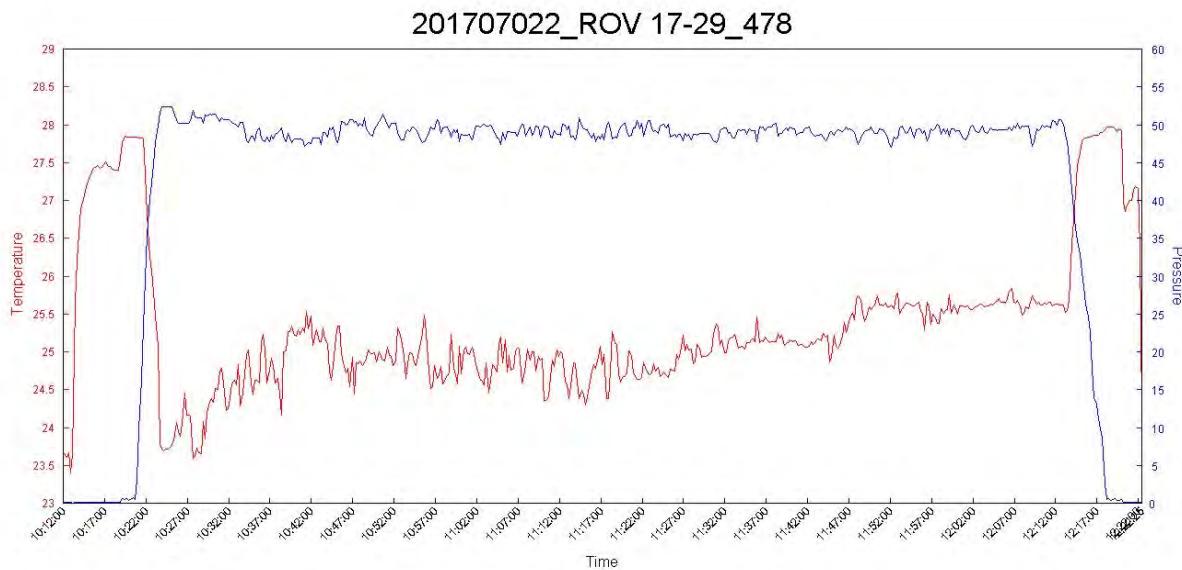
Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

Dive Data:

Minimum Bottom Depth (m):	50	Total Transect Length (km):	1.505
Maximum Bottom Depth (m):	52.5	Surface Current (kn):	0.6
On Bottom (Time- EDST):	10:21	On Bottom (Lat/Long):	32.8583°N; -78.2515°W
Off Bottom (Time- EDST):	12:11	Off Bottom (Lat/Long):	32.8703°N; -78.2493°W
Physical (bottom); Temp (°C):	27.4	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-29 are as follows: Depth Maximum: 52.4 m, Temperature: 23.6-27.4 °C

Dive Imagery:



Figure 1: -52.1 m

Dense cover of biota on reef surface- algae, *Filograna* worm clusters, bryozoa, sponges, hydroids.



Figure 2: -51.1 m

Icilogorgia schrammi gorgonian.



Figure 3: -49.4 m

Rock hind (*Epinephelus adscensionis*).



Figure 4: -52.6 m

Reef mostly 1-2 m smooth mounds, 10-20 m diameter.



Figure 5: -51.3 m

Hogfish (*Lachnolaimus maximus*).



Figure 6: -52 m

Rounded mounds, an unusual geology in the shelf-edge region.

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 2-VII-17-2; ROV 17-29, UNCW Dive 478, South Carolina, Northern South Carolina MPA, Site SC-5, 50 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 50- 52.5 m.

MB map (Sedberry OE Block 1, 5 m resolution) shows flat topped mound with low relief ridges and scattered mounds, relief 47.5 to 49.5 m, 10-20 m diameter. Previous dive in same region, but to the west, dive 14-08. Transect heading N along an apparent ridge on top of mound.

10:17- Launch; sunny, air- 28.9, wind- 14 kn from 233 dg, seas- 3-4' from SW, current- 0.6 kn to 54 dg, water- 25.44 dg C, salinity- 36.572.

10:21- On bottom, depth- 54 m , visibility- 10 m, current- 0.1 from S.

On bottom, 100 m east of WP. Flat coarse sand, rounded smooth mounds, 50 m on top, 52.5 in sand at base, 2 m relief, 10-20 m diameter, 45-60 dg slope. No undercut ledges. Low rugosity. Flat sand between the mounds, 10 cm sand waves, E-W. Narrow sand chutes between mounds, to wide valleys. Biota- Ellisella whips, Filograna, Stichopathes, Agelas clathrodes, Peyssonnelia, dense small algae- Dictyota, Phaeophyta, Narcissia trigonaria, Muricea, Iciligorgia schrammi, Schizoporella, bushy bryozoa, Callyspongia vaginalis, hydroids, small gorgonians, Filograna.

10:35- scattered mounds. MB ridge- contiguous rounded mounds, similar relief, 50- 52 m. Biota- Madracis bushy coral, Swiftia exserta, Carijoa on top, Diodogorgia, antipatharia bush, Didemnidae knobs, Eudistoma grey lobate, few fish, Ircinia campana, Tanacetipathes single stalk, Dictyota, dense Filograna, 10 cm gorgonians, Antipathes atlantica, Tanacetipathes bush.

11:08- 51 m, same habitat, dense 2 m relief smooth mounds; 50 m top, 52.3 m in sand at base. Muricea with brittlestars, 30 cm Hydrozoa Solandaria.

11:26- 50 m, same habitat, heading N. Spaghetti Niphates?, dense Filograna balls, Swiftia (uncommon), 50 cm Muricea.

11:52- 50 m, MB shows N-S linear ridge among the round mounds. Habitat of the ridge is similar to the rounded mounds but continuous; smooth rock slope on sides, rounded top, no ledges, no rugosity, same biota, dense Filograna, Ellisella elongata, Muricea, turf algae.

12:12- 52 m, in sand, maximum depth. End dive.

Dominant Benthic Macrobiota:

Scleractinia- Madracis (EB)

Antipatharia- Stichopathes, Tanacetipathes single stalk, Tanacetipathes bush, Antipathes atlantica

Gorgonacea- Diodogorgia, 10 cm gorgonians, Muricea, few Swiftia, Ellisella barbadensis, Ellisella elongata, Carijoa, Iciligorgia schrammi

Hydroids

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

Hydrozoa- Solendaria

Porifera- *Ircinia campana*, *Spirastrellidae*, encrusting yellow and orange sponges, purple tube *Aplysina*, *Clathriidae*, *Agelas clathrodes*, *Ircinia strobilina*, *Callyspongia vaginalis*, *Niphates spaghetti* sponge

Annelida- *Filograna* (abundant)

Asteroidea- *Narcissia trigonaria*

Ophiuroidea

Bryozoa- *Schizoporella*, bryozoa bushy

Asciidiacea- *Didemnidae*, *Eudistoma grey lobate*

Algae- *Dictyota* (green), *Rhodophyta* small blades branching, *Peyssonnelia*

Dominant Fish:

Lionfish- 77

Cony- 1, soapfish, graysby, scamp- 3, reef butterfly, calamus porgy, sunshine, blue angel, sharpnose puffer, tattler, squirrel, orange back bass, spotfin hog, yellow head wrasse

Human debris:

None

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

CPCe Percent Cover Analysis:

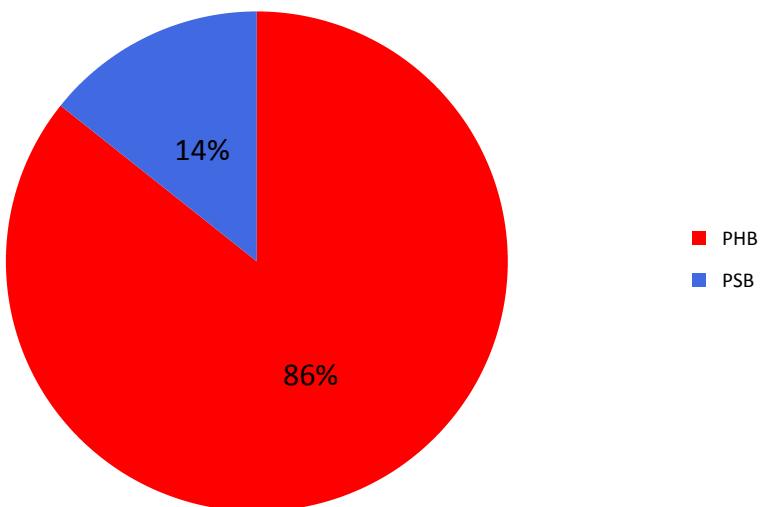
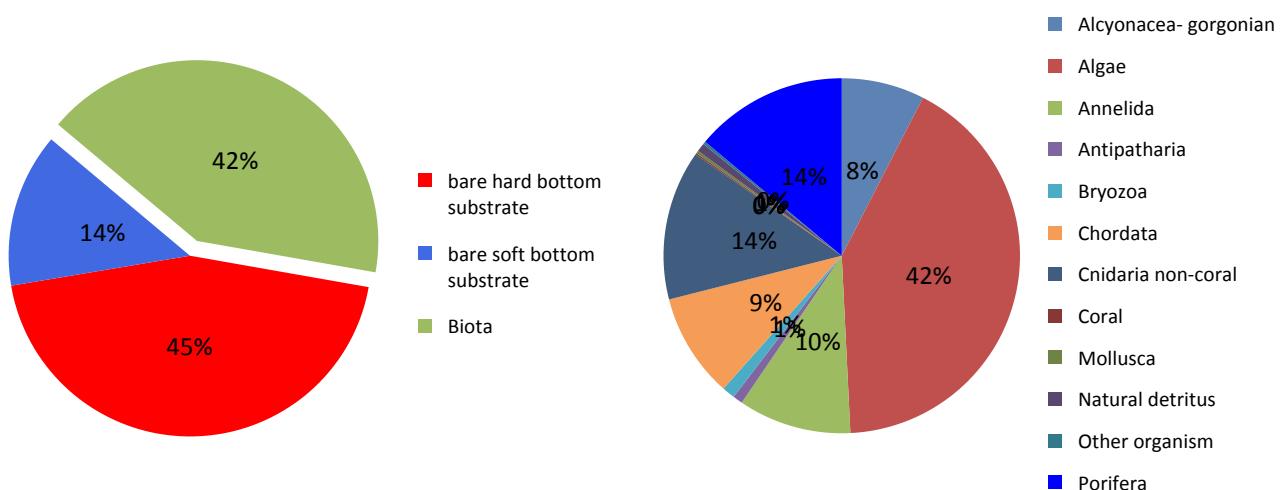


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-29. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-29.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-29.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-29 dive notes
Biota	41.64%	X
Algae	17.36%	X
Cyanobacteria	3.46%	
Chlorophyta		X
Ochrophyta	2.11%	X
<i>Dictyota</i> sp.	0.49%	X
Ochrophyta	1.62%	
Rhodophyta	11.79%	X
Corallinales	8.55%	
<i>Peyssonnelia</i> sp.		X
Rhodophyta	3.24%	
Porifera	5.79%	X
Demospongiae	5.79%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)	0.54%	X
<i>Agelas</i> sp.	0.27%	
<i>Callyspongia</i> sp.	0.16%	
<i>Callyspongia vaginalis</i> (Lamarck, 1814)	0.27%	X
<i>Cinachyrella</i> sp.		X
Demospongiae unid. sp.	4.22%	X
<i>Ircinia campana</i> (Lamarck, 1814)		X
<i>Ircinia</i> sp.	0.05%	
<i>Ircinia strobilina</i> (Lamarck, 1816)	0.05%	
<i>Niphates</i> sp.	0.05%	X
Spirastrellidae	0.16%	
Cnidaria	9.25%	X
Alcyonacea - gorgonian	3.14%	X
Alcyonacea- gorgonian	0.65%	
<i>Carijoa</i> sp.	0.54%	X
<i>Diodogorgia</i> sp.	0.43%	X
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.	0.97%	
Ellisellidae	0.49%	X
<i>Iciligorgia schrammi</i> Duchassaing, 1870		X

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

<i>Muricea</i> sp.	0.05%	X
<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Antipatharia	0.38%	X
<i>Antipathes atlantica</i> Gray, 1857		X
Antipathidae		X
<i>Stichopathes lutkeni</i> Brook, 1889	0.38%	X
<i>Tanacetipathes</i> sp.		X
Hydrozoa	5.68%	X
Hydroidolina	5.68%	X
<i>Solanderia gracilis</i> Duchassaing & Michelin, 1846		X
Scleractinia	0.05%	X
<i>Madracis decactis</i> (Lyman, 1859)	0.05%	
<i>Madracis myriaster</i> (Milne Edwards & Haime, 1850)		X
Annelida	4.27%	X
Polychaeta	4.27%	X
<i>Filograna</i> sp.	4.27%	X
Bryozoa	0.49%	X
Bryozoa	0.49%	X
Bryozoa	0.32%	X
<i>Schizoporella</i> sp.	0.16%	X
Echinodermata		X
Asteroidea		X
<i>Narcissia trigonaria</i> Sladen, 1889		X
Echinoidea		X
Ophiuroidea		X
Mollusca	0.11%	X
Bivalvia	0.11%	X
Bivalvia	0.11%	
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	3.46%	X
Tunicata	3.46%	X
Asciidiacea	1.51%	
Didemnidae	1.95%	X
<i>Eudistoma</i> sp.		X
Chordata - Vertebrate	0.49%	
Chordata	0.49%	
Actinopterygii	0.49%	
Non-Fauna	0.32%	
Detritus	0.32%	
Natural Detritus	0.32%	
UNKNOWN	0.11%	
Bare Substrate	58.36%	

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

Non-Fauna	58.36%
Habitat	58.36%
Bare rock, pavement, boulder, ledge	43.48%
Bare rubble/cobble	1.08%
Bare soft bottom	13.79%
Grand Total	100.00%

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-29.

Class/Scientific Name- Common Name	17-29
Actinopterygii	
schooling fish-	33.3333
Anguilliformes	
Muraenidae- Moray Eel	0.1333
Beryciformes	
Holocentridae- Squirrelfish	0.1333
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrelfish	3.2000
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	0.1333
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	1.4667
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	4.4000
<i>Bodianus rufus</i> (Linnaeus, 1758)- Spanish Hogfish	0.1333
<i>Calamus</i> sp.- Porgy	4.6667
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	1.3333
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.8000
<i>Cephalopholis fulva</i> (Linnaeus, 1758)- Coney Grouper	0.1333
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.6667
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	16.6667
<i>Chaetodontidae</i> - Butterflyfish	0.5333
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	1.6000
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	26.6667
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	2.6667
<i>Chromis</i> sp.- Damselfish	44.4000
<i>Epinephelus adscensionis</i> (Osbeck, 1765)- Rock Hind	0.5333
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	0.9333
<i>Halichoeres bathophilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.5333
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	8.5333
<i>Halichoeres</i> sp.- Wrasse	26.9333
<i>Holacanthus</i> sp.- Angelfish	6.2667
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	1.8667
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	1.4667
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	0.2667
<i>Lutjanus analis</i> (Cuvier, 1828)- Mutton Snapper	0.1333
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	0.4000
<i>Pomacanthus arcuatus</i> (Linnaeus, 1758)- Gray Angelfish	0.1333
<i>Pomacanthus</i> sp.- Angelfish	0.4000
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	2.5333
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.1333

Dive Site: South Carolina, N. SC MPA; 48 m; Target SC-5; 17-29; UNCW 478; 2-VII-17-2

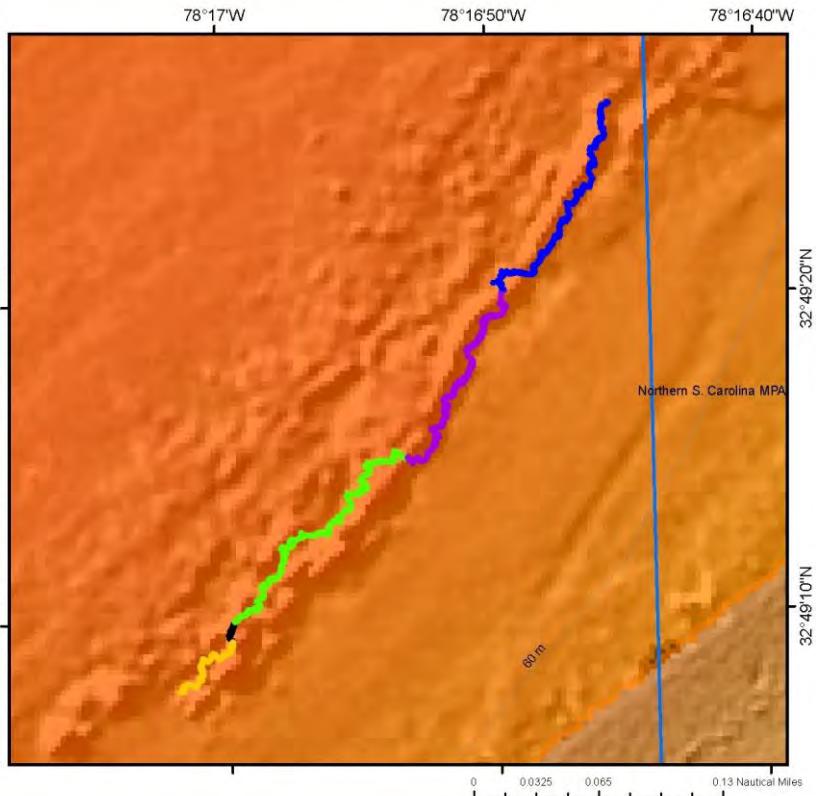
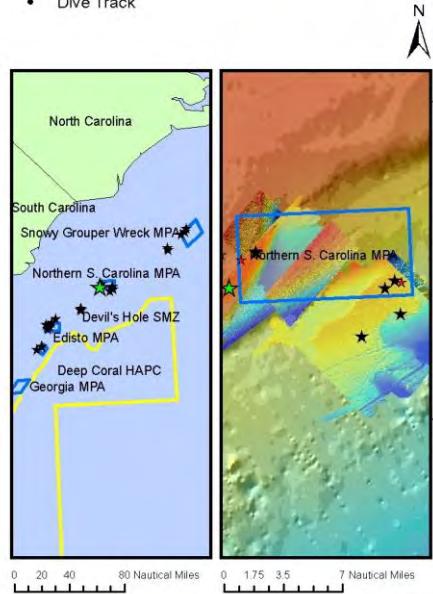
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	0.4000
<i>Rypticus</i> sp.- Soapfish	0.2667
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.1333
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.2667
<i>Seriola</i> sp.- Amberjack	0.8000
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	2.2667
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	5.4667
<i>Serranus phoebe</i> Poey, 1851- Tattler	6.5333
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.5333
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.1333
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.6667
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	11.7333
Tetraodontiformes	
<i>Acanthostracion polygonius</i> Poey, 1876- Honeycomb Cowfish	0.9333
<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)- Scrawled Cowfish	0.1333
<i>Aluterus scriptus</i> (Osbeck, 1765)- Scrawled Filefish	0.1333
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.2667
<i>Canthigaster</i> sp.- Puffer	9.4667
Ostraciidae- Cowfish	0.6667
Elasmobranchii	
Myliobatiformes	
<i>Dasyatis</i> sp.- Stingray	0.1333
UNKNOWN	3.8667

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

General Location and Dive Track:

South Carolina, Outside N. SC MPA; 48 m;
Target SC-7; 17-30; UNCW 479; 2-VII-17-3

- ★ ROV 17-30
- ★ CTD
- 201707023 - Transect 01
- 201707023 - Transect 02
- 201707023 - Transect 03
- 201707023 - Transect 04
- Dive Track
- ★ Mohawk ROV
- Oculina HAPC
- MPA
- Deep Coral HAPC



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Sedberry_OEBlock1_5m_UT M17N_MB_Grid
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/2/2017
Specimens:	0
Digital Photos:	298
No. DVD:	2
Hard Drive No.:	1

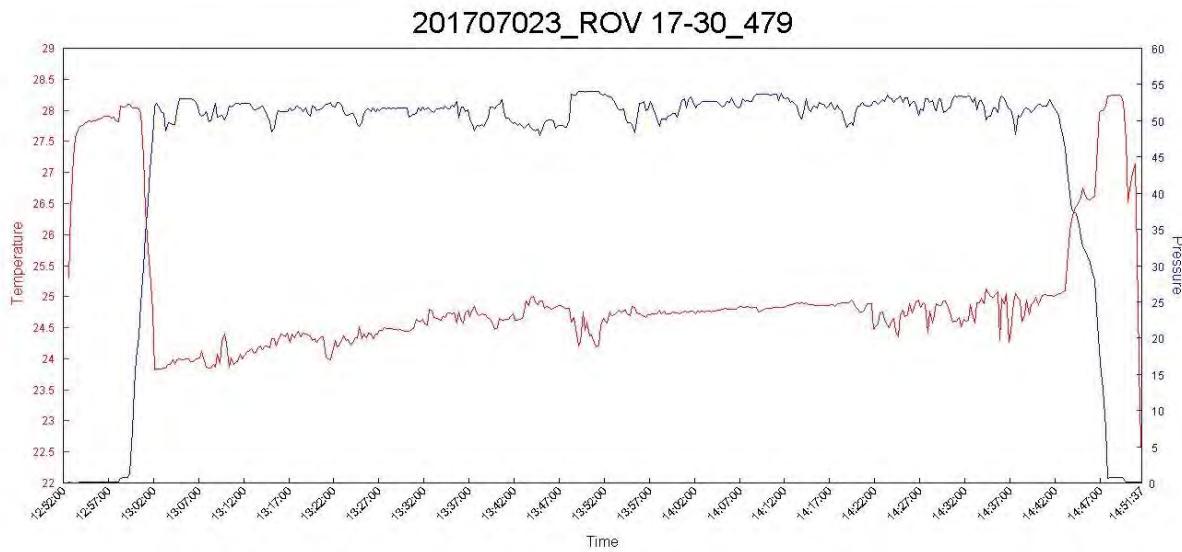
Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

Dive Data:

Minimum Bottom Depth (m):	49	Total Transect Length (km):	0.777
Maximum Bottom Depth (m):	55.3	Surface Current (kn):	0.5
On Bottom (Time- EDST):	13:00	On Bottom (Lat/Long):	32.8186°N; -78.2839°W
Off Bottom (Time- EDST):	14:40	Off Bottom (Lat/Long):	32.8237°N; -78.2793°W
Physical (bottom); Temp (°C):	27.3	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-30 are as follows: Depth Maximum: 54 m, Temperature: 23.8-27.3 °C

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

Dive Imagery:



Figure 1: -52.7 m

Blue angelfish (*Holacanthus bermudensis*) at reef edge.



Figure 2: -55.1 m

120 lionfish were counted on this dive.



Figure 3: -55.2 m

Greater soapfish (*Rypticus saponaceus*) with thorny oyster on right.



Figure 4: -52.1 m

Large *Dasyatis* stingray.



Figure 5: -53 m

Scamp grouper (*Mycteroperca phenax*) were common at this site.



Figure 6: -53 m

Reef consists of 1-2 m tall rounded mounds similar to previous dive site.

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 2-VII-17-3; ROV 17-30, UNCW Dive 479, South Carolina, outside Northern South Carolina MPA, Site SC-7, 55 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Site Description/Habitat/Biota:

Depth range: 50- 55 m.

MB map (Sedberry OE Block 1, 5 m resolution) shows a not-well defined, NE-SW oriented ridge, 3.5 miles long, 220 m wide, east edge top- 48.7 m, east base- 52.2m. Previous dives- none. Transect along east slope of ridge, heading NE along slope.

12:56- Launch; sunny, air- 28.5, wind- 14 kn from 237 dg, seas- 2-3' from SW, current- 0.5 kn to 50 dg, water- 25.71 dg C, salinity- 36.578.

13:00- On bottom, depth- 55 m , visibility- 10 m, current- 0.1 from SW.

On bottom, 55 m at WP. Flat bottom, numerous smooth, rounded rock mounds, 10-20 m diameter, 30-45-60 dg slope, rounded tops, few eroded edges with ledges. Coarse sand between the mounds. 54-55 m in sand at base of mounds, 51-52 m at top of mounds, 3 m total relief, low rugosity. Narrow sand chutes between mounds, to wide valleys. MB ridge- is the continuous series of rounded mounds. More eroded edges, and ledges than the previous dive, but low rugosity overall.

13:05- Heading NE along east edge of MB ridge. Biota- Tanacetipathes single stalk, Callyspongia vaginalis, Ellisella elongata white whips, Agelas clathrodes (common), Stichopathes, dense turf algae- Dictyota, Filograna, Ircinia campana, Muricea, Iciligorgia schrammi, Tanacetipathes bush, Diodogorgia, 10 cm gorgonians, hydroids, Rhodophyta thin EB,

Chlorophyta bushy ball, hairy white hydroid, black CB with apical pores Erylus?

13:35-52 m on top of mounds. Several Solandaria 20 cm on top of mound, 20 cm black stinging hydroid with parazoanthids.

13:42- 51 m, top of continuous ridge, smooth flat topped mound. Top of ridge, 50 m, steep slope on east face, 80 dg wall, eroded surface. Flat sand at base, 55 m. 2 m vertical rock, undercut ledges along base. Small area of high rugosity. Back to the usual rounded rock mounds with low rugosity. Biota- Spondylus. Another area of high rugosity, eroded rock, caves. High density of fish- lionfish, scamp, striped bass. High rugosity in very narrow zone. 6' thorny tail stingray, 6 cobia, several remora.

17:56- Another high relief, 3-4 m, high rugosity zone on east slope. Rounded caves along base. Clathriidae, DMST sponge, Davidaster yellow crinoid.

14:13- 53 m, east slope of ridge, smooth rock slope, low rugosity. Peyssonnelia.

14:30- 54.5 m, base of east slope, region of deep caves at foot of wall, high rugosity.

14:39- 54 m, base of east slope. End of dive.

Dominant Benthic Macrobiota:

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

Scleractinia- solitary cup corals

Antipatharia- Stichopathes, Tanacetipathes single stalk, Tanacetipathes bush

Gorgonacea- Diodogorgia, 10 cm gorgonians, Muricea, 1 Swiftia, Ellisella elongata, Iciligorgia schrammi

Hydroida- black hydroid with Parazoanthus, hairy white hydroid

Hydrozoa- Solendaria

Porifera- Ircinia campana, Agelas clathrodes, Callyspongia vaginalis, Erylus?, DMST, Clathriidae

Annelida- Filograna

Crinoidea- Davidaster

Mollusca- Spondylus

Asciidiacea- Didemnidae

Algae- small unid turf, Peyssonnelia, Chlorophyta, Dictyota, Rhodophyta EB thin

Dominant Fish:

Lionfish- 120

Scamp- 21, hogfish- 3, graysby-2, sunshine, reef butterfly, roughtail stingray, cobia, remora, squirrel, spotfin hog, sharpnose puffer, tattler, blue angel, lizard fish

Human debris:

None

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

CPCe Percent Cover Analysis:

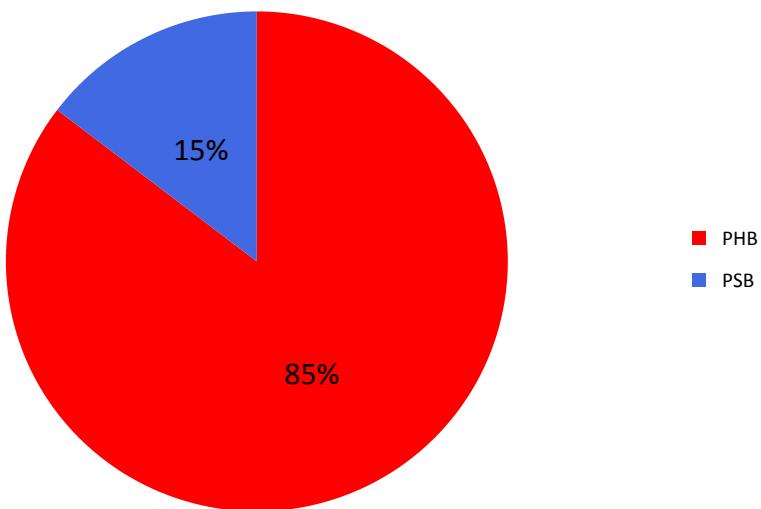
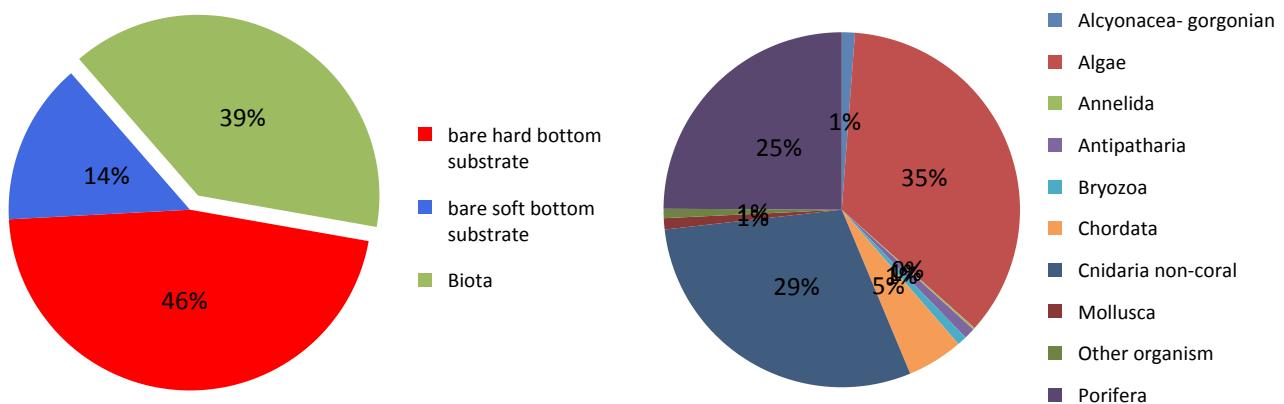


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-30. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-30.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-30.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-30 dive notes
Biota	39.15%	X
Algae	13.87%	X
Cyanobacteria	3.52%	
Chlorophyta		X
Ochrophyta	4.71%	X
<i>Dictyota</i> sp.	2.85%	X
Ochrophyta	1.86%	
Rhodophyta	5.64%	X
Corallinales	4.58%	
<i>Peyssonnelia</i> sp.		X
Rhodophyta	1.06%	X
Porifera	9.75%	X
Demospongiae	9.75%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)	2.65%	X
<i>Agelas</i> sp.	0.53%	
<i>Aulettia</i> sp.	0.07%	
<i>Callyspongia vaginalis</i> (Lamarck, 1814)	0.13%	X
Demospongiae- tan starlet thick encrusting	0.13%	
Demospongiae unid. sp.	5.24%	
<i>Erylus</i> sp.		X
<i>Ircinia campana</i> (Lamarck, 1814)		X
<i>Ircinia</i> sp.	0.40%	
<i>Niphates</i> sp.	0.07%	
Poecilosclerida	0.07%	
Spirastrellidae	0.46%	
Cnidaria	12.41%	X
Alcyonacea - gorgonian	0.46%	X
Alcyonacea- gorgonian	0.27%	
<i>Diogorgia</i> sp.	0.07%	X
Ellisellidae	0.07%	X
<i>Iciligorgia schrammi</i> Duchassaing, 1870		X
<i>Muricea</i> sp.		X
<i>Nicella</i> sp.	0.07%	

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

<i>Swiftia exserta</i> (Ellis & Solander, 1786)		X
Anthozoa - Non Coral		X
Zoanthidae		X
Antipatharia	0.40%	X
<i>Antipathes atlantica</i> Gray, 1857	0.13%	
Antipathidae	0.07%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.13%	X
<i>Tanacetipathes</i> sp.	0.07%	X
Hydrozoa	11.55%	X
Hydroidolina	11.55%	
<i>Solanderia gracilis</i> Duchassaing & Michelin, 1846		X
Annelida	0.07%	X
Polychaeta	0.07%	X
<i>Filograna</i> sp.	0.07%	X
Bryozoa	0.33%	X
Bryozoa	0.33%	X
Bryozoa	0.27%	X
<i>Schizoporella</i> sp.	0.07%	
Echinodermata		X
Crinoidea		X
<i>Davidaster</i> sp.		X
Mollusca	0.40%	X
Bivalvia	0.40%	X
Bivalvia	0.40%	
<i>Spondylus</i> sp.		X
Chordata - Invertebrate	1.06%	
Tunicata	1.06%	
Asciidiacea	0.86%	
Didemnidae	0.20%	
Chordata - Vertebrate	0.93%	
Chordata	0.93%	
Actinopterygii	0.93%	
UNKNOWN	0.33%	
Bare Substrate	60.85%	
Non-Fauna	60.85%	
Habitat	60.85%	
Bare coral rubble	0.07%	
Bare rock, pavement, boulder, ledge	45.85%	
Bare rubble/cobble	0.46%	
Bare soft bottom	14.47%	
Grand Total		100.00%

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-30.

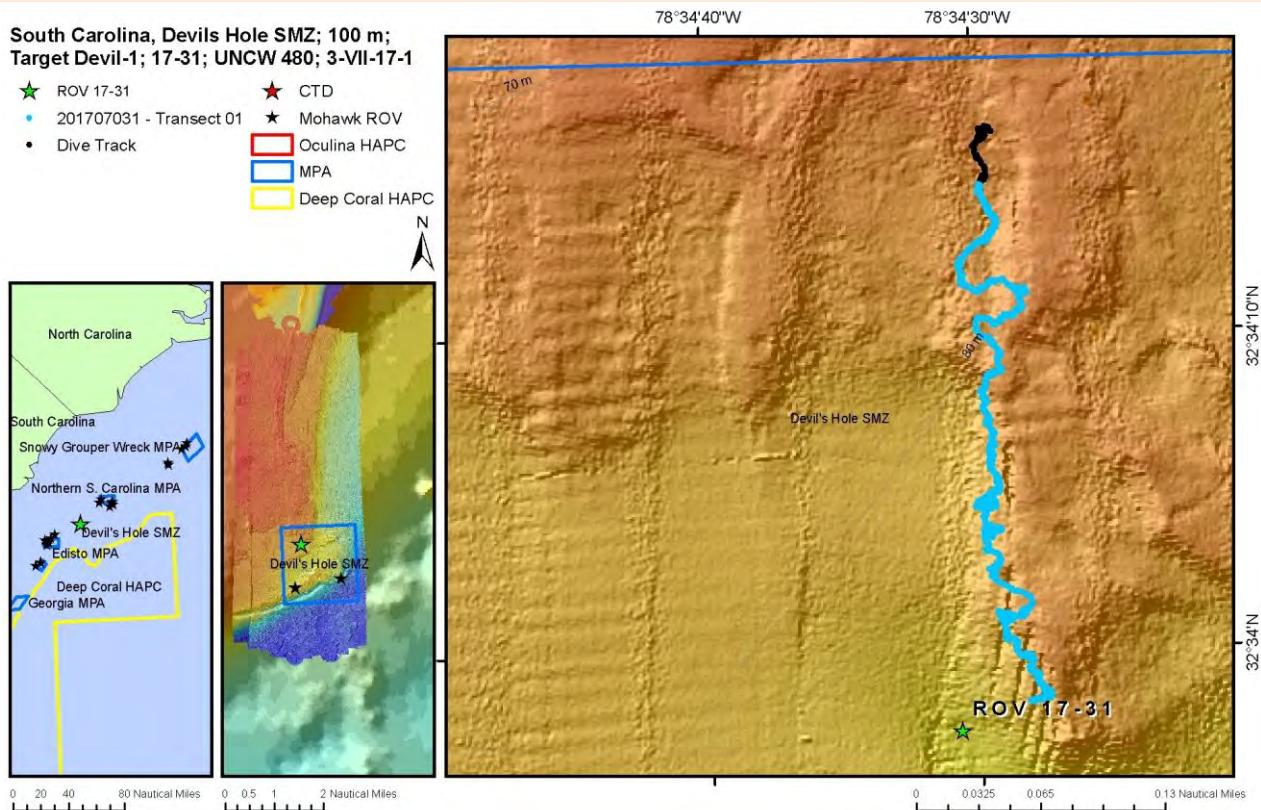
Class/Scientific Name- Common Name	17-30
Actinopterygii	
Anguilliformes	
<i>Gymnothorax moringa</i> (Cuvier, 1829)- Spotted Moray	0.2442
Aulopiformes	
<i>Synodus synodus</i> (Linnaeus, 1758)- Red Lizardfish	0.2442
Beryciformes	
<i>Holocentridae</i> - Squirrfish	7.8144
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	8.3028
<i>Holocentrus rufus</i> (Walbaum, 1792)- Longspine Squirrfish	2.1978
<i>Myripristis jacobus</i> Cuvier, 1829- Blackbar Soldierfish	0.2442
Perciformes	
<i>Acanthurus</i> sp.- Doctorfish	1.4652
<i>Apogon</i> sp.- Cardinalfish	24.4200
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	13.9194
<i>Bodianus rufus</i> (Linnaeus, 1758)- Spanish Hogfish	0.2442
<i>Calamus</i> sp.- Porgy	3.4188
<i>Caranx ruber</i> (Bloch, 1793)- Bar Jack	0.2442
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	1.7094
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	0.7326
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	2.1978
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	22.2222
<i>Chromis encrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	2.1978
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	83.2723
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	5.8608
<i>Chromis</i> sp.- Damselfish	63.2479
<i>Clepticus parrae</i> (Bloch & Schneider, 1801)- Creole Wrasse	2.9304
<i>Echeneidae</i> - Remora	0.4884
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	24.9084
<i>Haemulon plumieri</i> (Lacepède, 1801)- White Grunt	0.7326
<i>Haemulon striatum</i> (Linnaeus, 1758)- Striped Grunt	97.6801
<i>Halichoeres cyancephalus</i> (Bloch, 1791)- Yellowcheek Wrasse	0.4884
<i>Halichoeres garnoti</i> (Valenciennes, 1839)- Yellowhead Wrasse	15.1404
<i>Halichoeres</i> sp.- Wrasse	19.7802
<i>Holacanthus</i> sp.- Angelfish	7.3260
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	2.9304
<i>Hypoplectrus</i> sp.- Hamlet	0.2442
<i>Lachnolaimus maximus</i> (Walbaum, 1792)- Hogfish	0.7326
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	1.9536

Dive Site: South Carolina, Outside N. SC MPA; 48 m; Target SC-7; 17-30; UNCW 479; 2-VII-17-3

<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	2.9304
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	3.4188
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	7.8144
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.9768
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	2.4420
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	0.7326
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	0.4884
<i>Rachycentron canadum</i> (Linnaeus, 1766)- Cobia	1.7094
<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	1.2210
<i>Seriola</i> sp.- Amberjack	0.4884
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	2.9304
<i>Serranus baldwini</i> (Evermann & Marsh, 1899)- Lantern Bass	4.1514
<i>Serranus phoebe</i> Poey, 1851- Tattler	4.3956
<i>Sparisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.7326
<i>Stegastes partitus</i> (Poey, 1868)- Bicolor Damselfish	0.4884
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	31.9902
Tetraodontiformes	
<i>Acanthostracion polygonius</i> Poey, 1876- Honeycomb Cowfish	0.2442
<i>Acanthostracion</i> sp.- Cowfish	0.2442
<i>Balistes vetula</i> Linnaeus, 1758- Queen Triggerfish	0.2442
<i>Canthigaster</i> sp.- Puffer	13.4310
<i>Lactophrys trigonus</i> (Linnaeus, 1758)- Trunkfish	0.2442
Elasmobranchii	
Myliobatiformes	
<i>Dasyatis centroura</i> (Mitchill, 1815)- Roughtail Stingray	0.2442
UNKNOWN	0.2442

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_EastDevilsHole MPA_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/3/2017
Specimens:	0
Digital Photos:	207
No. DVD:	2
Hard Drive No.:	1

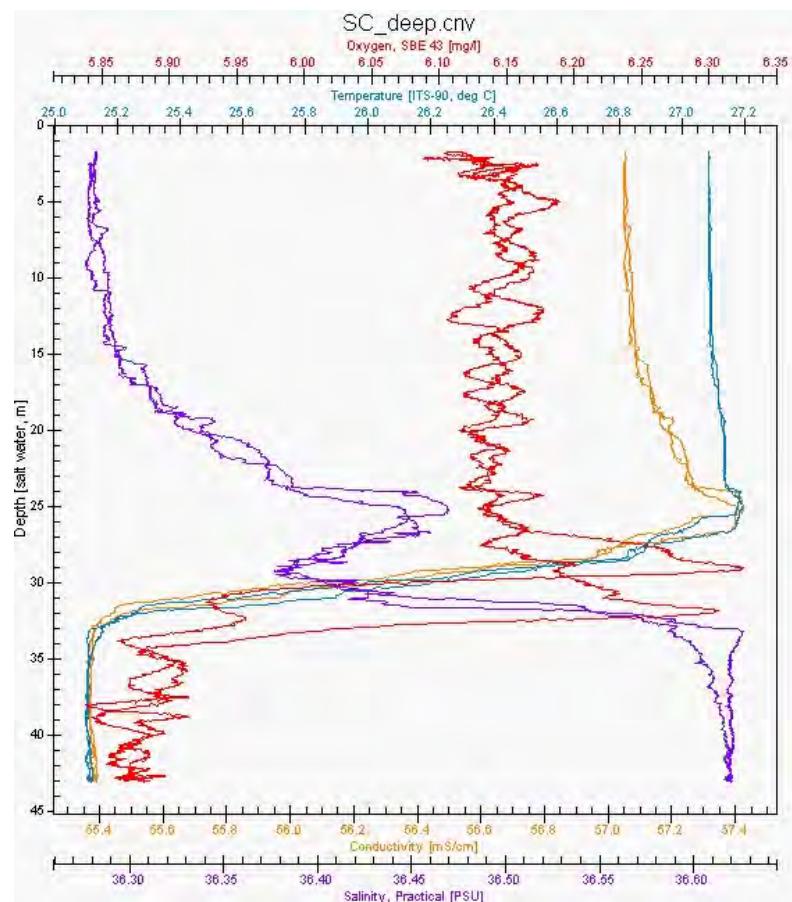
Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

Dive Data:

Minimum Bottom Depth (m):	65	Total Transect Length (km):	0.837
Maximum Bottom Depth (m):	86	Surface Current (kn):	0.6
On Bottom (Time- EDST):	9:56	On Bottom (Lat/Long):	32.5662°N; -78.5748°W
Off Bottom (Time- EDST):	11:09	Off Bottom (Lat/Long):	32.5708°N; -78.5749°W
Physical (bottom); Temp (°C):	N/A	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 41.34



Shipboard CTD casts were made with the Sea-Bird 19. The ranges of the water column data recorded during CTD 17-19 are as follows: Depth Maximum: 43 m, Temperature: 25.1-27.2 °C, Salinity: 36.1-36.6 PSU, Oxygen Saturation: 2.8-4.5 ml/l, and Fluorescence: 0-0.8 RFU.

Dive Imagery:



Figure 1: ~70 m

Thickets of live *Oculina varicosa* coral (may be *Madracis*- need sample to verify) were abundant. A spanish flag (*Gonioplectrus hispanus*) is seen on this one.



Figure 2: ~70 m

Rocky escarpment with schools of tomtate (*Haemulon aurolineatum*) and anhiids (Anthiadinae) were common.



Figure 3: ~70 m

Rocky edge with dense black coral and school of tomtate (*Haemulon aurolineatum*).



Figure 4: ~70 m

Scamp grouper (*Mycteroperca phenax*) and tomtate (*Haemulon aurolineatum*).



Figure 5: ~70 m

Orangeback bass (*Serranus annularis*).



Figure 6: ~70 m

Flat pavement on reef top, with dense macrobiota-gorgonians, black corals, sponges, and algae.

Dive Site: South Carolina, Devil's Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 3-VII-17-1; ROV 17-31, UNCW Dive 480, South Carolina, Devil's Hole SMZ (to be enacted July 31, 2017), Site- Devil 1, 75 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Dive delayed- original dive plan site had fishers on site; refused to move.

Video frame grabs not working during transect along high density of *Oculina*.

ROV tracking not turned on- no data recorded. Converted live ArcGIS Dive Track- Date/Time off bottom at 11:09:23 AM- found closest point and extrapolated time (2 seconds per point), no depth avbl and original data is from before the UNCW-USVP post cruise offset correction;

Site Description/Habitat/Biota:

Depth range: 65- 86 m.

MB map (Pisces 2013, East Devil's Hole, 5 m resolution) shows flat topped plateau with escarpment along east edge. Dive site along southeastern tip of plateau; west face of N-S oriented escarpment, 65 m top of ridge, 85 m at west base, 101 m at tip of south base. Previous dives- none. Transect heading N along the west facing slope.

09:50- Launch; pt/cloudy, air- 28.3, wind- 10 kn from 257 dg, seas- 1-2' from SW, current- 0.6 kn to 102 dg, water- 25.44 dg C, salinity- 36.856.

9:56- On bottom, depth-86 m , visibility- 10 m, current- 0.1 kn.

On bottom- west base of escarpment; 80% cover 1 m eroded boulders on flat bottom, 10 dg slope. *Oculina varicosa* (depth 75 m, abundant), 10 cm to 1 m on vertical rock.

10:00- 69 m, upper escarpment, sharp ledge, 2-3 relief, eroded rugged boulders; top of edge, flat rock pavement, 68 m; base 86 m, 18 m relief overall. Lower slope, 75 m, flat, with 1-2 m eroded rock boulders. Biota- low diversity, large sponges; *Oculina* abundant to 1 m diameter on vertical face of boulders; huge schools of anhiids red barbier, dense *Antipathes atlantica*, encrusting yellow and orange sponges, *Stichopathes*, CCA, dense *Oculina* on upper vertical rocks, large pile of fishing line, hydroids.

10:12- 75 m, heading N along west base of escarpment, flat with 1 m rounded flat boulders.

10:16- 69.5 m, top is flat pavement, few ledges. MB shows ROV on top also (ship heading SW). Biota- *Carijoa*, turf algae, *Filograna*, *A. furcata*, hydroids, 10 cm gorgonacea.

10:18- 73 m, west face escarpment, not as prominent; 2 m relief boulders at top, narrow zone of high rugosity. 75 m- abundant *Oculina* 10- 50 cm on boulders, dense *A. atlantica* fans.

10:27, 77 m, lower slope, 1-2 m diameter eroded boulders, 1 m relief, <10 dg slope; base 25-50 cm boulders, flat. Upper zone, rugose, fractured boulders 2-3 m diameter, 2 m relief. Biota- Chlorophyta fuzzy ball, no large sponges, dense *A. atlantica*, *Oculina* 25 cm (72 m), 15 cm *Oculina*, *Oculina*.

10:37- 72 m, 5 *Oculina*, numerous *Oculina*, rock looks like dead coral, very porous conglomerate rock; *Tanacetipathes* single stalk. 65 m top rock pavement.

10:44- 66 m, upper edge, pavement. *Ellisella* whips, *Carijoa*.

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

10:49- 65 m, MB- at WP, end of sharp escarpment, flattens out to gentle slope. Flat pavement, rolling low relief hills, sand between, few low relief ledges. Biota- 5 cm orange plexaurid, *Aulettia*, algae- small turf Chlorophyta, Rhodophyta, *Peyssonnelia*, very few large sponges, no *Ircinia campana*, no *Swiftia*; DMST, yellow balls Poecilosclerida?, *Filograna*, *Ellisella elongata*, 30 cm *Solanderia*.

10:58- 69 m, west slope, 5-10 dg, flat pavement, no ledges. Base of slope, sediment, rubble, no fish, no macrobiota. On slope- 5-10 dg slope, low relief pavement and same biota, dense *Peyssonnelia*, *Filograna*, *Diodogorgia*, small gorgonians, sparse fish. 1- *Ircinia campana*.

11:09- 65 m, upper west slope. End dive.

Dominant Benthic Macrobiota:

Scleractinia- solitary cup corals; *Oculina varicosa*, abundant along upper escarpment, 10 cm - 1 m diameter on vertical face of boulders, mostly 70-75 m.

Antipatharia- *Stichopathes*, *Tanacetopathes* single stalk, dense *Antipathes atlantica*, *Antipathes furcata*
Gorgonacea- *Diodogorgia*, 10 cm gorgonians, 0- *Swiftia*, *Ellisella elongata*, *Carijoa*

Hydroida

Hydrozoa- *Solenaria*

Porifera- *Ircinia campana*-1, very few macro sponges, mostly encrusting yellow and orange, DMST-1

Annelida- *Filograna*

Algae- CCA, small unid turf, *Peyssonnelia*, Chlorophyta, Rhodophyta

Dominant Fish:

Lionfish- 87

Scamp- 18, graysby- 5, vermillion snapper, gag- 2, red snapper-2, cobia, soapfish, bank butterfly, spotfin hog, red barbier (abundant), tomate, cherub, creole, baracuda, amberjack, latern bass, calamus porgy

Human debris:

Large pile fishing line

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

CPCe Percent Cover Analysis:

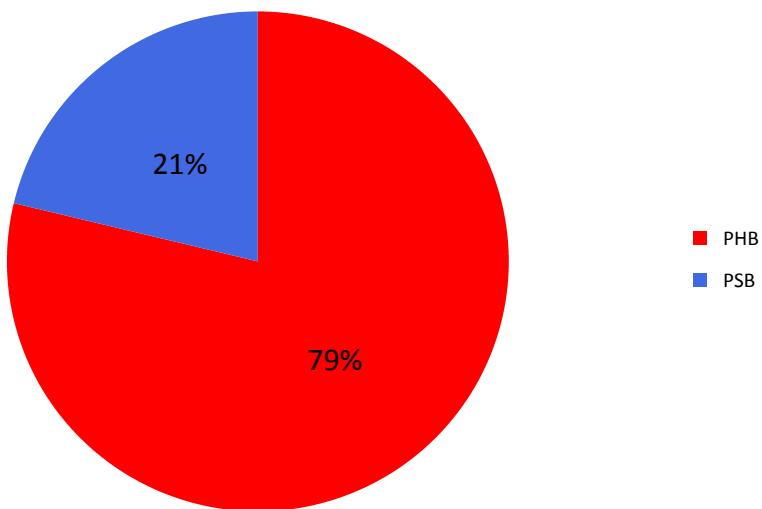
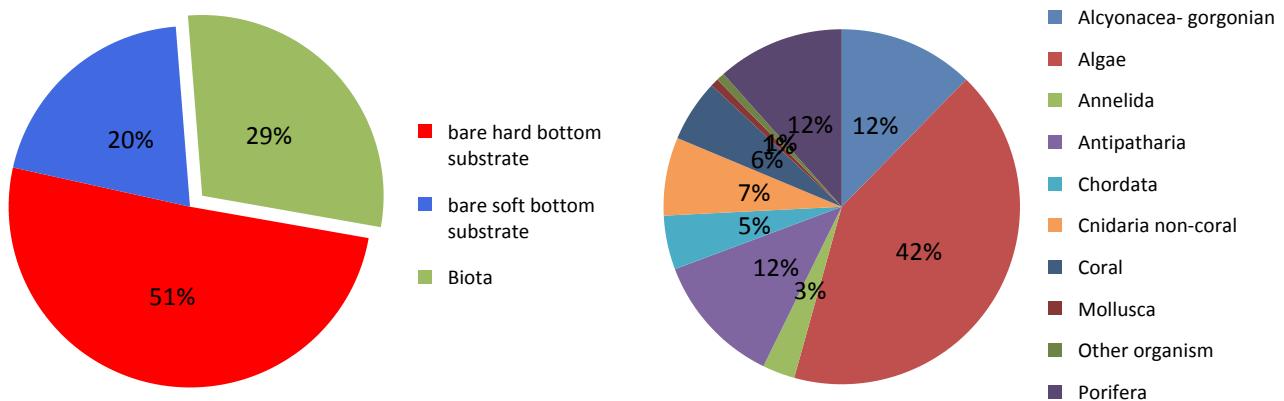


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-31. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-31.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site 17-31.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-31 dive notes
Biota	29.03%	X
Algae	12.20%	X
Cyanobacteria	0.43%	
Chlorophyta		X
Ochrophyta	0.21%	
Ochrophyta	0.21%	
Rhodophyta	11.55%	X
Corallinales	10.98%	X
<i>Peyssonnelia</i> sp.		X
Rhodophyta	0.57%	
Porifera	3.35%	X
Demospongiae	3.35%	X
<i>Agelas clathrodes</i> (Schmidt, 1870)	0.43%	
<i>Aulettia</i> sp.	0.07%	
Demospongiae- orange sphere		X
Demospongiae- tan starlet thick encrusting		X
Demospongiae unid. sp.	2.78%	
<i>Ircinia</i> sp.	0.07%	X
Poecilosclerida		X
Cnidaria	10.77%	X
Alcyonacea - gorgonian	3.57%	X
Alcyonacea- gorgonian	1.64%	
<i>Carijoa</i> sp.	0.36%	X
<i>Diodogorgia</i> sp.	0.07%	
<i>Ellisella elongata</i> (Pallas, 1766)		X
<i>Ellisella</i> sp.		X
Ellisellidae	0.21%	
<i>Nicella</i> sp.	1.28%	
Antipatharia	3.50%	X
<i>Antipathes atlantica</i> Gray, 1857	2.21%	X
<i>Antipathes furcata</i> Gray, 1857	0.14%	X
Antipathidae	0.64%	
<i>Stichopathes lutkeni</i> Brook, 1889	0.29%	X

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

<i>Tanacetipathes</i> sp.	0.21%	X
Hydrozoa	2.07%	X
Hydroidolina	2.07%	X
<i>Solanderia gracilis</i> Duchassaing & Michelin, 1846		X
Scleractinia	1.64%	X
<i>Oculina varicosa</i> Lesueur, 1821	1.43%	X
Scleractinia- unid colonial	0.21%	
Scleractinia- unid cup		X
Annelida	0.86%	X
Polychaeta	0.86%	X
<i>Filograna</i> sp.	0.86%	X
Echinodermata		X
Asteroidea		X
Mollusca	0.21%	
Bivalvia	0.21%	
Chordata - Invertebrate	0.07%	
Tunicata	0.07%	
Didemnidae	0.07%	
Chordata - Vertebrate	1.36%	
Chordata	1.36%	
Actinopterygii	1.36%	
UNKNOWN	0.21%	
Human Debris		X
Non-Fauna		X
Human debris		X
Human debris- fish line/gear		X
Bare Substrate	70.97%	
Non-Fauna	70.97%	
Habitat	70.97%	
Bare coral rubble	0.07%	
Bare rock, pavement, boulder, ledge	46.79%	
Bare rubble/cobble	3.71%	
Bare soft bottom	20.26%	
dead standing Scleractinia	0.14%	
Grand Total	100.00%	

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-31.

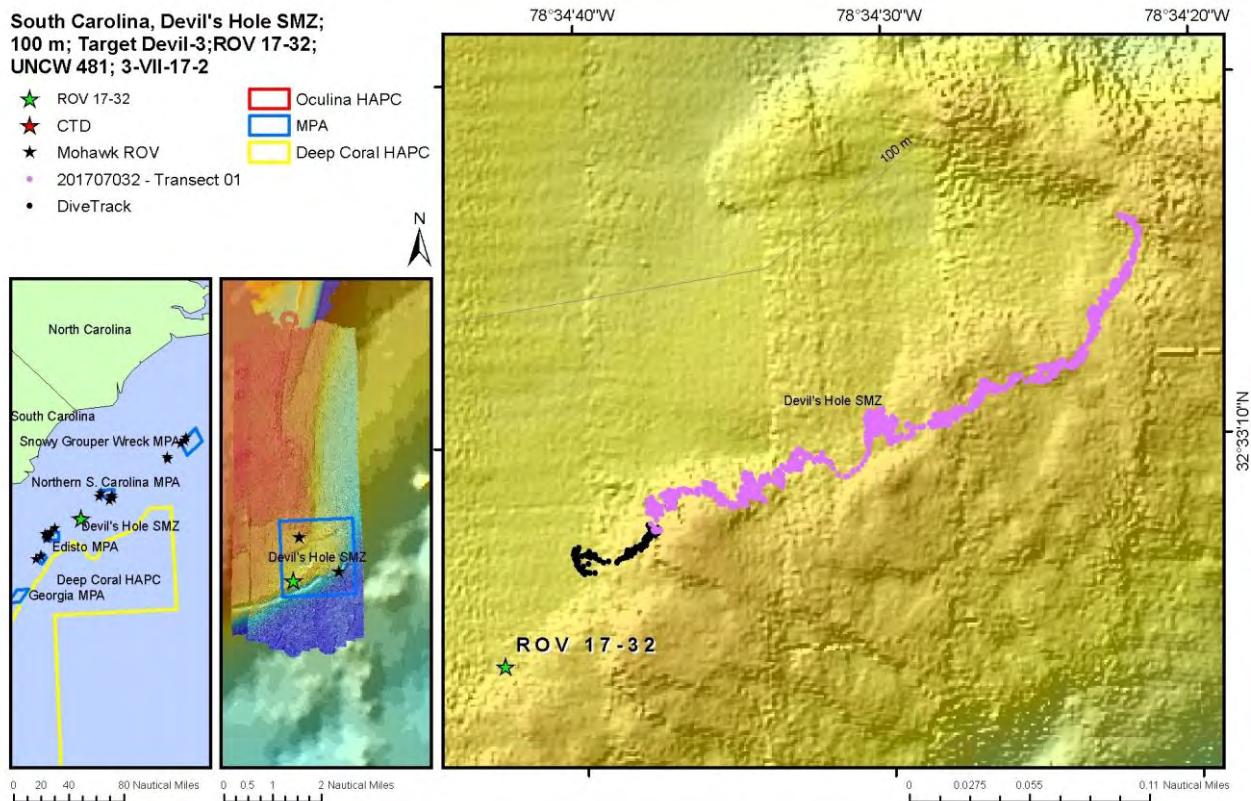
Class/Scientific Name- Common Name	17-31
Actinopterygii	
Beryciformes	
<i>Holocentridae</i> - Soldierfish	0.2389
<i>Holocentridae</i> - Squirrfish	17.4432
<i>Holocentrus adscensionis</i> (Osbeck, 1765)- Squirrfish	1.6726
Perciformes	
<i>Anthiinae</i> - Anthiid	33.4528
<i>Apogon</i> sp.- Cardinalfish	1.9116
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	18.3990
<i>Calamus</i> sp.- Porgy	2.6284
<i>Centropyge argi</i> Woods & Kanazawa, 1951- Cherubfish	23.4170
<i>Cephalopholis cruentata</i> (Lacepède, 1802)- Graysby	1.9116
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.4779
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	10.5137
<i>Chromis enchrysura</i> Jordan & Gilbert, 1882- Yellowtail Reeffish	5.0179
<i>Chromis insolata</i> (Cuvier, 1830)- Sunshinefish	19.1159
<i>Chromis scotti</i> Emery, 1968- Purple Reeffish	36.0812
<i>Chromis</i> sp.- Damselfish	45.8781
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	836.3202
<i>Haemulon</i> sp.- Grunt	215.0538
<i>Halichoeres</i> sp.- Wrasse	10.5137
<i>Hameulon striatum</i> (Linnaeus, 1758)- Striped Grunt	262.8435
<i>Hemanthias vittatus</i> (Jordan & Swain, 1885)- Red Barbier	3485.5436
<i>Holacanthus</i> sp.- Angelfish	2.8674
<i>Holacanthus tricolor</i> (Bloch, 1795)- Rock Beauty	0.9558
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	3.5842
<i>Mycteroperca microlepis</i> (Goode & Bean, 1879)- Gag Grouper	0.4779
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	3.8232
<i>Paranthias furcifer</i> (Valenciennes, 1828)- Creolefish	1.1947
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	37.0370
<i>Pomacanthus paru</i> (Bloch, 1787)- French Angelfish	0.4779
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	0.7168
<i>Prognathodes aculeatus</i> (Poey, 1860)- Longsnout Butterflyfish	2.1505
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	14.5759
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	80.5257
<i>Pseudupeneus maculatus</i> (Bloch, 1793)- Spotted Goatfish	1.9116
<i>Rachycentron canadum</i> (Linnaeus, 1766)- Cobia	0.2389
<i>Rhomboplites aurorubens</i> (Cuvier, 1829)- Vermilion Snapper	17.9211

Dive Site: South Carolina, Devils Hole SMZ; 75 m; Target Devil-1; 17-31; UNCW 480; 3-VII-17-1

<i>Rypticus saponaceus</i> (Bloch & Schneider, 1801)- Greater Soapfish	0.7168
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	0.4779
<i>Seriola</i> sp.- Amberjack	0.9558
<i>Serranus annularis</i> (Günther, 1880)- Orangeback Bass	3.5842
<i>Serranus phoebe</i> Poey, 1851- Tattler	6.2127
<i>Spalisoma atomarium</i> (Poey, 1861)- Greenblotch Parrotfish	0.2389
<i>Sphyraena barracuda</i> (Edwards, 1771)- Barracuda	0.7168
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	26.7622
Scorpaenidae- Scorpionfish	0.2389
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	13.3811

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_EastDevilsHole MPA_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/3/2017
Specimens:	0
Digital Photos:	202
No. DVD:	1
Hard Drive No.:	1

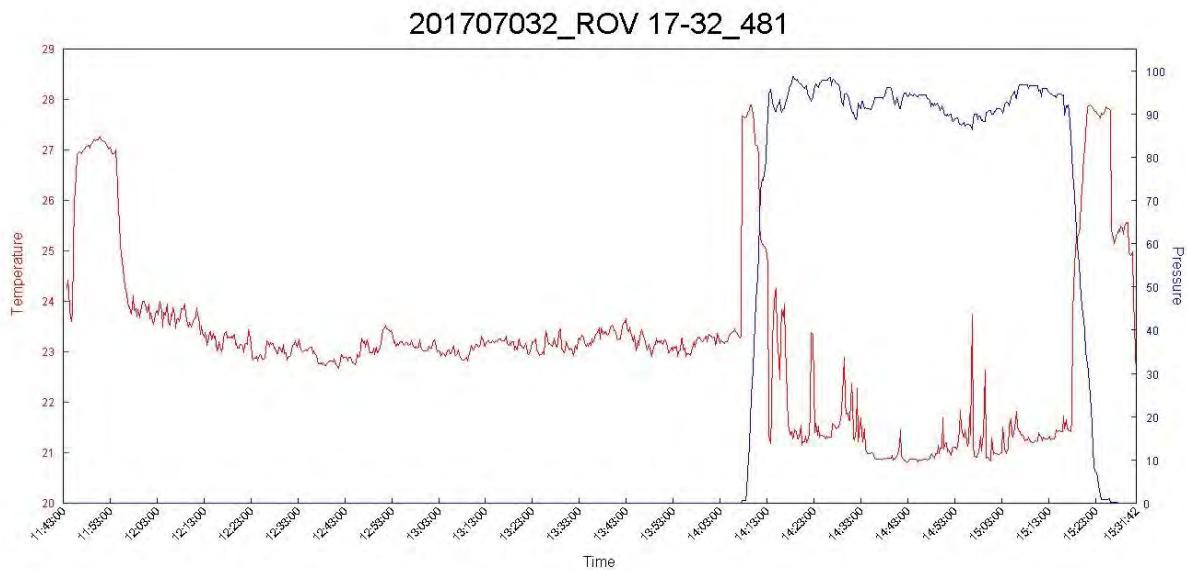
Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

Dive Data:

Minimum Bottom Depth (m):	90	Total Transect Length (km):	0.690
Maximum Bottom Depth (m):	100	Surface Current (kn):	0.2
On Bottom (Time- EDST):	14:16	On Bottom (Lat/Long):	32.5519°N; -78.5777°W
Off Bottom (Time- EDST):	15:14	Off Bottom (Lat/Long):	32.5544°N; -78.573°W
Physical (bottom); Temp (°C):	27.2	Salinity:	N/A
		Visibility (m):	10
		Current (kn):	1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-32 are as follows: Depth Maximum: 98.7 m, Temperature: 20.8-23.9 °C

Dive Imagery:



Figure 1: -99.2 m

Dense gorgonians are common on the reef.

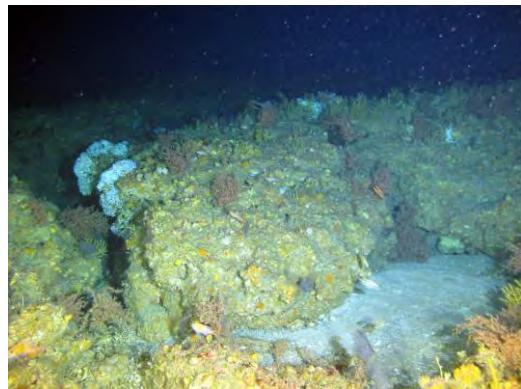


Figure 2: -93.5 m

Oculina varicosa were abundant on the upper escarpment.



Figure 3: -93.1 m

Rugged, rugose reef edge with scamp grouper (*Mycteroperca phenax*).



Figure 4: -88.9 m

Live white *Oculina* coral on rock boulder.

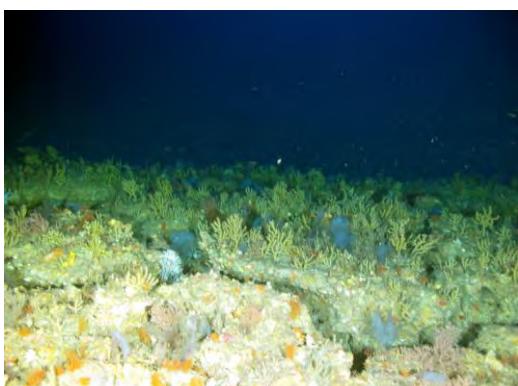


Figure 5: -92.3 m

Reef flat with dense gorgonians.



Figure 6: -92.4 m

Oculina coral and gorgonians with a spanish flag (*Gonioplectrus hispanus*) at reef edge.

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 3-VII-17-2; ROV 17-32, UNCW Dive 481, South Carolina, Devil's Hole SMZ (to be enacted July 31, 2017), Site- Devil 3, 90 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Dive delayed by lightning. Had to call dive early. Boatswain left ship few days ago, so have to end dives by 3:30.

Difficulty getting to bottom, bottom current 1 kn. Unable to get quantitative down photos.

Site Description/Habitat/Biota:

Depth range: 90- 100 m.

MB map (Pisces 2013, East Devil's Hole, 5 m resolution) shows flat topped plateau oriented NE-SW, 2 miles long, ½ mile wide; top- 90 m, west base- 94 m, 125 m in scour. Previous dives- none. Transect heading NE along the west facing slope.

14:05- Launch; cloudy/rain, air- 23.9, wind- 11 kn from 153 dg, seas- 2-3' from SW, current- 0.2 kn to 30 dg, water- 25.26 dg C, salinity- 36.209.

14:11- On bottom, depth- 100 m , visibility- 5-10 m, current- 1.0 from SW ; large school of AJ near bottom. On bottom, near WP 1, west base of escarpment. Flat sand, shell hash, patchy low relief pavement. Biota: *Antipathes atlantica*, 10 cm yellow gorgonacea, 5 cm orange gorgonians, 4-5 spp gorgonians, *Bebryce*, *Tanacetipathes* single stalk, orange and yellow sponges. Pulled off bottom, due to current.

14:27- 95 m, on escarpment briefly, 1-2 m rugged boulders, dense *Oculina varicosa* 25- 50 cm. Upper slope, flat rock slabs, 1-3 m diameter, 1-2 m relief, broken off edge of escarpment, 45 dg slope. Biota- gorgonians abundant, *Oculina* abundant in high rugosity areas, *Tanacetipathes* bushes.

14:33- 93 m, top of escarpment, flat rock, covered with 10-20 cm gorgonacea and *A. atlantica*, fuzzy bushy coral- Parazoanthidae on dead gorgonian or hydroids.

14:36- heading NE along face of west slope. 96 m- lower slope, rock pavement, small boulders <1/2 m relief, 5-10 dg slope. 96 m, flat sand, rubble at base of slope. Overall relief 3 m, about 20 m wide.

14:50- 91 m, upper slope, pavement, rock slabs, 1 m ledges. Biota- very diverse and dense; *Muricea*, dense yellow gorgonians, *Oculina* 10-25 cm common (90 m), *Bubarus*, Parazoanthids, *Tanacetipathes*.

14:56- 90 m, near WP 2; dense *Oculina* on top of rocks (unusual) with dense gorgonians, *Aullela*.

15:01- 91 m, upper slope; white *Hypnogorgia*?, *Stichopathes*.

97.8 m- west base, flat sand, shell hash. 8 m total relief slope. *Oculina*, *A. furcata*, yellow lump sponge Clathriidae?

15:14- 91 m, upper slope; dense *Oculina*. End dive. All dives ending early since boatswain left ship a few days ago.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa*, abundant along upper escarpment, 10 cm - 1 m diameter on vertical face of

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

boulders and on flat top of slope, mostly 90- 95 m.

Antipatharia- *Stichopathes*, *Tanacetipathes* single stalk, *Antipathes atlantica*, *Antipathes furcata*, *Tanacetipathes* bushy

Gorgonacea- dense 5-10 cm gorgonians (several spp), *Bebryce*, *Hypnogorgia*- 1, *Muricea*

Hydroida

Parazoanthidae- on dead gorgonian or black coral

Porifera- encrusting yellow and orange, Clathriidae, *Bubarus*

Annelida- *Filograna*

Algae- none noted

Dominant Fish:

Lionfish- 8

Scamp- 4, amberjack (abundant), roughtongue, bank butterfly, cubbyu, tatler, wrasse bass, cardinal, stripped grunt, spanish flag

Human debris:

Anchor line, few fishing line

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

CPCe Percent Cover Analysis:

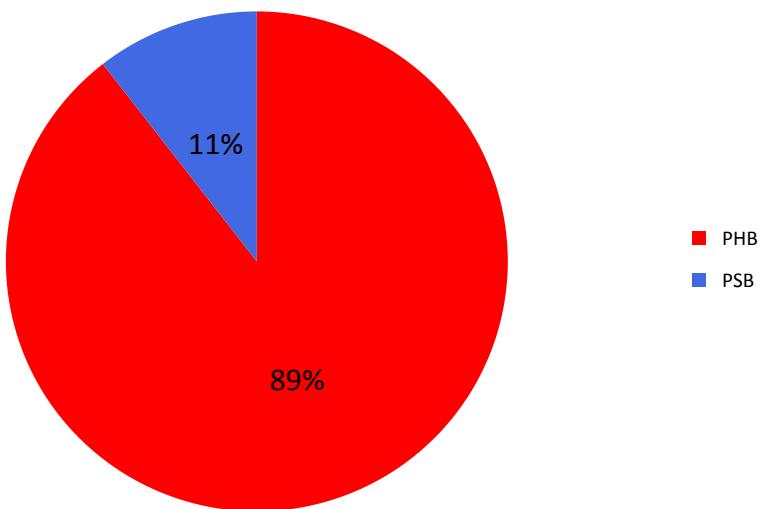
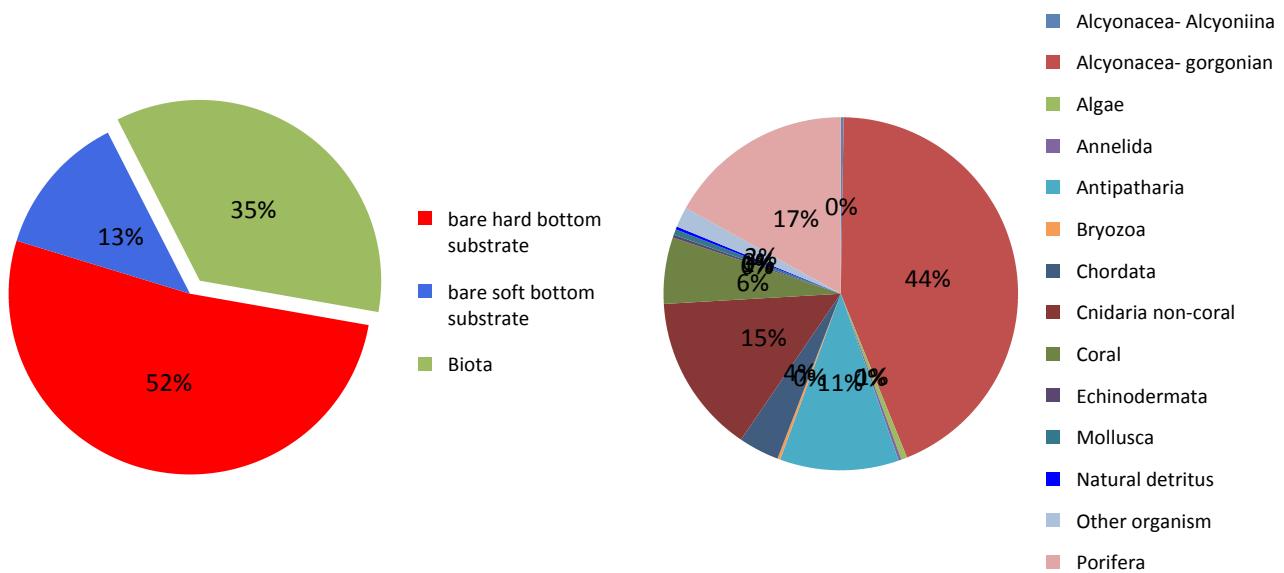


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-32. CPCe© points on organisms were scored as the underlying substrate (hard or soft).



A

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-32.

A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

B

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-32.

Group/Phylum/Scientific Name - Authority	ROV 17-32 CPCe	dive notes
Biota	35.26%	X
Algae	0.19%	
Rhodophyta	0.19%	
Corallinales	0.09%	
Rhodophyta	0.09%	
Porifera	5.97%	X
Demospongiae	5.97%	X
<i>Aulettia</i> sp.	0.37%	X
Axinellidae	0.09%	
<i>Bubaris</i> sp.		X
Demospongiae unid. sp.	5.22%	
Microcionidae		X
Spirastrellidae	0.28%	
Cnidaria	26.59%	X
Alcyonacea - Alcyoniina	0.09%	
Alcyoniina	0.09%	
Alcyonacea - gorgonian	15.39%	X
Alcyonacea- gorgonian	3.08%	X
<i>Bebryce</i> sp.		X
<i>Carijoa</i> sp.	0.09%	
<i>Hypnogorgia</i> sp.		X
<i>Muricea</i> sp.		X
<i>Nicella</i> sp.	1.40%	
Plexauridae	0.28%	
Plexauridae- yellow	10.54%	
Anthozoa - Non Coral	3.36%	X
Zoanthidae	3.36%	X
Antipatharia	3.82%	X
<i>Antipathes atlantica</i> Gray, 1857	1.49%	X
<i>Antipathes furcata</i> Gray, 1857	0.47%	X
Antipathidae	0.47%	
<i>Stichopathes lutkeni</i> Brook, 1889		X
<i>Tanacetipathes</i> sp.	1.40%	X

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

Hydrozoa	1.77%
Hydroidolina	1.77%
Scleractinia	2.15% X
<i>Oculina varicosa</i> Lesueur, 1821	2.15% X
Annelida	0.09%
Polychaeta	0.09%
Serpulidae	0.09%
Bryozoa	0.09%
Bryozoa	0.09%
Echinodermata	0.09%
Echinoidea	0.09%
<i>Centrostephanus longispinus</i> (Philippi, 1845)	0.09%
Mollusca	0.19%
Bivalvia	0.19%
Chordata - Invertebrate	0.19%
Tunicata	0.19%
Didemnidae	0.19%
Chordata - Vertebrate	1.12%
Chordata	1.12%
Actinopterygii	1.12%
Non-Fauna	0.09%
Detritus	0.09%
Natural Detritus	0.09%
UNKNOWN	0.65%
Human Debris	X
Non-Fauna	X
Human debris	X
Human debris- anchor line	X
Human debris- other	X
Bare Substrate	64.74%
Non-Fauna	64.74%
Habitat	64.74%
Bare coral rubble	0.09%
Bare rock, pavement, boulder, ledge	47.95%
Bare rubble/cobble	3.73%
Bare soft bottom	12.78%
dead standing Scleractinia	0.19%
Grand Total	100.00%

Dive Site: South Carolina, Devil's Hole SMZ; 90 m; Target Devil-3; ROV 17-32; UNCW 481; 3-VII-17-2

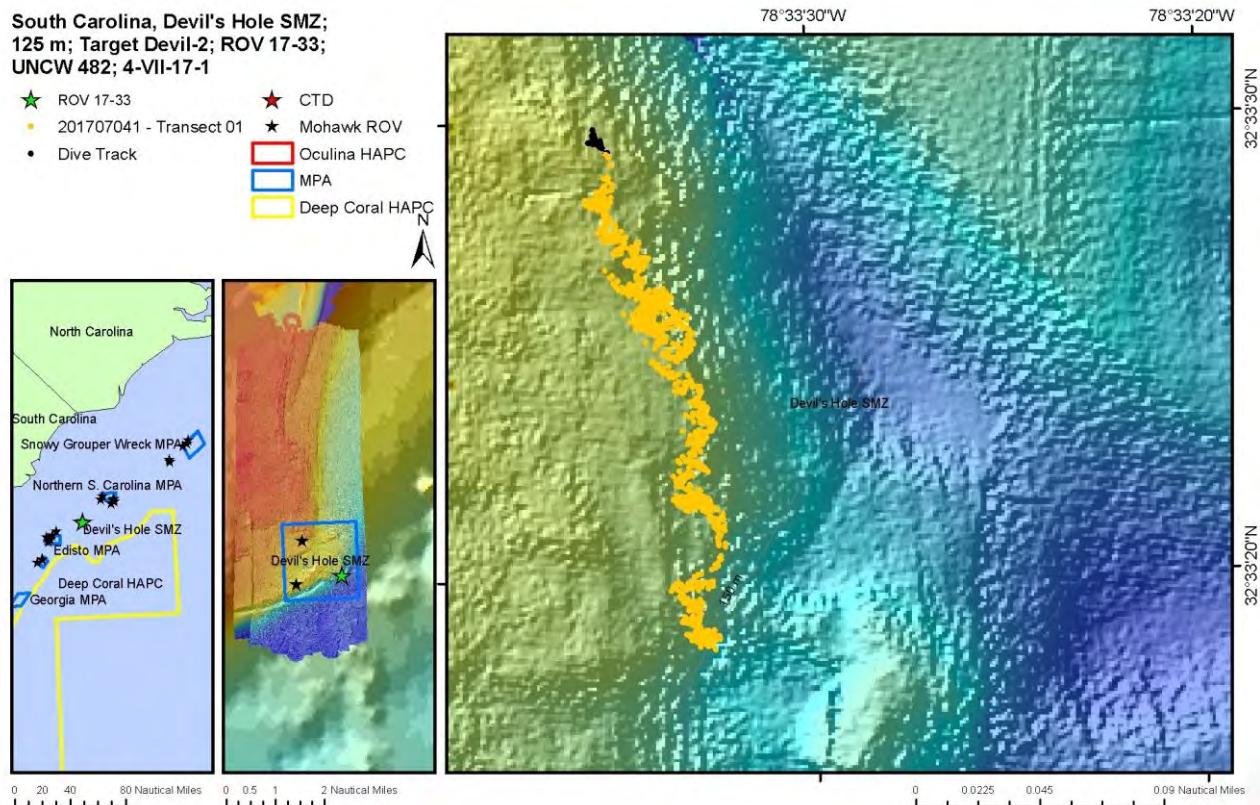
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-32.

Class/Scientific Name- Common Name	17-32
Actinopterygii	
Beryciformes	
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	11.6743
Perciformes	
<i>Anthiinae</i> - Anthiid	588.3257
<i>Apogon pseudomaculatus</i> Longley, 1932- Twospot Cardinalfish	0.3072
<i>Bodianus pulchellus</i> (Poey, 1860)- Spotfin Hogfish	2.4578
<i>Chaetodon ocellatus</i> Bloch, 1787- Spotfin Butterflyfish	0.3072
<i>Chaetodon sedentarius</i> Poey, 1860- Reef Butterflyfish	2.7650
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)- Spanish Flag	0.9217
<i>Haemulon aurolineatum</i> Cuvier, 1830- Tomtate	52.5346
<i>Halichoeres bathyphilus</i> (Beebe & Tee-Van, 1932)- Greenband Wrasse	0.6144
<i>Halichoeres</i> sp.- Wrasse	28.2642
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	7.3733
<i>Lutjanus buccanella</i> (Cuvier, 1828)- Blackfin Snapper	0.6144
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	3.0722
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	0.6144
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	95.2381
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	3.0722
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	19.0476
<i>Pronotogrammus martinicensis</i> (Guichenot, 1868)- Roughtongue Bass	4.3011
<i>Seriola dumerili</i> (Risso, 1810)- Greater Amberjack	19.0476
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	16.5899
<i>Seriola</i> sp.- Amberjack	2.4578
<i>Serranus phoebe</i> Poey, 1851- Tattler	4.3011
Scorpaeniformes	
<i>Pterois volitans</i> (Linnaeus, 1758)- Lionfish	5.5300
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	2.4578
UNKNOWN	0.6144

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	Pisces_2013_EastDevilsHole MPA_MB
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/4/2017
Specimens:	0
Digital Photos:	246
No. DVD:	1
Hard Drive No.:	1

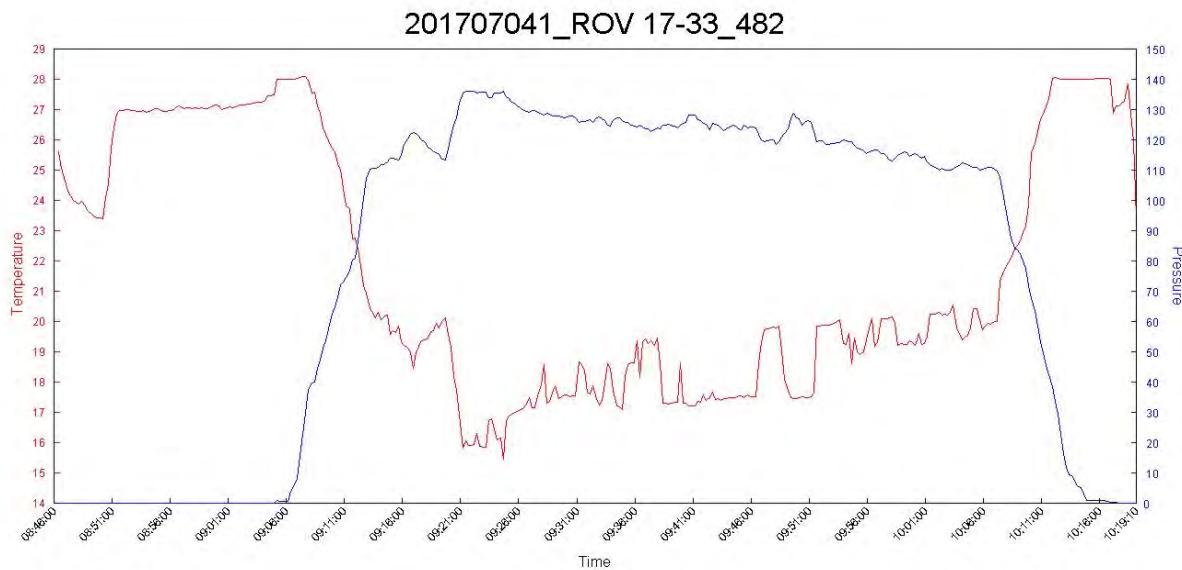
Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

Dive Data:

Minimum Bottom Depth (m):	112	Total Transect Length (km):	0.366
Maximum Bottom Depth (m):	137	Surface Current (kn):	0.9
On Bottom (Time- EDST):	9:19	On Bottom (Lat/Long):	32.5554°N; -78.5592°W
Off Bottom (Time- EDST):	10:05	Off Bottom (Lat/Long):	32.5582°N; -78.5601°W
Physical (bottom); Temp (°C):	20	Salinity:	N/A
		Visibility (m):	15
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-33 are as follows: Depth Maximum: 136.2 m, Temperature: 15.4-20.6 °C

Dive Imagery:



Figure 1: -131 m
Lower slope of escarpment. Bulleye (*Cookeolus boops*).



Figure 2: -128.9 m
Moray eel (Muraenidae).



Figure 3: -127.4 m
Anchor line on reef habitat. Reticulate moray eel (*Muraena retifera*) and a short bigeye (*Pristigenys alta*).



Figure 4: -127.4 m
Large manta ray (*Manta birostris*) swims over ROV.



Figure 5: -125.6 m
Anchor and chain at base of reef.

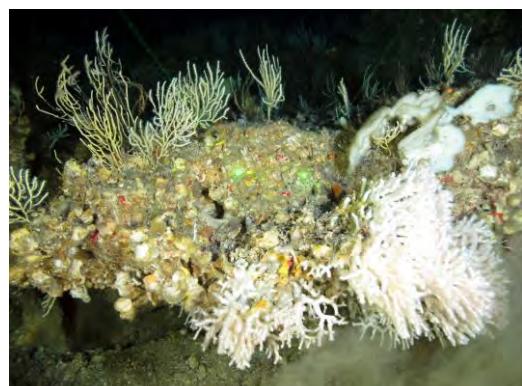


Figure 6: -112.2 m
Rock ledges covered with *Oculina* coral, gorgonians and sponges.

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 4-VII-17-1; ROV 17-33, UNCW Dive 482, South Carolina, Devil's Hole SMZ (to be enacted July 31, 2017), Site- Devil 2, 140 m.

Objectives- Ground truth MB map; conduct continuous photo/video transect for fish population characterization and digital still photo transects for habitat and benthic macrobiota characterization.

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

No red lasers. Green laser only on for down photos.

ROV GPS- ROV Nav offset incorrect.

Dive delayed, fishers on planned dive site and refuse to move. Move to new dive site.

Site Description/Habitat/Biota:

Depth range: 112- 137 m.

MB map (Pisces 2013, East Devil's Hole, 5 m resolution) shows flat topped plateau oriented NE-SW, 2 miles long, ½ mile wide; depth on top of east side- 124 m, base in scour- 191 m. Previous dives- none. Transect heading north along east facing slope.

09:03- Launch; pt/cloudy, air- 27.8, wind- 22 kn from 202 dg, seas- 2-3' from SW, current- 0.9 kn to 87 dg, water- 25.53 dg C, salinity- 36.374. Large school AJ at 120 m, also shows up in fathometer.

9:19- On bottom, depth- 137 m , visibility- 15 m, current- 0.1 on bottom, strong current during descent.

On bottom, near WP, top of escarpment, flat, ½ m boulders, pavement. Escarpment to E, 45 dg slope, 1-2 m diameter boulders, very eroded, jumble of flat and rugged boulders, high rugosity. Biota- oysters, sabellidae, 10 cm fan gorgonians, *Centrostephanus* black urchin, dense gorgonians on top pavement, orange and yellow encrusting sponges, no large sponges.

9:27- 130 m, flat top pavement, 5 dg slope, low relief outcrops, <1/2 m. Dense cover of gorgonians, fishing line, sash weight for deep drop fishing, anchor line, manta ray, holothurian.

9:34- 127 m, top edge of escarpment. Upper escarpment, 132 m, 45-90 dg, 1-2 m flat topped boulders, 3 m relief of near vertical relief with layers of flat topped boulder, undercut ledges, high rugosity. Below vertical escarpment is 30 dg slope of flat topped boulders. Anchor on top of rock with chain. Biota- dense cover of oyster, but low density and diversity of biota. Cup coral, *Paracolochirus* sea weanies.

9:45- 121 m, top edge of escarpment, flat pavement. Transect Hd N along edge. Drop weight with fishing wire. *Centrostephanus*, fish very sparse, asteroidea, sash weight.

9:57- 117 m, top, pavement, low outcrops, white vase sponge, fan sponge.

10:01- 112 m, flat pavement, sediment veneer. Mostly 10 cm grey gorgonians. Thin elephant ear, curtain sponges- *Phakelia*?, Raspailiidae?, 30 m *Oculina varicosa* (112 m).

10:05- 112 m. End dive.

Dominant Benthic Macrobiota:

Scleractinia- *Oculina varicosa*- 1, 30 cm (112 m), cup coral- 1

Antipatharia- none

Gorgonacea- several species, 10 cm grey fan (abundant on top of plateau)

Porifera- very few, encrusting yellow and orange, curtain sponges- Raspailiidae?

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

Holothuroidea- Holothuria, *Paracolochirus*

Echinoidea- *Stephanostephanus*

Mollusca- oysters

Dominant Fish:

Lionfish- 0

Scamp- 14, snowy grouper- 1, roughtongue, bank butterfly, bulleye, cubbyu, anhiids, cardinal soldiers, scorpion, wrasse bass, green moray, moray, manta ray

Human debris:

Anchor line, chain and anchor.

Deep drop weights, common (sash weights)

Steel fishing lines, numerous

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

CPCe Percent Cover Analysis:

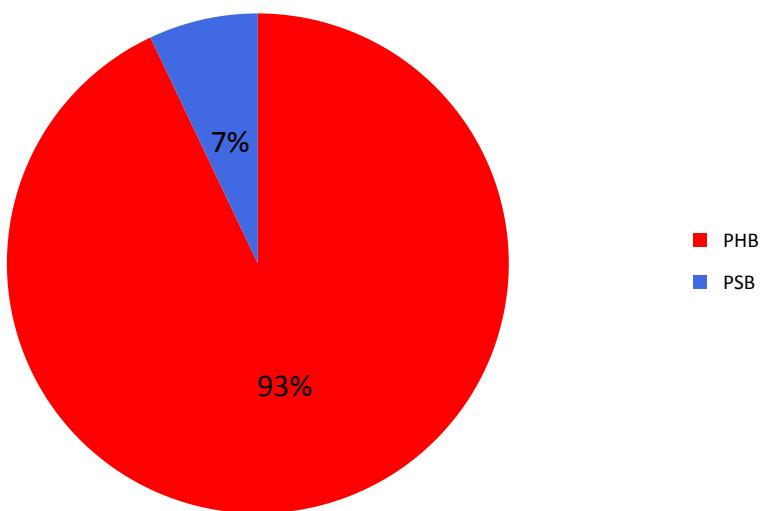
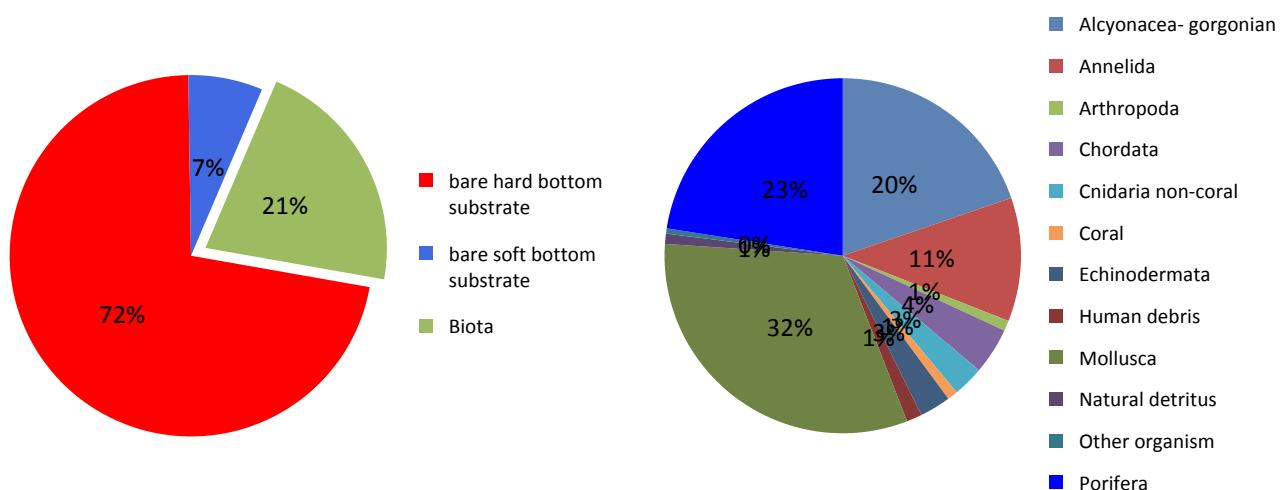


Figure 1. Percent cover of hard and soft bottom substrate at dive site ROV 17-33. CPCe® points on organisms were scored as the underlying substrate (hard or soft).



A

B

Figure 2. Percent cover of bare substrate and benthic macro-biota at dive site ROV 17-33.
A. CPCe percent cover of biota and bare substrate (hard or soft bottom). B. Relative CPCe percent cover of biota and human debris.

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Percent cover of benthic macro-biota and substrate types from CPCe Point Count analysis of photographic transects and presence of fauna recorded at dive site ROV 17-33.

Group/Phylum/Scientific Name - Authority	CPCe	ROV 17-33 dive notes
Biota	21.08%	X
Porifera	4.82%	X
Demospongiae	4.82%	X
Demospongiae unid. sp.	4.72%	X
Pachastrellidae	0.10%	
<i>Phakellia</i> sp.		X
Raspailiidae		X
Cnidaria	5.02%	X
Alcyonacea - gorgonian	4.22%	X
Alcyonacea- gorgonian	2.91%	X
Plexauridae- yellow	1.31%	
Hydrozoa	0.60%	
Hydroidolina	0.60%	
Scleractinia	0.20%	X
<i>Oculina varicosa</i> Lesueur, 1821		X
Scleractinia- unid colonial	0.20%	
Scleractinia- unid cup		X
Annelida	2.41%	X
Polychaeta	2.41%	X
Sabellidae	1.91%	X
Serpulidae	0.50%	
Arthropoda	0.20%	
Decapoda	0.20%	
Paguroidea	0.20%	
Echinodermata	0.60%	X
Asteroidea		X
Asteroidea		X
<i>Narcissia trigonaria</i> Sladen, 1889		X
Echinoidea	0.30%	X
<i>Centrostephanus longispinus</i> (Philippi, 1845)	0.30%	X
Holothuroidea	0.30%	X
Holothuroidea	0.10%	X

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

<i>Paracolochirus mysticus</i> (Deichmann, 1930)	0.20%	X
Mollusca	6.83%	X
Bivalvia	6.83%	X
Gastropoda		X
<i>Perotrochus</i> sp.		X
Chordata - Vertebrate	0.90%	
Chordata	0.90%	
Actinopterygii	0.90%	
Non-Fauna	0.20%	
Detritus	0.20%	
Natural Detritus	0.20%	
UNKNOWN	0.10%	
Human Debris	0.30%	X
Non-Fauna	0.30%	X
Human debris	0.30%	X
Human debris- fish line/gear	0.10%	X
Human debris- anchor line	0.20%	X
Human debris- other		X
Bare Substrate	78.61%	
Non-Fauna	78.61%	
Habitat	78.61%	
Bare rock, pavement, boulder, ledge	66.37%	
Bare rubble/cobble	5.62%	
Bare soft bottom	6.63%	
Grand Total	100.00%	

Dive Site: South Carolina, Devil's Hole SMZ; 125 m; Target Devil-2; ROV 17-33; UNCW 482; 4-VII-17-1

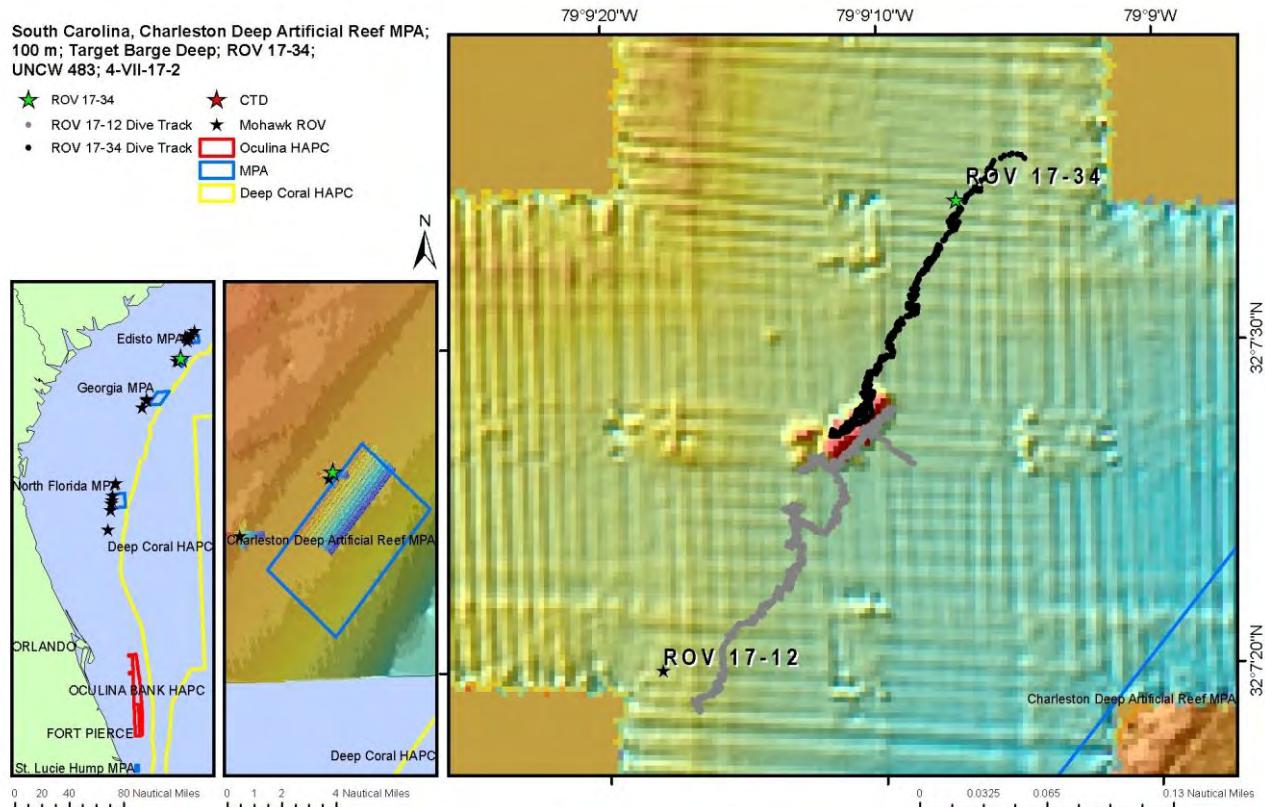
Density of Fish:

Table 2. Density (# individuals/1000 m²) of fish from video transects at dive site ROV 17-33.

Class/Scientific Name- Common Name	17-33
Actinopterygii	
Anguilliformes	
<i>Muraena retifera</i> Goode & Bean, 1882- Reticulate Moray	1.8265
Beryciformes	
<i>Plectrypops retrospinis</i> (Guichenot, 1853)- Cardinal Soldierfish	15.5251
Lophiiformes	
<i>Ogcocephalus corniger</i> Bradbury, 1980- Longnose Batfish	0.9132
<i>Ogcocephalus</i> sp.- Batfish	0.9132
Perciformes	
Anthiinae- Anthiid	2958.9041
<i>Cookeolus japonicus</i> (Cuvier, 1829)- Bulleye	10.9589
<i>Gonioplectrus hispanus</i> (Cuvier, 1828)- Spanish Flag	2.7397
<i>Halichoeres</i> sp.- Wrasse	21.9178
<i>Holacanthus</i> sp.- Angelfish	1.8265
<i>Liopropoma eukrines</i> (Starck & Courtenay, 1962)- Wrasse Bass	19.1781
<i>Mycteroperca phenax</i> Jordan & Swain, 1884- Scamp	14.6119
<i>Pareques iwamotoi</i> Miller & Woods, 1988- Blackbar Drum	8.2192
<i>Pareques umbrosus</i> (Jordan & Eigenmann, 1889)- Cubbyu	47.4886
<i>Plectranthias garrupellus</i> Robins & Starck, 1961- Apricot Bass	4.5662
Priacanthidae- Bigeye	24.6575
<i>Priacanthus arenatus</i> Cuvier, 1829- Bigeye	6.3927
<i>Pristigenys alta</i> (Gill, 1862)- Short Bigeye	15.5251
<i>Prognathodes aculeatus</i> (Poey, 1860)- French Butterflyfish	1.3699
<i>Prognathodes aya</i> (Jordan, 1886)- Bank Butterflyfish	3.6530
<i>Prognathodes guyanensis</i> (Durand, 1960)- French Butterflyfish	1.3699
<i>Prognathodes</i> sp.- Butterflyfish	21.0046
<i>Seriola rivoliana</i> Valenciennes, 1833- Almaco Jack	0.9132
<i>Seriola</i> sp.- Amberjack	13.6986
<i>Serranus phoebe</i> Poey, 1851- Tattler	0.9132
Scorpaeniformes	
Scorpaenidae- Scorpionfish	33.7900
Tetraodontiformes	
<i>Canthigaster</i> sp.- Puffer	2.7397
Elasmobranchii	
Myliobatiformes	
<i>Mobula birostris</i> (Walbaum, 1792)- Manta Ray	0.9132

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 100 m; Target Barge Deep; ROV 17-34; UNCW 483; 4-VII-17-2

General Location and Dive Track:



Site Overview:

Project:	MPA Grant
Principal Investigator:	Stacey Harter
PI Contact Info:	3500 Delwood Beach Rd., Panama City, FL 32444
Webpage:	N/A
Scientific Observers:	John Reed, Stephanie Farrington, Andrew W. David, Stacey Harter, Lance Horn, Jason White, Felicia Drummond, Eric Glidden
ROV Navigation Data:	TrackLink
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	5/30/2018

Dive Overview:

Vessel:	NOAA Ship <i>Pisces</i> Cruise 1702 SAMPA
Sonar Data:	NancyFoster_14_08_Barge1
Purpose:	Survey the SAFMC Shelf Edge MPAs
Vehicle:	Mohawk ROV
Sensors:	Temperature (°C), Depth (m)
Data Management:	Access Database
Date of Dive:	7/4/2017
Specimens:	0
Digital Photos:	80
No. DVD:	1
Hard Drive No.:	1

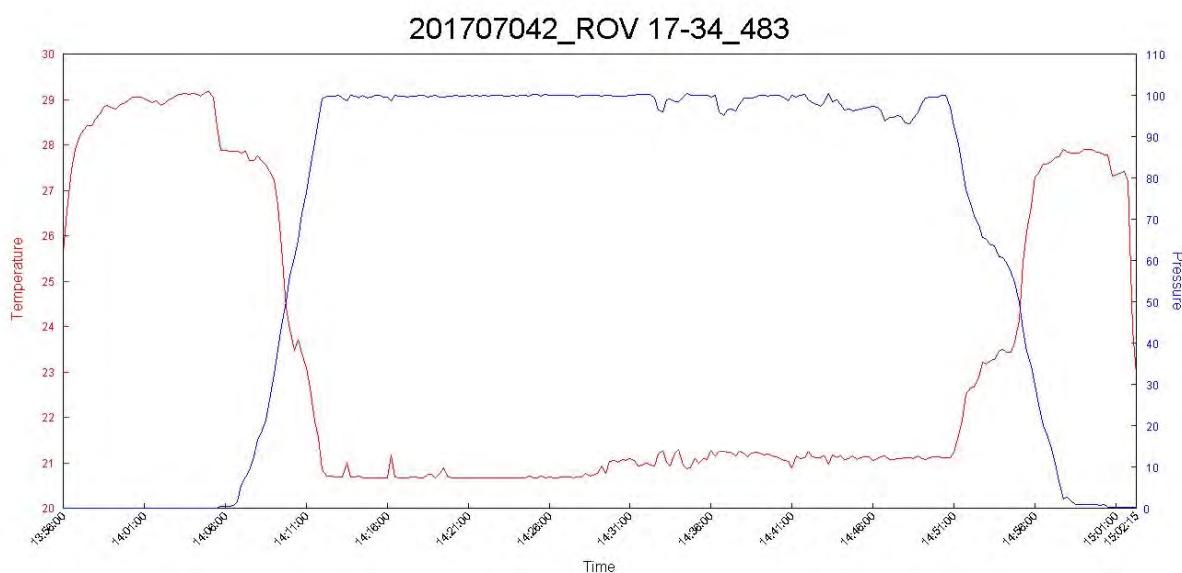
Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 100 m; Target Barge Deep; ROV 17-34; UNCW 483; 4-VII-17-2

Dive Data:

Minimum Bottom Depth (m):	94.2	Total Transect Length (km):	0.373
Maximum Bottom Depth (m):	101.9	Surface Current (kn):	0.4
On Bottom (Time- EDST):	14:10	On Bottom (Lat/Long):	32.1264°N; -79.1516°W
Off Bottom (Time- EDST):	14:47	Off Bottom (Lat/Long):	32.1246°N; -79.1532°W
Physical (bottom); Temp (°C):	23.7	Salinity:	N/A
		Visibility (m):	5
		Current (kn):	0.1

Physical Environment:

Distance from Dive Site(km): 0.00



Temperature and Depth were collected with a Sea-Bird 39 Temperature- Depth recorder attached to the ROV (recording descent, bottom and ascent). The ranges of the bottom data recorded during ROV 17-34 are as follows: Depth Maximum: 100.4 m, Temperature: 20.7-23.7 °C

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 100 m; Target Barge Deep; ROV 17-34; UNCW 483; 4-VII-17-2

Dive Imagery:



Figure 1: -101.8 m
Squat lobster- galatheid at base of shipwreck.



Figure 2: -100.9 m
Oysters cover the sides of the shipwreck. Anthiids (Anthiadinae).



Figure 3: -97 m
Upper hull of shipwreck.



Figure 4: -97.7 m
Fireworm- *Hermodice carunculata* on oysters.



Figure 5: -100.4 m
Snowy grouper (*Hyporthodus niveatus*) at base of wreck. Very few grouper compared to previous years.
The word is out?



Figure 6: -101.2 m
Fireworm- *Hermodice carunculata*.

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 100 m; Target Barge Deep; ROV 17-34; UNCW 483; 4-VII-17-2

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

Site #- 4-VII-17-2; ROV 17-34, UNCW Dive 483; South Carolina, Barge Deep MPA, 100 m.

Objectives- Test ROV tracking relative to the MB map position of barge. No XS images

ROV Setup/Dive Events:

See Dive 01 for Setup Notes.

Site Description/Habitat/Biota:

Depth range: 96-101 m

MB map (Nancy Foster 14-08 Barge, 1 m resolution) shows barge laying NE-SW, 81 m long, with pile of debris (cargo containers) off SW end; 100 m at northeast base. Sunk in 2014. Previously surveyed 2014, 2016, 2017.

14:03- Launch; sunny, air- 29.10, wind- 14 kn from 239 dg, seas 1-2' from SE, current- 0.4 kn to 329 dg, water- 25.53 dg C, salinity- 36.528.

14:10- On bottom; depth- 101.6 m , visibility- 5 m, current- 0.1

On bottom- 220 m north of barge, off MB map. Flat grey sand, sparse shells. Squat lobster, spider crab, sargassum detritus, cerianthidae, hermit crab.

14:29:45- 101.1 m, at NE corner. ROV position on MB is shifted 15 m south of actual position (ship heading S).

14:32- transect along north side of barge. MB shows the transect going along the S side which is incorrect. Vertical hull 90% cover of bivalve shells. Top of barge, 96 m. Anthids, few fish. Hermodice carunculata bristle worms, purple anemones, school of AJ, Stichopathes on top.

14:48- end dive.

Dominant Benthic Macrobiota:

Actiniaria- purple anemone

Cerianthidae

Antipatharia- Stichopathes

Mollusca- bivalves, Ostreidae?, dense on vertical surface of hull

Decapoda- hermit crab, squat lobster Galatheidae, spider crab

Annelida- Hermodice carunculata

Dominant Fish:

Lionfish- 5

Snowy grouper- 3, scamp- 1, anthiid, red barbier, bank butterfly, cubbyu, sharpnose puffer, amberjack

Human debris:

Fishing line

Dive Site: South Carolina, Charleston Deep Artificial Reef MPA; 100 m; Target Barge Deep; ROV 17-34; UNCW 483; 4-VII-17-2

Percent Cover of Benthic Macro-Biota and Substrate:

Table 1. Presence of fauna recorded at dive site ROV 17-34.

Group/Phylum/Scientific Name - Authority	ROV 17-34 dive notes
Biota	X
Algae	X
Ochrophyta	X
<i>Sargassum</i> sp.	X
Cnidaria	X
Anthozoa - Non Coral	X
Actiniaria	X
Cerianthidae	X
Antipatharia	X
<i>Stichopathes lutkeni</i> Brook, 1889	X
Annelida	X
Polychaeta	X
<i>Hermodice carunculata</i> (Pallas, 1766)	X
Arthropoda	X
Decapoda	X
Anomura	X
<i>Munida</i> sp.	X
<i>Stenorhynchus seticornis</i> (Herbst, 1788)	X
Mollusca	X
Bivalvia	X
Grand Total	