PRELIMINARY CRUISE REPORT

2015 HBOI-FAU CIOERT CRUISE

Mesophotic and Deepwater Reef Ecosystems-
ROV/AUV Surveys of SW Florida Shelf Including Northern Pulley Ridge
and Howell Hook Regions
May 7-20, 2015

University of Miami R/V *Walton Smith*- Cruise No.: WS15125
IMO- 8964501; Call Sign- WCZ6292
NOAA NMS *Mohawk* ROV
Bluefin-12 AUV

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PROJECT OVERVIEW

The primary focus of the Mesophotic Reef Project is to advance NOAA OER goals while complementing the management objectives of NOAA's Mesophotic Reef Ecosystems program, NOAA's Deep Sea Coral Research and Technology Program, NOAA's Sanctuaries Program, NOAA Fisheries, and Regional Fishery Management Councils (Gulf of Mexico, GOM). A major goal of the CIOERT project is to characterize mesophotic and deepwater reef ecosystems across a variety of sites in the GOM off the west Florida shelf, targeting northern Pulley Ridge and adjacent shelf-edge banks and hard bottom habitat that are prospective Essential Fish Habitat (EFH), and prospective MPA sites. This will provide a comprehensive examination of mesophotic communities in this region of the GOM within the jurisdiction of the GOM Council. We will also continue analyses on connectivity of the fauna within the vertical scale from shallow to deep reef ecosystems and horizontally among reef systems which will be used to supplement and add value to our 5-year NOAA-NOA-NCCOS Grant ("Understanding Coral Ecosystem Connectivity in the Gulf of Mexico-Pulley Ridge to the Florida Keys").

A 14-day cruise, May 7-20, 2015, used the University of Miami's R/V *Walton Smith* with the NOAA Sanctuary's *Mohawk* ROV (operated by UNCW Undersea Vehicle Program) to map and survey selected areas of interest to NOAA, NIUST, FWC, GOM FMC, and FKNMS on the SW Florida shelf, and in particular, northern Pulley Ridge outside of the Pulley Ridge HAPC, and shelf-edge areas of the Howell Hook region at depths of 70 m to 250 m (maximum depth of ROV). The objectives are to ground-truth new sonar maps that were made with the Bluefin-12 AUV, and to conduct ROV photographic/video transects to characterize the benthic habitats, associated fish communities, and benthic macrobiota, including coral and sponge densities. These data will be analyzed specifically to better understand the interrelationships of the fish communities, including commercially and recreationally important species, relative to the mesophotic and deepwater reef ecosystem habitats. The newly developed Bluefin U-4000 AUV/ROV hybrid was scheduled to be used for the first time to make photo mosaics of reef areas of high interest and to measure carbonate chemistry; however, Bluefin had technical difficulties with the vehicle and it was not brought on the expedition.

On May 21, 2014, CIOERT hosted a webinar with NIUST and FWC to select sites of interest for our surveys. FWC (Kathleen O'Keife) provided target sites that have high interest to FWC and NOAA Fisheries from bottom longline fisheries data and are potential hard bottom and reef habitat. Except for a single swath of multibeam sonar (D. Naar, USF) along northern Pulley Ridge (~70-80 m depth, from Pulley Ridge HAPC north to off Fort Myers), the outer shelf in this region has not been mapped. FWC has considerable data from sonar mapping and drop cameras just north of our area of interest. In our collaboration with NOAA Fisheries (Andy David, Stacey Harter; Panama City Lab), some ROV and drop camera data are available for a few sites on northern Pulley Ridge. Also the Biomedical Marine Research program at Harbor Branch Oceanographic Institute (HBOI-FAU), conducted several submersible dives and bottom trawls in the 1980s and 90s on the outer shelf in this region as did Continental Shelf Associates for the Bureau of Land Management in the early 1980s.

The new *Mohawk* ROV was purchased by NOAA Sanctuaries Program for primary use by

Flower Gardens NMS, but will support other programs such as CIOERT, and will be operated by the UNCW ROV team (Lance Horn, Jason White). Also in collaboration and funded by CIOERT and FGNMS, a collection tool skid has been designed and built by HBOI-FAU which will allow for the capability of collecting samples which is critical for the identification of many of the mesophotic benthic taxa which are difficult to impossible to identify without a specimen in hand. It will also allow for collections of marine specimens for our CIOERT New Biomedical Resources Project. In addition, coral samples will be collected for the coral health assessment, and samples will also be targeted for molecular and genetic research with the goal of assessing the connectivity and relative health of both deep shallow coral populations.

SCIENTIFIC PERSONNEL (12 max.)

John Reed	Chief Scientist	HBOI-FAU
Shirley Pomponi	Principal Investigator	HBOI-FAU
Stephanie Farrington	Research Scientist, Database Manager	HBOI-FAU
Megan Conkling	Graduate Student (S. Pomponi)	HBOI-FAU
Brian Cousin	Videographer	HBOI-FAU
Melissa Price	Fish Biologist	U.S. Geological Survey
Don Liberatore	ROV Ops and Collections	HBOI-FAU
Guido Wijffels	Student (S. Pomponi)	HBOI-FAU
ROV Team		
Lance Horn	ROV Operator	UNCW
Jason White	ROV Operator	UNCW
AUV Team		
Matthew Lockhart	AUV Operator	Bluefin
Andrew Vachon	AUV Operator	Bluefin

STUDY SITE

The study area is on the west Florida shelf. The general area of operations is along northern Pulley Ridge, ~70-80 m depth, north of the Pulley Ridge HAPC, and shelf-edge areas of Howell Hook region at depths of 100 to 250 m (west of Pulley Ridge). Figure 1 shows the general areas of interest and dive sites.

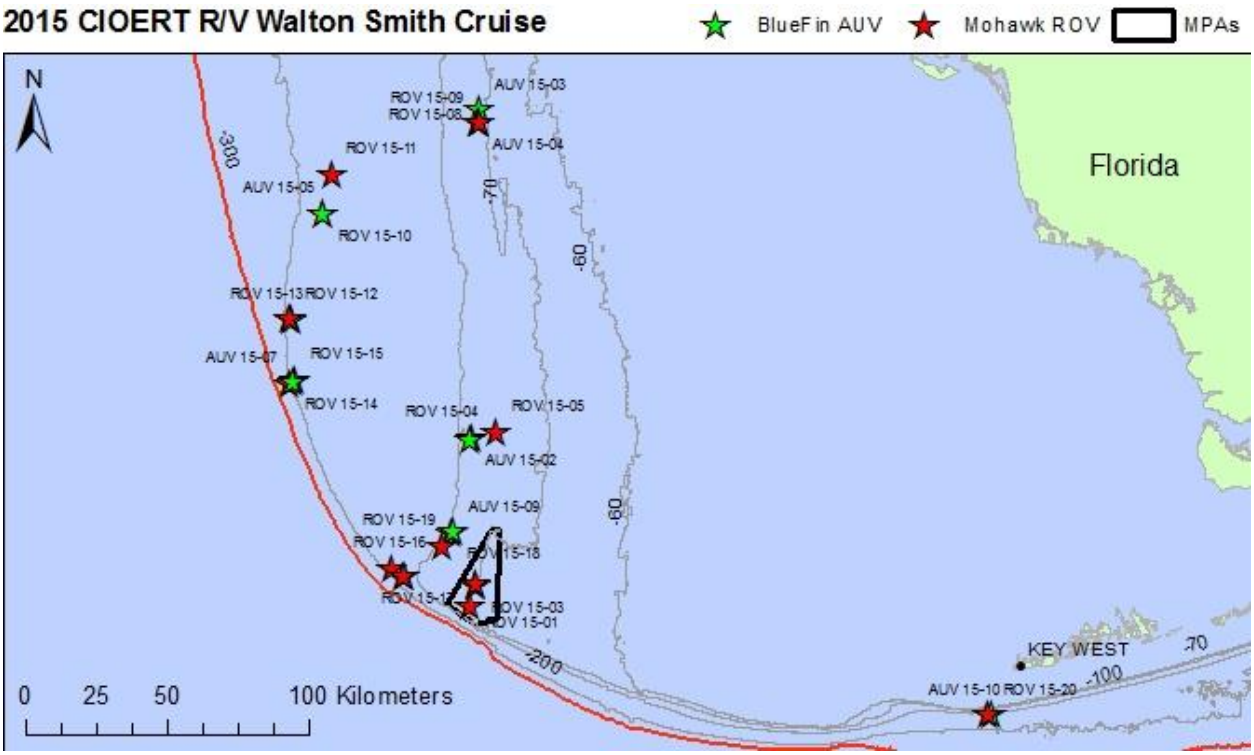


Figure 1. ROV and AUV dive sites for the 2015 CIOERT cruise on R/V *Walton Smith*, May 7-20. Red 300-m bathy line indicates maximum ROV dive depth. Pulley Ridge Habitat Area of Particular Concern (PR-HAPC)- black polygon. Depth contours in meters.

ITINERARY

Itinerary

May 5-6-	ROV and AUV teams mob gear on ship at UM dock.
May 6-	Science crew mob.
May 7-	CIOERT cruise begins; transit to dive site 1 at Pulley Ridge HAPC (ROV 15-01; 70 m depth; ~ 250 nmi from UM, ~30 hr).
May 8-19-	Conduct ROV/AUV ops on west Florida shelf.
May 19-20	Transit to UM.
May 20-	Arrive at UM dock; demob.

METHODS

ROV video and photographic surveys were made at each site to ground-truth multibeam and side-scan sonar maps; and to quantify and characterize the benthic habitats, benthic macrobiota, fish populations, and coral/sponge cover. Prior to some of the ROV dives, geo-referenced side-scan sonar bathymetry (Klein-3500) maps were made from surveys with the Bluefin-12 AUV. Waypoints were then overlaid on the maps for the ROV to survey the identified features of interest. Typically, two 4-hour ROV dives were completed each day during daylight hours (7 am

to 7 pm). The Bluefin-12 AUV surveys (~5 x 1 nmi per survery) were conducted at night for the next day's ROV dive site.

B-12 AUV Operations

Bluefin-12 AUV operators conducted sonar surveys at night. Following the final ROV dive each day, the ship steamed to the next dive site, where AUV mapping occurred from ~8:00 pm to 6:00 am to characterize the dive site for the next day's ROV dive. The Bluefin-12 was launched and recovered using the A-Frame and a quick release and a tag line on the nose of the vehicle. During operations, the operators tracked the position of the AUV using a pole-mounted acoustic navigation and communications system (Sonardyne AvTrak: http://auvac.org/uploads/manufacturer_spec_sheet_pdf_nav/Sonardyne_8220_av6.pdf). During operations, the DVI output from the AvTrak computer was connected to a monitor on the ship's bridge to improve the situational awareness of the ship's captain. Following each mapping survey, the AUV team provided a GIS-compatible map of the dive site to the ROV team in order to download into their navigation software. This map was used to overlay the proposed waypoints of the ROV dive. Following the cruise the AUV team provided the Chief Scientist with: 1) all raw acoustic and sound velocity probe (SVP) data, 2) complete processed xyz sonar data for each site, and 3) acoustic data rendered into maps in GIS-compatible format.

***Mohawk* ROV Operations**

Mohawk ROV operations were conducted by the UNCW Undersea Vehicles Program team. *Mohawk* ROV ops were conducted from ~7 am to 7 pm each day. During each dive the primary objectives were to document benthic habitat, benthic sessile biota, and fish populations; to conduct photo/video transects which will be used for quantitative analyses of the habitat and biota; and to collect benthic macrobiota. The general protocol included:

1. During the photo/video transects, the ROV should be kept <1 m off bottom with a speed over ground of ~¼ knot. During quantitative still images, the ROV will ascend to ~1.3 m. Each ROV dive will be ~1-2 km in length for duration of 3-4 hours and will be documented with continuously recording digital video and digital photographs.
2. Video transects will used for analysis of fish populations and general habitat characterization. The high definition video camera (Insite Pacific Mini Zeus high-definition CMOS color zoom camera with 2,000,000 effective pixels) will be angled ~20-30° down with 10 cm parallel lasers for scale. Underwater video will be 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 will recorded onto the video and transcribed into a Microsoft Access database (CIOERT At-Sea Database). All fish will be identified and counted from the video transects and densities determined emphasizing commercially and recreationally important species.
3. Digital still images will be used for quantitative analysis of habitat and benthic macrobiota. A high definition digital still camera (Kongsberg OE14-408, with resolution of 3648x2736 pixels) will be pointed down 90^{o} with 10 cm parallel lasers for quantitative photo transects. Still images will be captured with the digital still camera every 1-2 minutes throughout the dive at a height of 1.3 m to provide relatively consistent area for each image. Still images captured from the photo transects will be analyzed using Coral Point Count with Excel extensions (CPCe 4.1©, Kohler and Gill 2006) software to

determine relative percent cover of benthic biota and habitat types as well as coral colony diameter and count.

4. Benthic macrobiota will be collected on most dives. During collections the timed transect photos will stop, and any sample-specific photos will be logged as non-transect photos.
5. All data documentation (digital images, video, dive annotations, and samples) will be geo-referenced to ROV position by matching the time and date to the ROV navigation files in our CIOERT At-Sea Database.
6. Following each dive or by the end of the cruise, the ROV team will provide the Chief Scientist with digital, high resolution videotapes of each dive, all digital photographs labeled by date/time, ROV CTD data, and complete navigation data for each dive.

Fish Surveys

An On-Screen Display (OSD) video overlay will record time, date, ROV heading, and ROV depth. The video will be recorded continuously throughout each dive from surface to surface on digital drives. The video camera will be typically angled downward ~30^{o} from horizontal to view both near and far to the horizon for fish aggregations and habitat. Protocol for the fish analyses will be to divide the continuous video into 5 minute segments, or whenever there is a change in habitat type, whichever comes first. Consequently, each video segment will consist of only one habitat type. These habitat designations are described below in the benthic analyses. On each ROV dive, all fish will be identified to the lowest taxonomic level practicable and counted. The total distance (km) of each dive will be used to calculate the linear density (# of individuals km^{-1}) of each fish species. The video camera angle precludes an accurate calculation of areal density of the fish (i.e., # km^{-2}); however, we estimate that the field of view width is generally about 5 m, and most fish are typically identified within a 5 m distance.

Benthic Macrobiota Characterization

Photographic transects were conducted throughout each ROV dive using the digital still camera directed vertically downward (or as perpendicular as possible to the substrate). The camera was equipped with parallel lasers (10 cm) for scale. In general, digital images were recorded every minute during the quantitative transects. Each image filename was coded with the corresponding UTC time and date code (using Stamp 2.8 by Tempest Solutions©), which will be imported into the CIOERT At-Sea Database and linked to the ROV navigation data using the date/time field of each image. Poor and unusable photos (e.g., blurred, black, off bottom) or overlapping photos will not be included in the analyses. The benthic macrobiota will be quantified by analyzing the images for each dive using: 1) species occurrence (presence/absence), and 2) percent cover of benthic biota. Percent cover of benthic macrobiota will be determined by analyzing the quantitative transect images with CPCe 4.1©, and following protocols established in part by Vinick et al. (2012) for offshore, deepwater surveys in this region. Fifty random points overlaid on each image with CPCe© will be identified as to substrate type and associated benthic biota, and then percent cover calculated. All benthic macrobiota (usually >3 cm total length) will be identified to the lowest taxon level practicable. For this study we use the term 'coral' as defined by the NOAA Deep-Sea Coral Program (Partyka et al. 2007) which includes hard, or stony, corals (Scleractinia), other taxa with solid calcareous skeletons (Stylasteridae- hydrozoan lace corals), as well as non-accreting taxa such as gorgonians (Octocorallia) and black corals (Antipatharia). All hard corals will be counted and maximum diameter determined.

Benthic Habitat Characterization

Each ROV dive will be divided into transects based on several habitat descriptors that will be used as factors to characterize and define the benthic habitats. These factors will be used to plot percent cover of benthic macrobiota, density of fish, and to plot transects on the multibeam sonar maps in ArcGIS 10.1©. These factors include the following: 1) *[Geomorphology]*: The geological feature generally defined from the sonar maps; e.g., Mound-top (peak of rock mound), Mound-slope (flank of rock mound), Mound-wall (steep, near vertical upper slope of rock mound), Ledge, Pavement (flat, low relief hard-bottom areas). 2) *[Substrate]:* This is a subset of SEADESC Habitat Categories, which was developed by the NOAA Deep-Sea Coral Program for use in analysis of deep-sea coral dive surveys (Partyka et al. 2007). Substrate descriptors include soft bottom (unconsolidated sand/mud), and the following hardbottom types: rock pavement, pavement with ledges, pavement with sediment veneer, rock wall, and coral. 3) *[Depth]:* Depth range of the transect or dive. 4. *[Slope]:* Slope estimated from the ROV video: Flat = 0-5^{o}, Low = 5-30^{o}, Moderate = 30-60^{o}, High (Wall) = 60-90^{o}. 5) [*Relief*]: LR= Low Relief (0- <1.0 m), MR= Moderate Relief (1-3 m), HR= High Relief (>3 m). 6) [*Rugosity*]: LRu= Low Rugosity, HRu= High Rugosity. Rugosity here is defined as a degree of ruggedness of the rock bottom. This will be relative to the size of rock ledges, holes, crevices, which tend to provide the greatest fish habitat.

Specimen Collections

The *Mohawk* ROV was equipped with a collection skid which consists of a small 5-function manipulator, five suction buckets, and a thermally insulated Biobox. Collections were made of benthic macrobiota on most dives. Samples will be used for various projects including genetics, microbiology, taxonomy, and biomedical. Each specimen was labeled, photographed in the lab, and data entered into the CIOERT At-Sea Database. Most specimens were preserved as museum vouchers in 10% formalin or 95% ethanol.

RESULTS

A total of 20 ROV dive sites were surveyed, most of these for the first time, for a total bottom time of 72.4 hours and a total distance of 37.8 km (Table 1). A total of 3,085 digital still images documented the habitat and benthic biota along with 77 hours of high-definition video. Collections of benthic macrobiota with the new ROV tool sled resulted in 174 samples that will be used for taxonomic museum specimens, genetic DNA analysis, cell culture, and biomedical research. A total of 113 Porifera, 5 algae, 29 Cnidaria (12 Scleractinia, 14 Octocorallia, 2 Antipatharia), 7 Echinodermata, and 12 geological (rock/sediment) specimens were collected. Ten sites were surveyed for the first time with the Bluefin AUV which provided high-definition side-scan sonar maps of the bottom. These maps were used to select site specific target sites for the ROV dives.

Table 1. Summary of ROV and AUV dive results from 2015 HBOI-FAU CIOERT cruise, May 7-20, 2015.

CIOERT GOM Cruise							Wednesday, September 23, 2015
Number of Sites:	**30**						
ROV Sites:	**20**	**Total Bottom Time (hr):**	**72.42**	**ROV Dive Length (km):**	**37.87**		
# of AUV Sites:	**10**						
ROV Data:							
Number of Specimens	**174**	**Total Number of Subsamples**	**228**	**# of Total Images**	**3085**	**Hours of Video**	**77**
Taxonomy		**Subsamples**		**Sample Images**			
Chlorophyta:	3	MIC ISO:	0	# of InSitu Sample Images:	219	# of DVD:	77
Phaeophyta:	0	MIC FREZ:	0	# of Deck Images:	521	# of Hard Drives:	1 - 3
Rhodophyta:	2	TLC:	0			# of QuadCam:	19
Porifera:	113	HPLC:	0	**In Situ Images**			
Cnidaria:	29	Extract:	0	# of All In Situ Images:	2564		
Scleractinia:	12	Cell Culture:	16	# of Habitat Images:	272		
Octocorallia:	14	Portol:	0	# of Transect Images:	1582		
Antipatharia:	2			# of Screengrabs:	491		
Annelida:	1	**Frozen**					
Decapoda:	1	Frozen -80 °C:	42				
Echinodermata:	7	BMR Freezer:	51				
Mollusca:	2						
Chordata:	4	**Genetics**					
Ascidiacea:	2	DNA:	1				
Thaliacea:	1	RNA Later:	0				
Fish:	1						
Rocks/Sediment:	12	**Vouchers**					
Water/Plankton:	0	Taxonomy:	169				

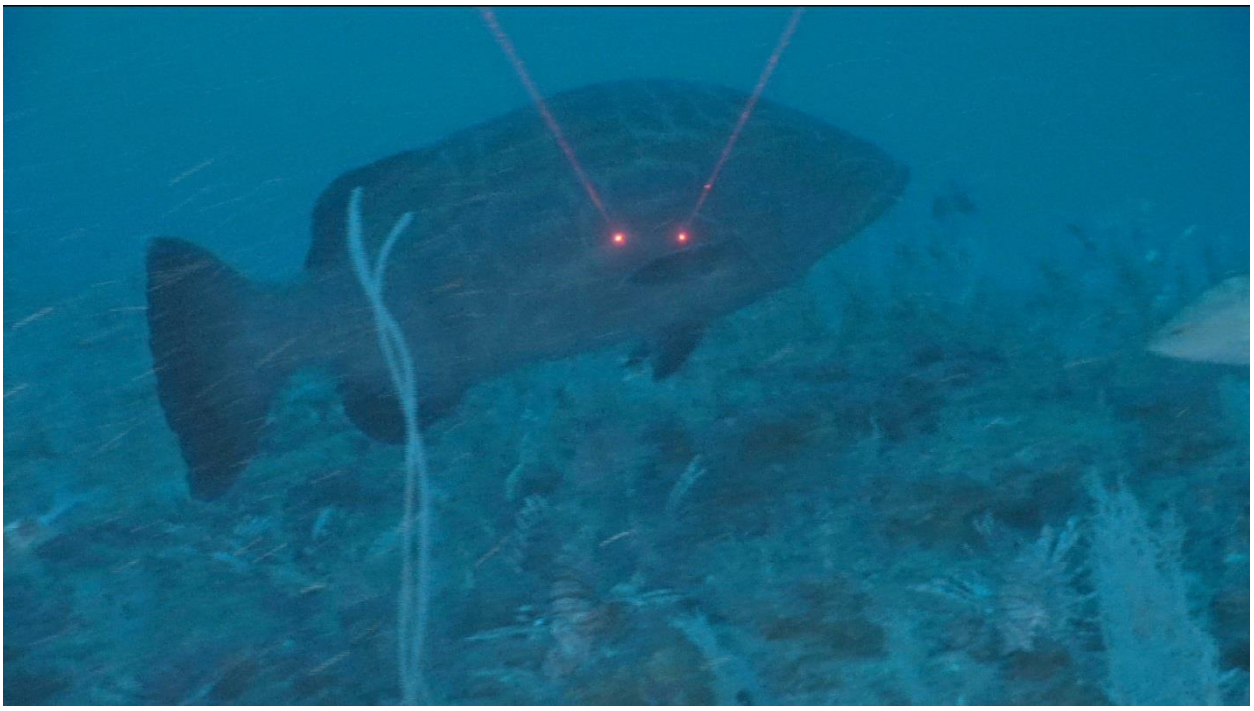


Figure 2. Large black grouper. Many of the sites that were surveyed for the first time, discovered essential fish habitat (EFH) for several important fish species including grouper (speckled hind, scamp, gag, yellowedge, yellow mouth, red, black), red snapper, and tilefish-blueline and golden. (Lasers- 10 cm)

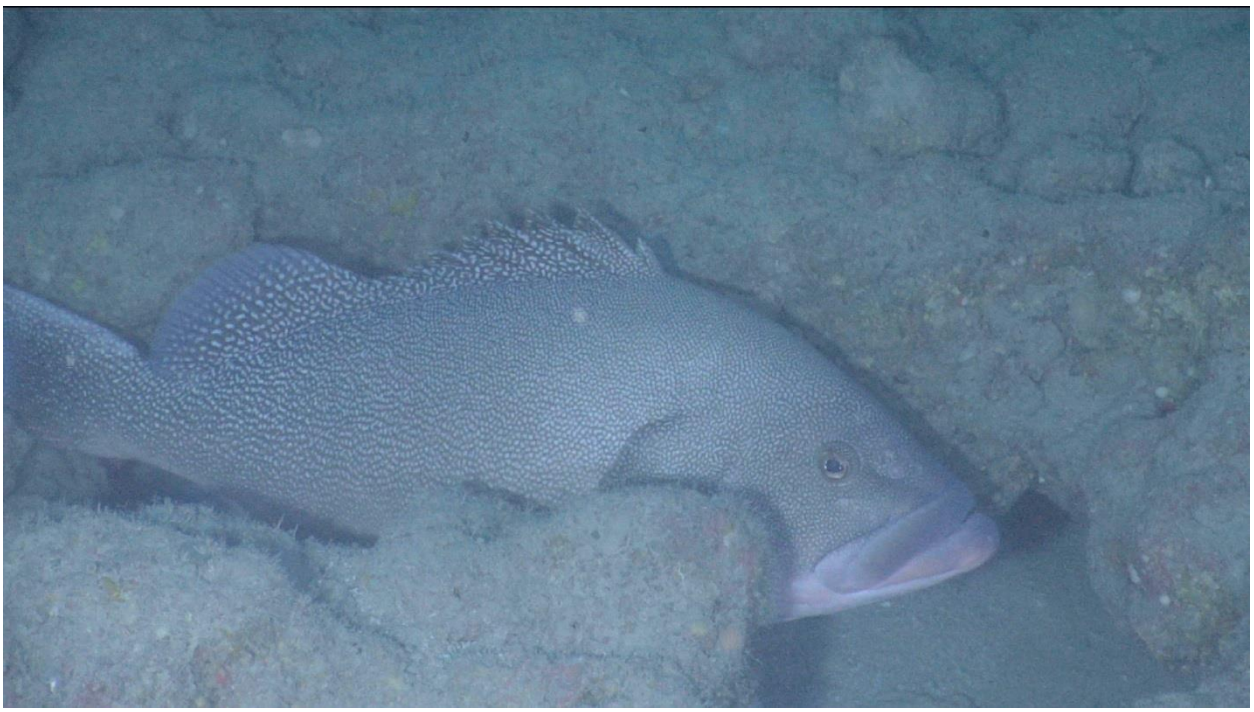


Figure 3. Critically endangered speckled hind. These were discovered at a number of sites along the Howell Hook region.

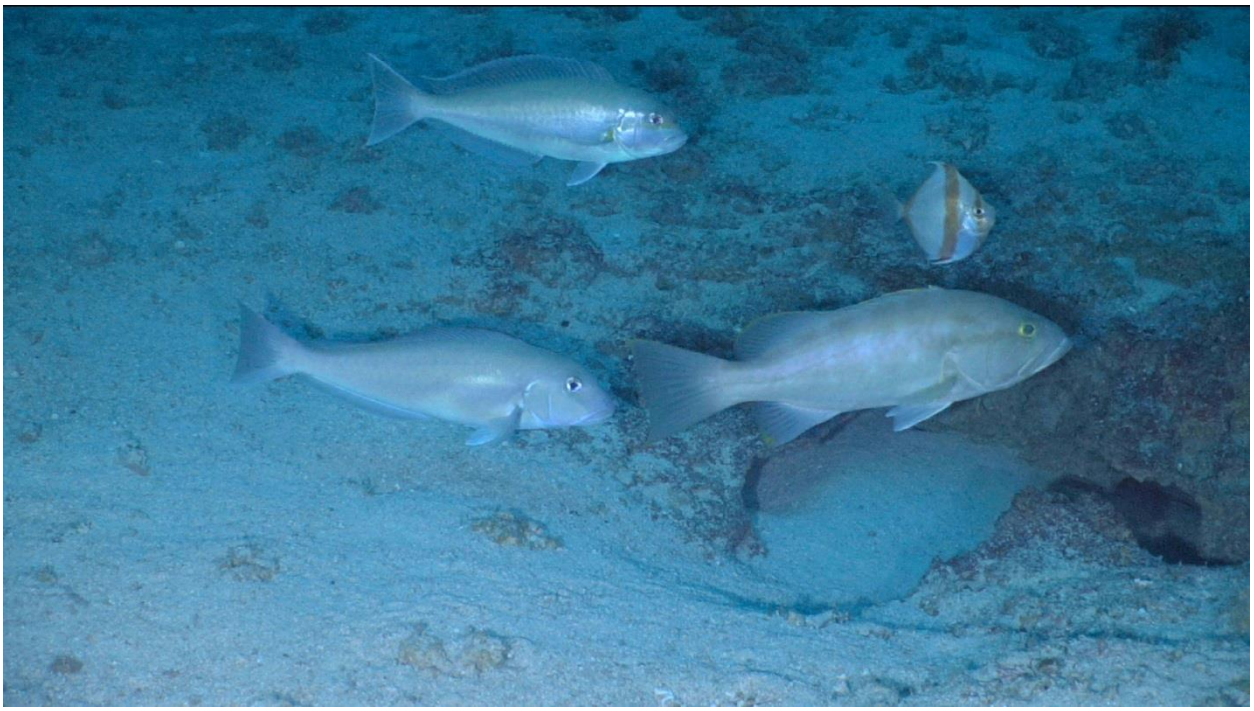


Figure 4. Golden tilefish (top left), blueline tilefish (bottom left), yellow edge grouper, and boarfish, share some rock ledge habitat along the shelf-edge break of the Howell Hook region. AUV maps in this region were invaluable for discovering numerous grouper and tilefish pits which provide habitat to other deepwater reef fish, grouper and tilefish.

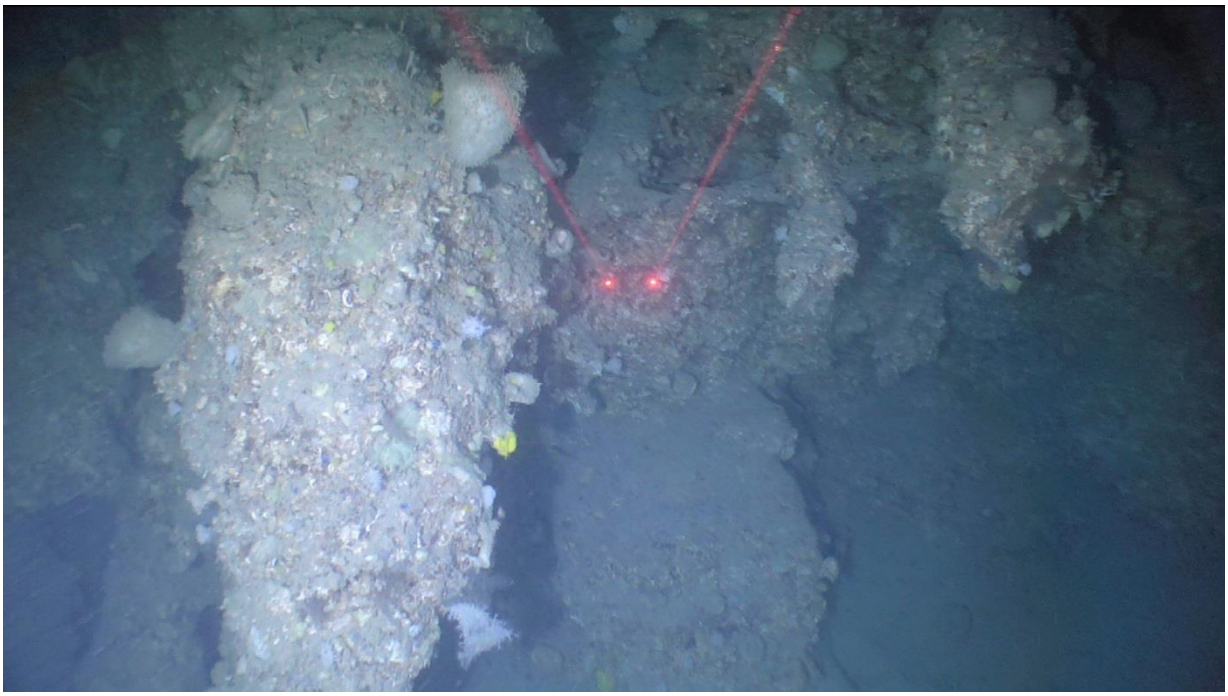


Figure 5. Vertical wall and rugged eroded rock inside of the Naples sinkhole, depth 200 m. This rugged rock provides habitat to a variety of sponges (several of biomedical interests) and grouper species.

Appendix 1 lists the qualitative counts and identifications of the benthic macrobiota from the ROV video surveys. Appendix 2 lists the qualitative counts and identifications of the fish populations from the ROV video surveys. Appendix 3 is a NOAA SEADESC Level 1 Report which describes in detail each ROV dive including: cruise metadata, figures showing each dive track overlaid on multibeam sonar maps (where available), dive track data (start and end latitude, longitude, depth), ROV CTD data, objectives and general description of the habitat and biota, and images of the biota and habitat that characterize the dive site.

In the future, a Final Cruise Report (SEADESC Level II Report) will provide for each dive site quantitative analyses detailing the percent cover of sessile macrobiota and substrate type, and densities of fish. These data will be used to characterize and document the habitat, benthic and fish communities, and to assess the coral health on northern Pulley Ridge and the shelf-edge region of Howell Hook on the southwest Florida shelf. These data may then be compared to previous and future research cruises to better understand the long term health and status of this important mesophotic reef system.

Dive Notes: Species Counts

Group: ALG

Species Name	Count
Chlorophyta;	3
Chlorophyta; Anadyomene menziesii	31
Chlorophyta; Caulerpa sertularioides	1
Chlorophyta; Caulerpa sp.	2
Chlorophyta; Codium sp.	1
Chlorophyta; Halimeda sp.	17
Chlorophyta; Halimeda tuna	2
Chlorophyta; Microdictyon sp.	1
Chlorophyta; Verdigellas peltata	19
Cyanobacteria;	1
Phaeophyceae; Dictyota sp.	2
Phaeophyta; Sargassum sp.	1
Rhodophyta;	3
Rhodophyta; crustose coralline algae	18
Rhodophyta; Halymenia sp.	14
Rhodophyta; Martensia pavonia	9
Rhodophyta; Peyssonnelia sp.	1
Species Group Count:	**17**

Group: ANN

Species Name	Count
Filograna sp.	7
Sabellidae;	1
Species Group Count:	**2**

Group: ART

Species Name	Count
Brachyura;	1
Cirripedia;	1
Decapoda;	1
Decapoda; Anomura	6
Decapoda; Axiidae; Guyanacaris hirsutimana	1
Decapoda; Galatheidae	1
Decapoda; Lysmata sp.	4
Decapoda; Majidae	2
Decapoda; Parthenope sp.	3
Decapoda; Rochinia sp.	4
Decapoda; shrimp	1
Decapoda; Stenopus hispidus	1
Decapoda; Stenorhynchus seticornus	1
Species Group Count:	**13**

Group: BRY

Species Name	Count
Bryozoa	3
Species Group Count:	**1**

Group: CHO

Species Name	Count
Ascidiacea	1
Ascidiacea; Aplydium sp.	1
Ascidiacea; Didemnidae	5
Species Group Count:	**3**

Group: CNI

Species Name	Count
Actinaria;	1
Actinaria; Liponema sp.	1
Actiniaria; Cerianthidae	2
Antipatharia;	7
Antipatharia; Antipathes atlantica	9
Antipatharia; Antipathes furcata	6
Antipatharia; Antipathes sp.	14
Antipatharia; Elatopathes abietina	22
Antipatharia; Stichopathes lutkeni	24
Antipatharia; Tanacetipathes tanacetum	1
Corallimorpharia;	3
Hydroidolina;	13
Hydroidolina; black hairy	2

Hydroidolina; black stinging	1
Octocorallia;	25
Octocorallia; Diodogorgia sp.	12
Octocorallia; Ellisella barbadensis	2
Octocorallia; Ellisella sp.	5
Octocorallia; Ellisellidae	3
Octocorallia; Muricea sp.	4
Octocorallia; Nephtheidae	1
Octocorallia; Nicella sp.	5
Octocorallia; Primnoidae	2
Octocorallia; Swiftia exserta	8
Octocorallia; Telesto sp.	16
Zoantharia	1
Species Group Count:	**26**

Group: COR

Species Name	Count
Agaricia fragilis	6
Agaricia sp.	37
Helioseris cucullata	2
Madracis brueggemanni	1
Madracis mirabilis	5
Madracis sp.	10
Madrepora oculata/carolina	18
Montastraea cavernosa	14
Scleractinia; unid. colonial	5
Scleractinia; unid. solitary cup	8
Stylaster sp.	14
Species Group Count:	**11**

Group: ECH

Species Name	Count
Asteroidea;	11
Asteroidea; Coscinasterius sp.	1
Asteroidea; Goniaster tessellatus	4
Asteroidea; Goniasteridae	1
Asteroidea; Narcissia trigonaria	6
Asteroidea; Tethiaster grandis	1
Crinoidea; Comatulida	16
Crinoidea; Crinometra brevipenna	5
Crinoidea; Davidaster discoideus	2
Echinoidea;	1
Echinoidea; Araeosoma fenestratum	2
Echinoidea; Centrostephanus longispinus	1
Echinoidea; Cidaroida	9
Echinoidea; Clypeaster sp.	1
Echinoidea; Eucidaris tribuloides	2
Echinoidea; sea biscuit	1
Echinoidea; Stylocidaris affinus	2
Holothuroidea;	1
Holothuroidea; Holothuria lentiginosa enodis	8
Ophiuroidea; Gorgonocephalidae	2
Ophiuroidea; Ophioderma devaneyi	4
Species Group Count:	**21**

Group: HUM

Species Name	Count
bottle	2
cable	1
can	1
fishing line	5
Human Debris;	5
longline	6
plywood	1
Species Group Count:	**7**

Group: MOL

Species Name	Count
Bivalvia; flame scallop	1
Bivalvia; scallop	1
Gastropoda	1
Gastropoda; Argonauta nodosa	1
Gastropoda; helmet conch	2

Gastropoda; Nudibranchia	1
Gastropoda; Perotrochus amabilis	5
Gastropoda; Scaphella junonia	2
Species Group Count:	**8**

Group: POR

Species Name	Count
Demospongiae;	27
Demospongiae; Agelas clathrodes	2
Demospongiae; Agelas conifera	1
Demospongiae; Agelas sp.	5
Demospongiae; Aplysina cauliformis	1
Demospongiae; Aplysina sp.	3
Demospongiae; Astrophorida	8
Demospongiae; Auletta sp.	1
Demospongiae; Axinellida	4
Demospongiae; Callyspongia plicifera	2
Demospongiae; Callyspongia sp.	2
Demospongiae; Callyspongia vaginalis	5
Demospongiae; Chondrilla sp.	1
Demospongiae; Cinachyrella sp.	2
Demospongiae; Cliona carribea	1
Demospongiae; Cliona sp.	1
Demospongiae; Corallistes sp.	15
Demospongiae; Dendroceratidae	1
Demospongiae; Dercitus sp.	1
Demospongiae; Dictyoceratida	4
Demospongiae; Discodermia sp.	1
Demospongiae; Dysidea sp.	1
Demospongiae; Erylus sp.	1
Demospongiae; Geodia neptuni complex	1
Demospongiae; Geodia sp.	11
Demospongiae; Ircinia campana	3
Demospongiae; Ircinia sp.	3
Demospongiae; Ircinia strobilina	2
Demospongiae; Leiodermatium sp.	3
Demospongiae; Lithistida	6
Demospongiae; Mycale sp.	1
Demospongiae; Niphates erecta	4
Demospongiae; Oceanapia sp.	5
Demospongiae; Pachastrellidae	10
Demospongiae; Petrosiidae	4
Demospongiae; Placospongia sp.	1
Demospongiae; Poecilosclerida	1
Demospongiae; Polymastia sp.	3
Demospongiae; Shrek Sponge	1
Demospongiae; Siphonodiction sp.	1
Demospongiae; Spirastrellidae	4
Demospongiae; Spongosorites siliquaria	3
Demospongiae; Spongosorites sp.	3
Demospongiae; Theonella sp.	24
Demospongiae; Verongida sp.	6
Demospongiae; Xestospongia muta	18
Demospongiae; Zyzzya sp.	1
Hexactinellida;	19
Hexactinellida; cup	1
Hexactinellida; fans	2
Species Group Count:	**50**

Group: REP

Species Name	Count
sea turtle	1
Species Group Count:	**1**

Group: SED

Species Name	Count
sand tilefish mound	15
Species Group Count:	**1**

Species Count Total: **161**

Dive Notes: Species Counts

Group: FIS

Species Name	Count
lionfish - Pterois volitans	551
Unidentified	464
Roughtongue bass - Pronotogrammus martinicensis	456
Chalk bass- Serranus tortugarum	412
Yellowtail reeffish - Chromis enchrysura	332
Greenband wrasse - Halichoeres bathyphilus	283
Scorpionfish - Scorpaenidae	260
Anthiinae	218
wrasse bass - Liopropoma eukrines	157
Reef butterflyfish - Chaetodon sedentarius	126
Spotfin hogfish - Bodianus pulchellus	123
Short Big Eye - Pristigenys alta	122
Bank butterflyfish - Chaetodon (Prognathodes) aya	122
Scamp - Mycteroperca phenax	121
Red hogfish - Decodon puellaris	115
Red barbier - Hemanthias vivanus	112
Tattler - Serranus phoebe	101
Snowy Grouper - Epinephelus niveatus	97
Cherubfish - Centropyge argi	95
Serranus sp. (Dorsally orange and white used to be Apricot bass?)	93
bicolor damselfish- Stegastes partitus	91
orangeback bass - Serranus annularis	88
sunshine fish - Chromis insolata	85
Squirrelfish - Holocentrus adscensionis	60
Deepbody boarfish - Antigonia capros	60
Bigeye soldierfish - Ostichthys trachypoma	57
Purple reeffish - Chromis scotti	49
Damselfish - Pomacentridae	47
Saddle bass - Serranus notospilus	46
Lizardfish - Synodus sp.	42
Spotfin butterflyfish - Chaetodon ocellatus	40
Greater amberjack - Seriola dumerili	39
blue angelfish - Holacanthus bermudensis	35
Goby - Gobiidae	34
Deepwater squirrelfish - Sargocentron bullisi	34
soldierfish - Holocentridae	32
Goldface puffer - Canthigaster jamestyleri	31
Snapper - Lutjanidae	30
Bigeye - Priacanthidae	28
Yellowfin bass - Anthias nicholsi	27
Pufferfish - Tetraodontidae	27
Blue dartfish - Ptereleotris calliura	27
Grouper - Epinephelinae	25
porgy - Calamus sp.	24
Wrasse - Labridae	22
sharpnose puffer - Canthigaster rostrata	22
speckled hind - Epinephelus drummondhayi	21
Bigeye - Priacanthus arenatus	19
Blueline tilefish - Caulolatilus microps	18
Rock beauty - Holacanthus tricolor	17
Red grouper - Epinephelus morio	15
Yellow-spotted golden bass - Liopropoma olneyi	14
Queen snapper - Etelis oculatus	14
striped grunt - Haemulon striatum	13
Cardinalfish - Apogonidae	13
Moray eel - Muraenidae	12
Blackbar drum - Pareques iwamotoi	12
twospot cardinalfish - Apogon pseudomaculatus	10

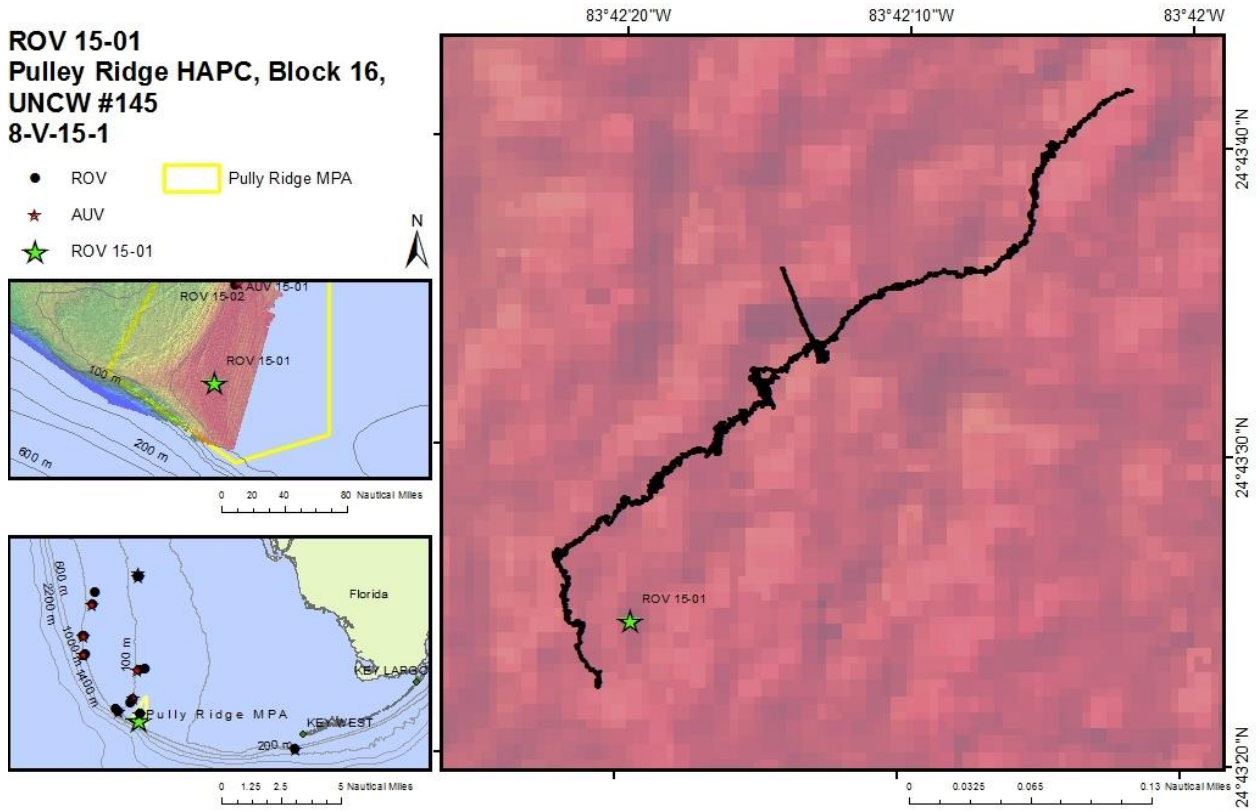
blue chromis - Chromis cyanea	9
Creole fish - Paranthias furcifer	9
Squirrelfish - Holocentrinae	9
Threadnose bass - Anthias tenuis	9
tomtate - Haemulon aurolineatum	9
Sanddiver lizardfish - Synodus intermedius	9
Almaco Jack - Seriola rivoliana	8
Grunt - Haemulon sp.	8
Jackknife-fish - Equetus lanceolatus	8
barracuda - Sphyraena barracuda	7
Bulleye bigeye - Cookelus japonicus	7
Cubbyu - Pareques umbrosus	7
Spinycheek soldierfish - Corniger spinosus	7
unid school	6
black grouper - Mycteroperca bonaci	6
longsnout butterflyfish - Chaetodon aculeatus	6
Bandtail puffer - Sphoeroides spengleri	5
Yellowedge grouper - Epinephelus flavolimbatus	5
soapfish - Rypticus sp.	5
Butterflyfish - Chaetodonidae	5
Gag grouper - Mycteroperca microlepis	5
shark;	4
French butterflyfish - Prognathodes guyanensis	4
Spanish flag - Gonioplectrus hispanus	4
Reeffish - Chromis sp.	4
squirrelfish - Holocentrus sp.	4
beaugregory damselfish - Stegastes leucostictus	4
Flounder - Bothidae	4
Hogfish - Lachnolaimus maximus	4
Drum - Pareques sp.	3
Warsaw grouper - Epinephelus nigritus	3
vermilion snapper - Rhomboplites aurorubens	3
School bass - Schultzea beta	3
Queen angelfish - Holacanthus ciliaris	3
Gray angelfish - Pomacanthus arcuatus	3
Sargassum triggerfish - Xanthichthys ringens	3
Margate - Haemulon album	3
Graysby - Epinephelus cruentatus	3
Longtail bass - Hemanthias leptus	3
angelfish - Pomacanthus sp.	2
reticulate moray - Muraena retifera	2
Bigeye scad - Selar crumenophthalmus	2
triggerfish - Balistes sp.	2
Longspine snipefish - Macroramphosus scolopax	2
toadfish - Opsanus sp.	2
Seabass - Serranidae	2
Jawfish - Opistognathidae	2
Gray triggerfish - Balistes capriscus	2
Carangidae	2
Seabass - Serranus sp.	2
Jack - Seriola sp.	2
Blenny - Blennidae	2
amberjack - Seriola sp.	1
Goldface tilefish - Caulolatilus chrysops	1
Remora - Echeneidae	1
Atlantic bearded brotula - Brotula barbata	1
Redspotted hawkfish - Amblycirrhitus pinos	1
ocean trigger - Canthidermis sufflamen	1
Sand perch - Diplectrum formosum	1
Batfish - Ogcocephalus sp.	1
Sand tilefish - Malacanthus plumieri	1
soldierfish - Myripristinae	1
Shortnose greeneye - Chloropthalmus agassizi	1
trumpetfish - Aulostomus maculatus	1
black brotula	1

Greenblotch parrotfish - Sparisoma atomarium	1
Cowfish - Acanthostracion sp.	1
Eel - Gymnothorax sp.	1
Spotted moray - Gymnothorax moringa	1
Slender Filefish - Monacanthus tuckeri	1
Honeycomb moray - Gymnothorax saxicola	1
Mahogany Snapper - Lutjanus mahogoni	1

Species Group Count:	**130**
Species Count Total:	**130**

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Block 16, 67 m; UNCW ROV Dive 145

General Location and Dive Track:



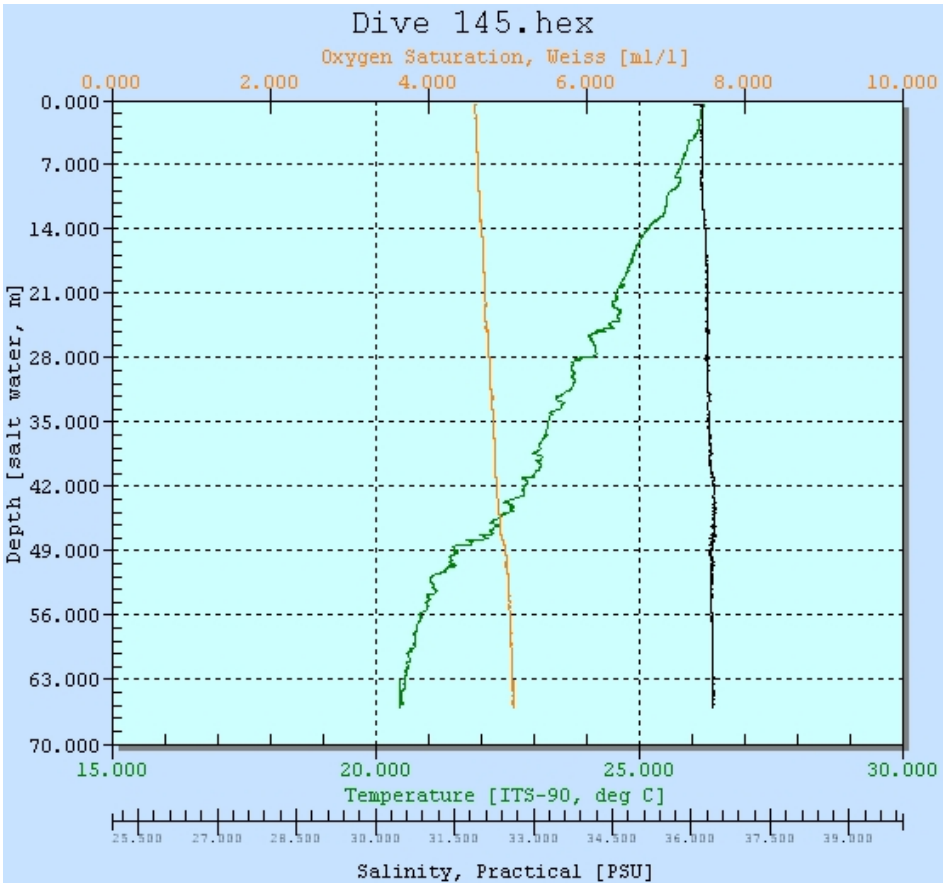
Site Overview:		**Dive Overview:**	
Project:	CIOERT GOM Cruise	**Vessel:**	University of Miami R/V Walton Smith- Cruise No.: WS15125
Principal Investator:	John Reed	**Sonar Data:**	Naar_PulleyRidge_Main_Grid
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946	**Purpose:**	Exploration and Collections
Website:	www.fau.edu/hboi/cioert/index.php	**ROV:**	Mohawk ROV
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington	**ROV Sensors:**	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Data Management:	Access Database	**Date of Dive:**	5/8/2015
ROV Navigation Data:	Trackpoint II	**Specimens:**	12
Ship Position System:	DGPS	**Digital Photos:**	87
Report Analyst:	John Reed, Stephanie Farrington	**DVD:**	5
Date Compiled:	9/23/2015	**Hard Drive:**	2

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Block 16, 67 m; UNCW ROV Dive 145

Dive Data:

Minimum Bottom Depth (m):	57.4	**Total Transect Length (km):**	1.359
Maximum Bottom Depth (m):	66.8	**Surface Current (kn):**	0.5
On Bottom (Time- GMT):	13:25	**On Bottom (Lat/Long):**	24.72°N; -83.71°W
Off Bottom (Time- GMT):	17:48	**Off Bottom (Lat/Long):**	24.73°N; -83.7°W
Physical (bottom); Temp (°C):	20.49	**Salinity:** 36.42 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-01 are as follows: Depth: 57.4-66.8 m, Temperature: 20.5-20.6 °C , Conductivity: 50200-50300 (µS/cm), Pressure: 83.7-97.5 (PSI), Salinity: 36.4-36.4 (PSU), Sound Velocity: 1525.4-1525.6 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1025.9-1026 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Block 16, 67 m; UNCW ROV Dive 145

Dive Imagery:

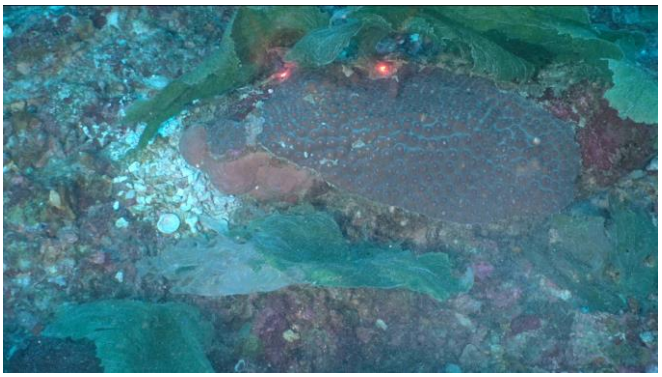


Figure 1: -65.7 m
Montastraea annularis and *Anadyomene menzizii*

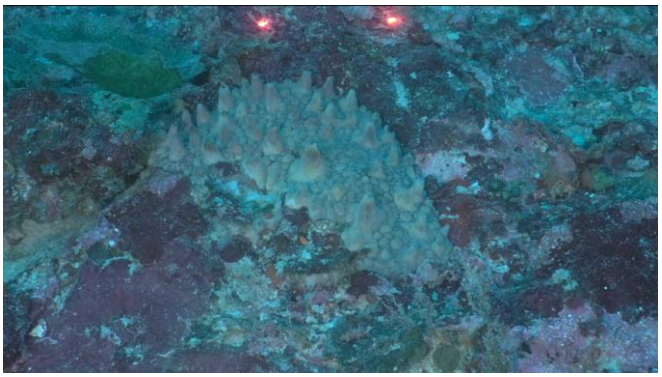


Figure 2: -65.7 m
Polymastia sp.

Figure 3: -66.3 m
Agelas sp. sponge

Figure 4: -65.7 m
Orange finger sponge

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Block 16, 67 m; UNCW ROV Dive 145

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-01, Site #- 8-V-15-1, Mohawk Dive #145. Target Site –Gulf of Mexico off SW Florida, Pulley Ridge HAPC, Block 16. Ground truth USGS PR multibeam sonar map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Made various tests of photo transects.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). Digital still images were taken with a digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125 s, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator was used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

At the end of the dive we conducted a photo test: Kept ROV at 1.3 m, and SOG of 0.5-0.7 kn; 5 photos shot at fixed 1/125; 5 photos at 1/250 to see if blurred. No difference in tests, so will use 1/125 for all photos.

Site Description/Habitat/Biota

Depth range: 66.5 m.

XS 1- Start near SW corner of Block 16; headed NE for 100 m for test photo transect. Took 10 photos for test. Habitat is coral pavement, rock rubble; 100% hard bottom; flat, low relief, low rugosity, and no ledges except in fish burrows. Dense cover of *Anadyomene*; rock pavement or dead plates covered with crustose Corallinales. Corals- areas with common to dense Agaricia; Agaricia fragilis 10-15 cm with white rim common; *A. lamarcki* 20-30 cm common; several *Montastraea cavernosa* 20-50 cm. No coral disease or bleaching. Sparse Antipathes white fans. No Octocorallia. Sponges- *Xestospongia muta* common; *Agelas conifer* common, *Agelas clathrodes* common. Crinoid; tunicates- white Didemnidae and Eudistoma? sp.

After photo transect began slow transit to N and NE for collections.

12 samples collected. Took on average 5-15 minutes/sample. 2 coral- Agaricia, Madracis brueggemanni; 1 Didemnidae; 9 Porifera.

Common Species

Coral- Agaricia sp., *Montastraea cavernosa*

Porifera- Demospongiae; *Xestospongia muta*

Algae- Chlorophyta; *Anadyomene menziesii*

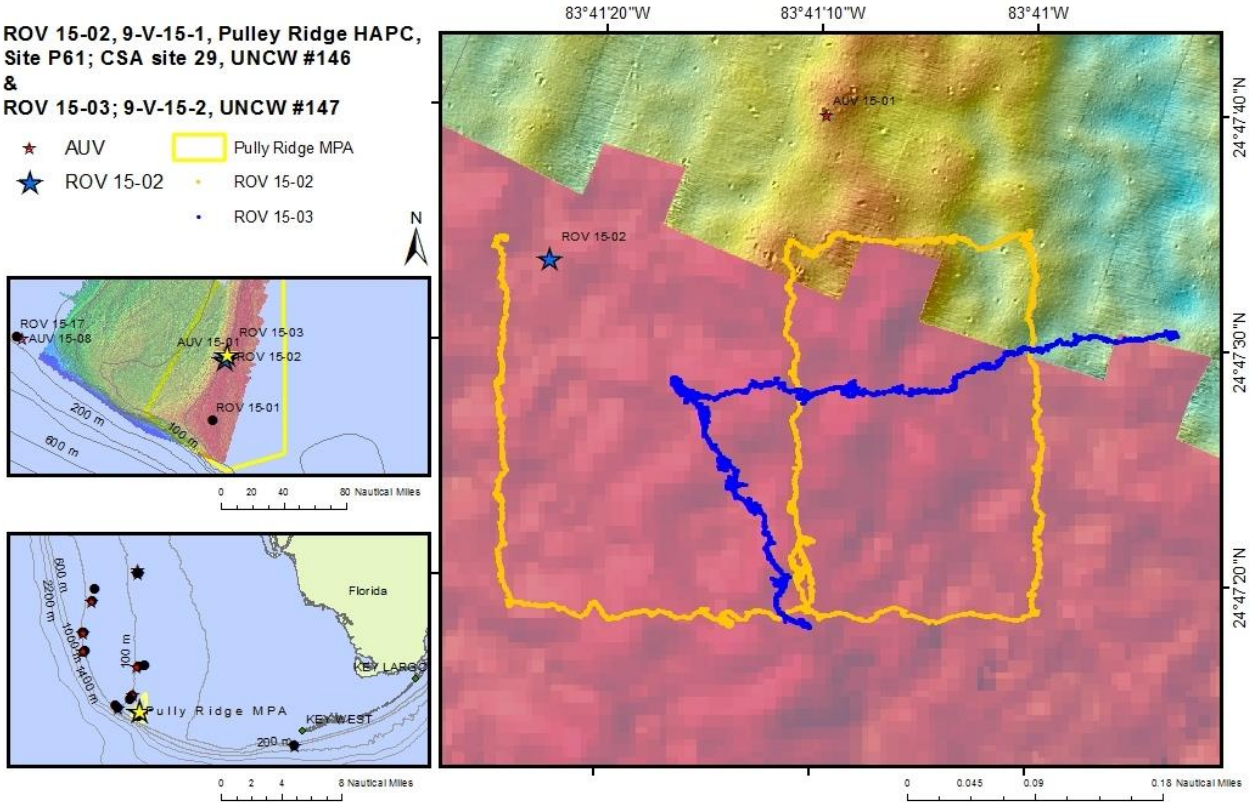
Fish- bicolor damselfish- *Stegastes partitus*, blue chromis - *Chromis cyanea*, Chalk bass- - *Serranus tortugarum*, Cherubfish - *Centropyge argi*, Damselfish - Pomacentridae, lionfish - *Pterois volitans*, orangeback bass - *Serranus annularis*, Purple reeffish - *Chromis scotti*, Reef butterflyfish - *Chaetodon sedentarius*, Rock

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Block 16, 67 m; UNCW ROV Dive 145

beauty - *Holacanthus tricolor*, spotfin hogfish - *Bodianus pulchellus*, sunshine fish - *Chromis insolata*, wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*
Habitat- sand tilefish mound

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 146

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

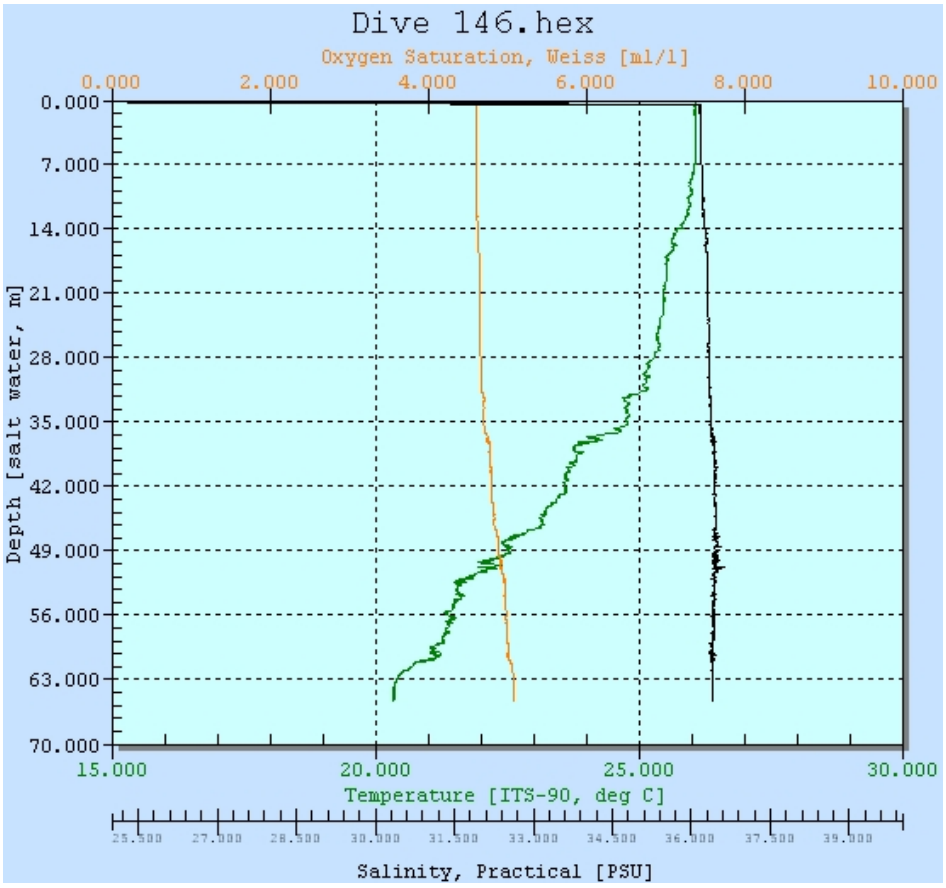
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	Naar_PulleyRidge_Main_Grid
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/9/2015
Specimens:	
Digital Photos:	260
DVD:	4
Hard Drive:	1

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 146

Dive Data:

Minimum Bottom Depth (m):	57.8	**Total Transect Length (km):**	2.681
Maximum Bottom Depth (m):	66.2	**Surface Current (kn):**	0.7
On Bottom (Time- GMT):	8:23	**On Bottom (Lat/Long):**	24.79°N; -83.69°W
Off Bottom (Time- GMT):	11:36	**Off Bottom (Lat/Long):**	24.79°N; -83.69°W
Physical (bottom); Temp (°C):	21.28	**Salinity:** 36.43 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-02 are as follows: Depth: 57.8-66.2 m, Temperature: 20.3-21.3 °C , Conductivity: 50000-51000 (µS/cm), Pressure: 84.3-96.6 (PSI), Salinity: 36.3-36.4 (PSU), Sound Velocity: 1525-1527.6 (m/s), Oxygen Saturation: 5-5.1 (ml/l), Density: 1025.7-1026 (Kg/m^3), Nitrogen Saturation: 9.2-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 146

Dive Imagery:

Figure 1: -64 m
Pulley Ridge habitat

Figure 2: -63.7 m
grouper

Figure 3: -63.8 m
Lionfish and a crinoid on X. muta

Figure 4: -64.1 m
Banded coral shrimp

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 146

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-02, Site #- 9-V-15-1, Mohawk Dive #146. Target Site: Gulf of Mexico off SW Florida, Pulley Ridge HAPC, Site P-61, CSA Site 29 from 1981. Ground truth USGS multibeam sonar map and CSA site 29 data. Conducted photo/video transects following CSA transect. Bluefin 12 AUV also conducted a test dive using laser bathymetry and continuous photo transects within the block covering 100 m x 20 m over a 10-m diameter red grouper burrow. ROV dive did not ground truth that data.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Made 3 N-S 500 m transects following CSA site 29 lines: one on main Pulley Ridge, one on west slope, and one on east slope; and E-W connecting transect. Started N-S on west leg; second transect along south connector; third transect S to N on East leg, back to middle leg to south.
Took 10 random photos per 100 m, for total of 200 photos.

Site Description/Habitat/Biota

Depth range: 63-67 m.
Typical Pulley Ridge habitat: flat, 100% hard bottom, mostly rubble/cobble and some rock/coral plates covered with crustose coralline algae. Only a few places with Agaricia: A. fragilis 10-20 cm, and A. lamarcki 10-20 cm. Dominant taxa Anadyomene, CCA; sponges- X. muta, Aplysina, Agelas; Antipathes white fan; one Primnoid. One loggerhead turtle. Several red grouper pits with 10+ lionfish each; no red grouper seen, but several pits had scamp grouper and black grouper.

Common Species

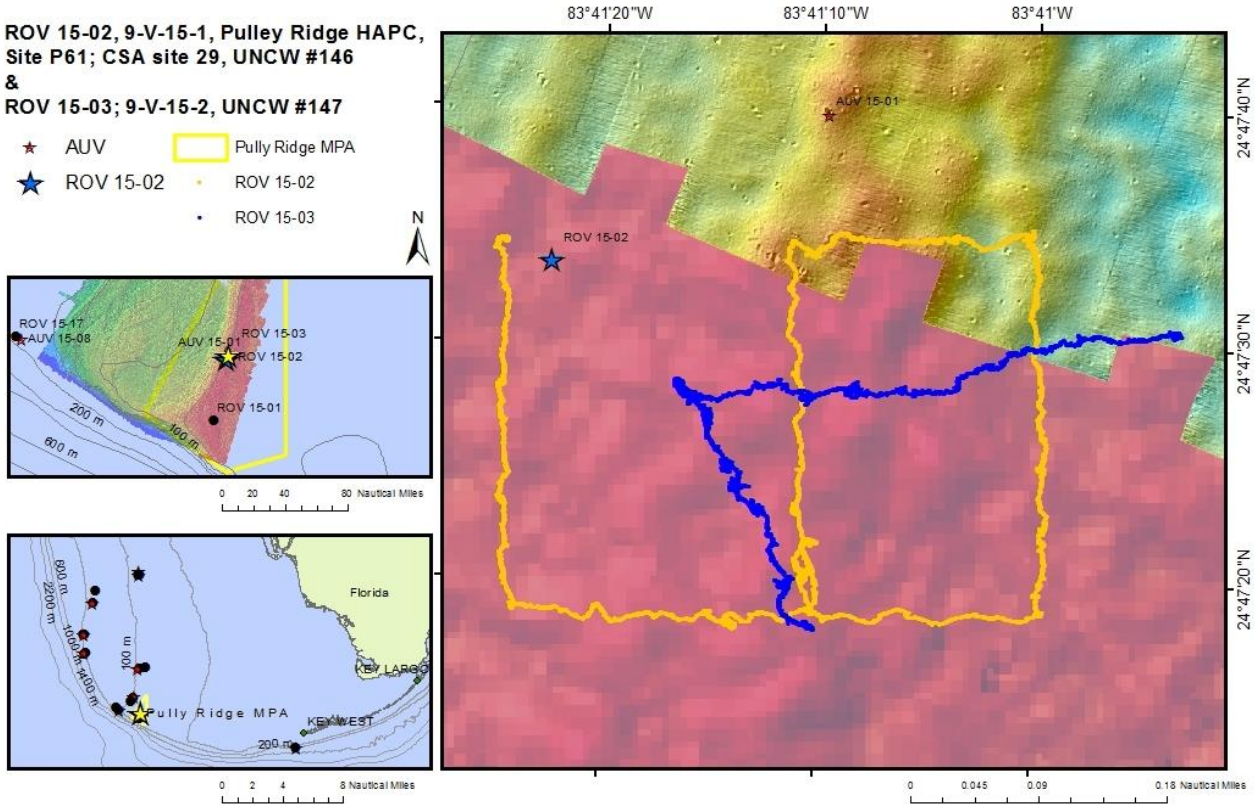
Algae- Chlorophyta; *Anadyomene menziesii*
Coral- *Agaricia* sp., *Montastraea cavernosa*
Fish- bicolor damselfish- *Stegastes partitus*, Chalk bass- - *Serranus tortugarum*, Cherubfish - *Centropyge argi*, Damselfish - *Pomacentridae*, lionfish - *Pterois volitans*, longsnout butterflyfish - *Chaetodon aculeatus*, orangeback bass - *Serranus annularis*, Purple reeffish - *Chromis scotti*, Reef butterflyfish - *Chaetodon sedentarius*, Spotfin hogfish - *Bodianus pulchellus*, Squirrelfish - Holocentrinae, striped grunt - *Haemulon* striatum, sunshine fish - *Chromis insolata*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 146

Porifera- Demospongiae; *Xestospongia muta*

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 147

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
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Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

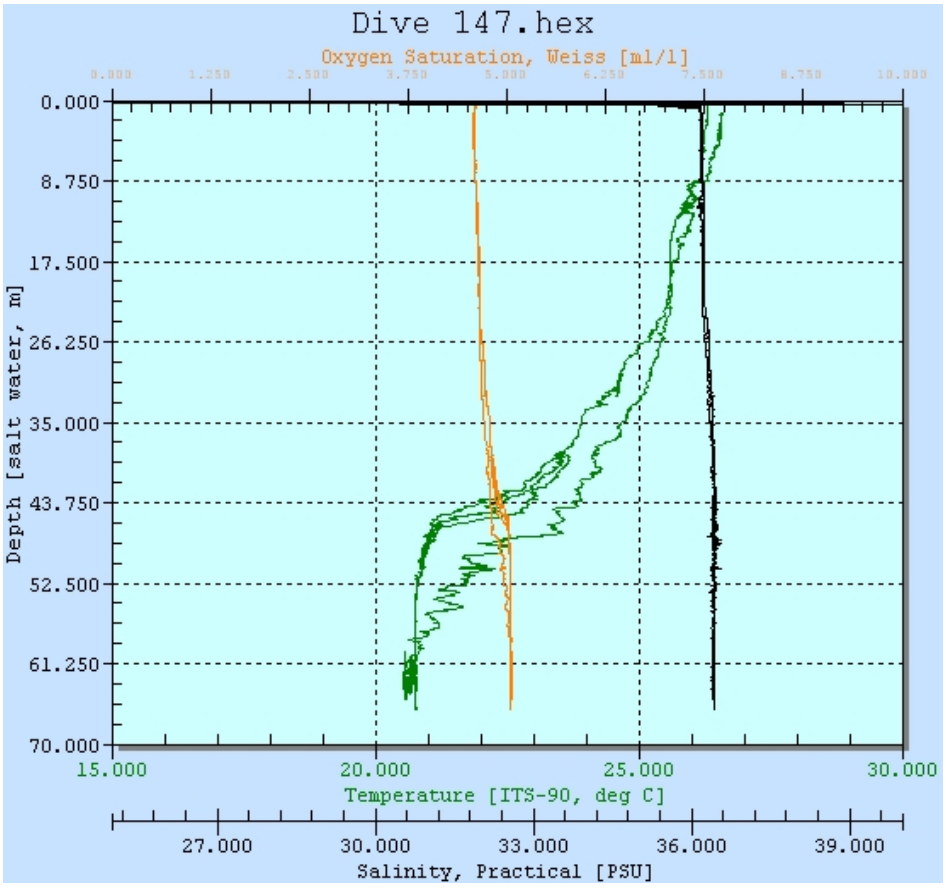
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	Naar_PulleyRidge_Main_Grid
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/9/2015
Specimens:	9
Digital Photos:	41
DVD:	4
Hard Drive:	2

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 147

Dive Data:

Minimum Bottom Depth (m):	59.9	**Total Transect Length (km):**	1.385
Maximum Bottom Depth (m):	66.3	**Surface Current (kn):**	0.7
On Bottom (Time- GMT):	13:04	**On Bottom (Lat/Long):**	24.79°N; -83.69°W
Off Bottom (Time- GMT):	17:12	**Off Bottom (Lat/Long):**	24.79°N; -83.68°W
Physical (bottom); Temp (°C):	20.54	**Salinity:** 36.39 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-03 are as follows: Depth: 59.9-66.3 m, Temperature: 20.5-20.8 °C , Conductivity: 50200-50500 (µS/cm), Pressure: 87.4-96.7 (PSI), Salinity: 36.4-36.4 (PSU), Sound Velocity: 1525.6-1526.3 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1025.9-1026 (Kg/m^3), Nitrogen Saturation: 9.3-9.3 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 147

Dive Imagery:

Figure 1: -65.3 m
X. muta

Figure 2: -63.5 m
Plumarella/Primnoid

Figure 3: -63.2 m
School of lionfish

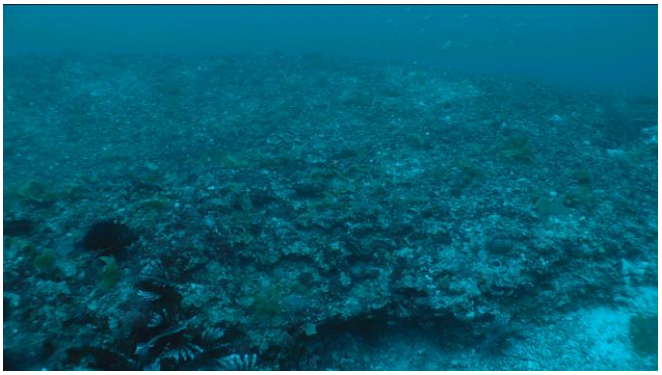


Figure 4: -63.2 m
Pulley Ridge habitat

Dive Site: Gulf of Mexico, Pulley Ridge HAPC, Reed Site P61, CSA Site 29, 67 m; UNCW ROV Dive 147

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-03, Site #- 9-V-15-2, Mohawk Dive #147. Target Site: Gulf of Mexico, off SW Florida, Pulley Ridge HAPC, Site P-61, CSA Site 29 from 1981. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. No photo transects.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat/Biota

Depth range: 62.3- 66.7m

Typical Pulley Ridge habitat: flat, 100% hard bottom, mostly rubble/cobble and some rock/coral plates covered with crustose coralline algae. Only a few places with Agaricia: A. fragilis 10-20 cm, and A. lamarcki 10-20 cm. Dominant taxa Anadyomene, CCA; sponges- X. muta, Aplysina, Agelas; Antipathes white fan; one Primnoid. One loggerhead turtle. Several red grouper pits with 10+ lionfish each.

Collected 9 samples: 8 Porifera, 1 Agaricia.

Common Species

Coral- *Montastraea cavernosa*,

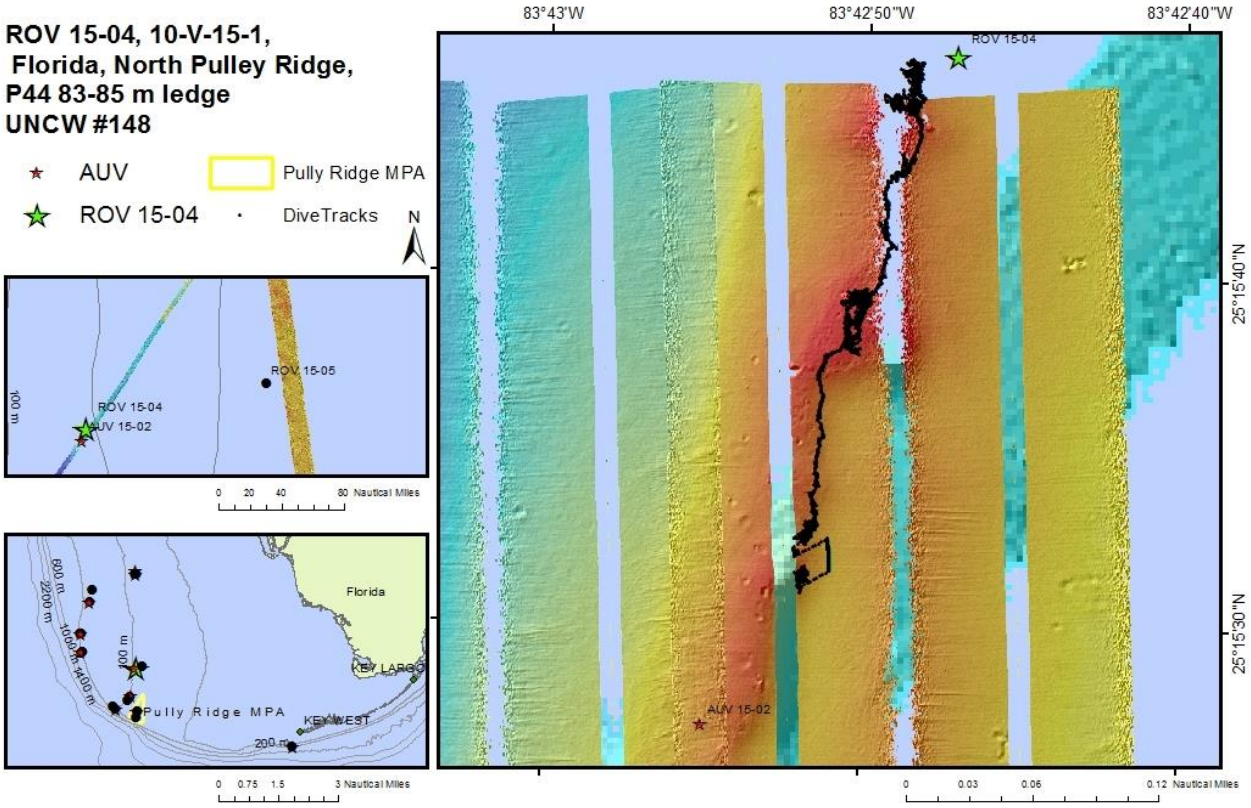
Fish- bicolor damselfish- *Stegastes partitus*, Chalk bass- - *Serranus tortugarum*, Cherubfish - *Centropyge argi*, Damselfish - Pomacentridae, Deepwater squirrelfish - *Sargocentron bullisi*, lionfish - *Pterois volitans*, orangeback bass - *Serranus annularis*, Purple reeffish - *Chromis scotti*, Reef butterflyfish - *Chaetodon sedentarius*, sunshine fish - *Chromis insolata*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*,

Porifera- Demospongiae; *Niphates erecta*, *Xestospongia muta*,

Habitat- sand tilefish mound,

Dive Site: Gulf of Mexico, North Pulley Ridge, Reed Site P44, 83-85 m ledge; UNCW ROV Dive 148

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

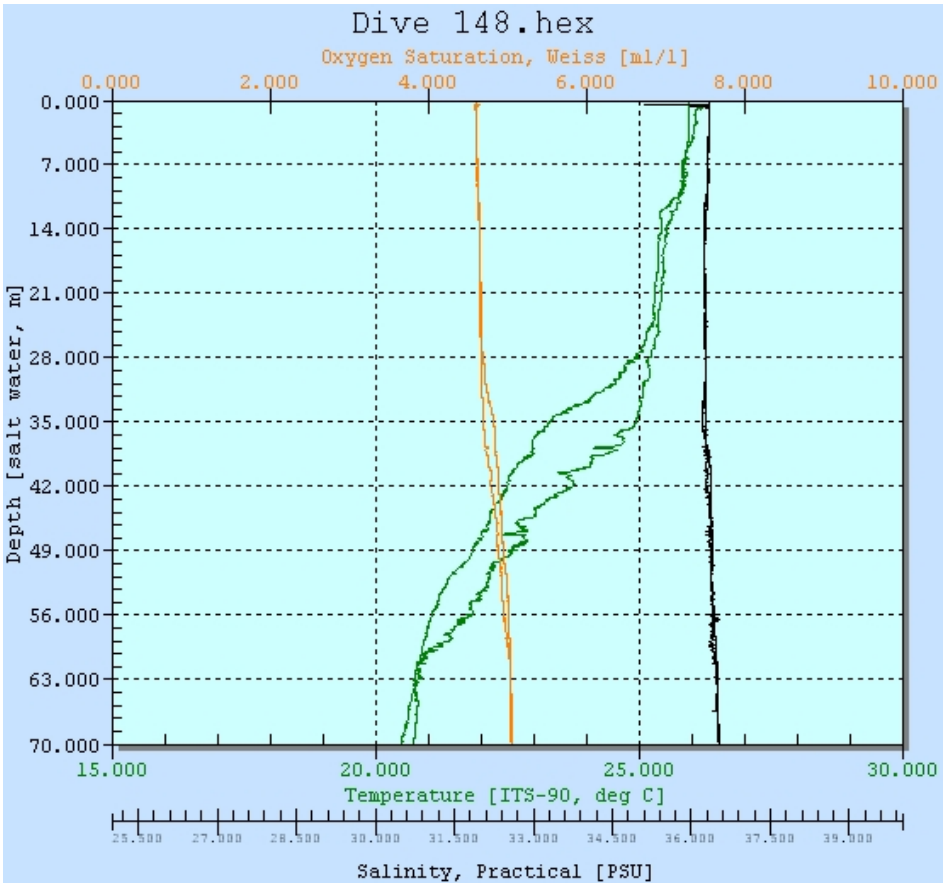
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-02
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/10/2015
Specimens:	12
Digital Photos:	199
DVD:	4
Hard Drive:	1

Dive Site: Gulf of Mexico, North Pulley Ridge, Reed Site P44, 83-85 m ledge; UNCW ROV Dive 148

Dive Data:

Minimum Bottom Depth (m):	77.8	**Total Transect Length (km):**	0.939
Maximum Bottom Depth (m):	85.2	**Surface Current (kn):**	0.2
On Bottom (Time- GMT):	8:19	**On Bottom (Lat/Long):**	25.26°N; -83.71°W
Off Bottom (Time- GMT):	11:46	**Off Bottom (Lat/Long):**	25.26°N; -83.71°W
Physical (bottom); Temp (°C):	20.20	**Salinity:** 36.51 **Visibility (ft):** 10	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-04 are as follows: Depth: 77.8-85.2 m, Temperature: 19.3-20.3 °C , Conductivity: 48900-50000 (µS/cm), Pressure: 113.5-124.3 (PSI), Salinity: 36.2-36.6 (PSU), Sound Velocity: 1522.6-1525.2 (m/s), Oxygen Saturation: 5.1-5.2 (ml/l), Density: 1026.2-1026.4 (Kg/m^3), Nitrogen Saturation: 9.4-9.5 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, Reed Site P44, 83-85 m ledge; UNCW ROV Dive 148

Dive Imagery:

Figure 1: -84.9 m
Red grouper

Figure 2: -85.1 m
Lionfish on an outcrop

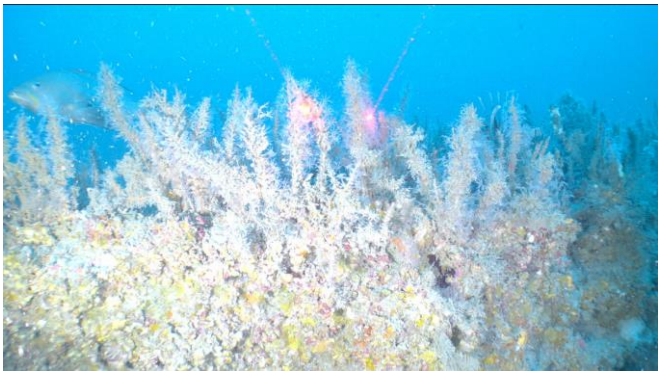


Figure 3: -85.1 m
Telesto sp. encrusting an outcrop

Figure 4: -84.8 m
Lionfish

Dive Site: Gulf of Mexico, North Pulley Ridge, Reed Site P44, 83-85 m ledge; UNCW ROV Dive 148

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-04, Site #- 10-V-15-1, Mohawk Dive #148. Target Site: Gulf of Mexico, off SW Florida, Site P-44; north Pulley Ridge, north of Pulley Ridge HAPC. Ground truth single swath of Naar (USF) multibeam data and new side-scan sonar from Bluefin 12 dive (1 km x 500 m). Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: 84-85.5 m.

Naar MB data shows a NNE-SSW oriented ridge from 83-85 m depth. The Bluefin AUV side-scan sonar showed a relatively flat bottom with numerous 8-10 m pits (red grouper), and a few small medium relief features which were ground truthed. The dive started at the north end of the sonar maps and headed south along the main ridge. The pits in fact were red grouper pits (although no red grouper were observed). These were scoured 1-1.5 m deep with rock ledges in the bottom. Most had several scamp grouper, numerous small reeffish- Chaetodon spp., bicolor damsel, yellowtail damsel, etc. and dozens of lionfish. The WP 1 was a 5-10 m area of several ½ to 1 m rock outcrops, very rugged eroded rock, and densely covered with biota- hydroids, octocorals, sponges, some green algae. Between the rock outcrops and pits was flat bottom, mostly sediment on pavement with small 5 cm rubble or sediment. No Anadyomene and most flora and fauna different from Pulley Ridge south biota. Coral- cup coral, Stylaster; no other hard coral. Octocorals- Plexaurids, Ellisellidae, Ellisella, Telesto dense on rock, Swiftia exerta common, white fan octocorals; maybe 6-8 species. Black coral- Antipathes white fan, Tanacetipathes, Stichopathes lutkeni. Very odd. Lionfish very dense everywhere, in pits and on rubble flats.

Photo transect 1: From WP 1 (grouper pit) to WP 2 (rock outcrop feature), 260 m long, 47 random photos, 84.5 m depth.

Photo transect 2: Over rock outcrop area, 185 m length, 15 photos, 85 m depth.

Collected 11 samples: 2 Octocorallia, 1 Chlorophyta, 8 Porifera.

Dive Site: Gulf of Mexico, North Pulley Ridge, Reed Site P44, 83-85 m ledge; UNCW ROV Dive 148

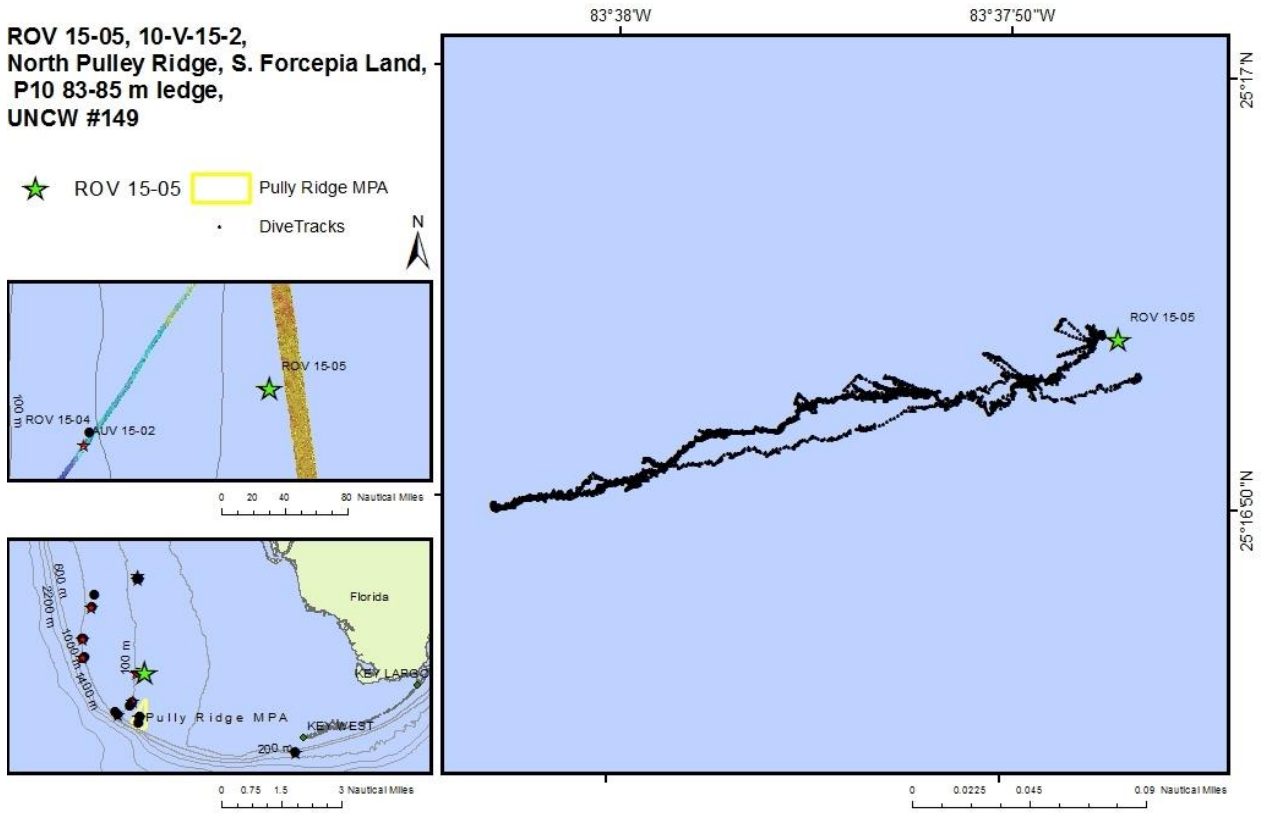
Common Species

Cnidaria- Hydroidolina, Octocorallia; *Telesto* sp.,

Fish- Anthiinae, blue angelfish - *Holacanthus bermudensis*, Creole fish - *Paranthias furcifer*, Deepwater squirrelfish - *Sargocentron bullisi*, Goldface puffer - *Canthigaster jamestyleri*, Greater amberjack - *Seriola dumerili*, Greenband wrasse - *Halichoeres bathyphilus*, lionfish - *Pterois volitans*, Purple reeffish - *Chromis scotti*, Reef butterflyfish - *Chaetodon sedentarius*, Roughtongue bass - *Pronotogrammus martinicensis*, Scamp - *Mycteroperca phenax*, Spotfin butterflyfish - *Chaetodon ocellatus*, spotfin hogfish - *Bodianus pulchellus*, Squirrelfish - *Holocentrus adscensionis*, sunshine fish - *Chromis insolata*, Tattler - Serranus *phoebe*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*,

Dive Site: Gulf of Mexico, North Pulley Ridge, S. Forcepia Land, Reed Site P10, 85 m ledge; UNCW ROV Dive 149

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

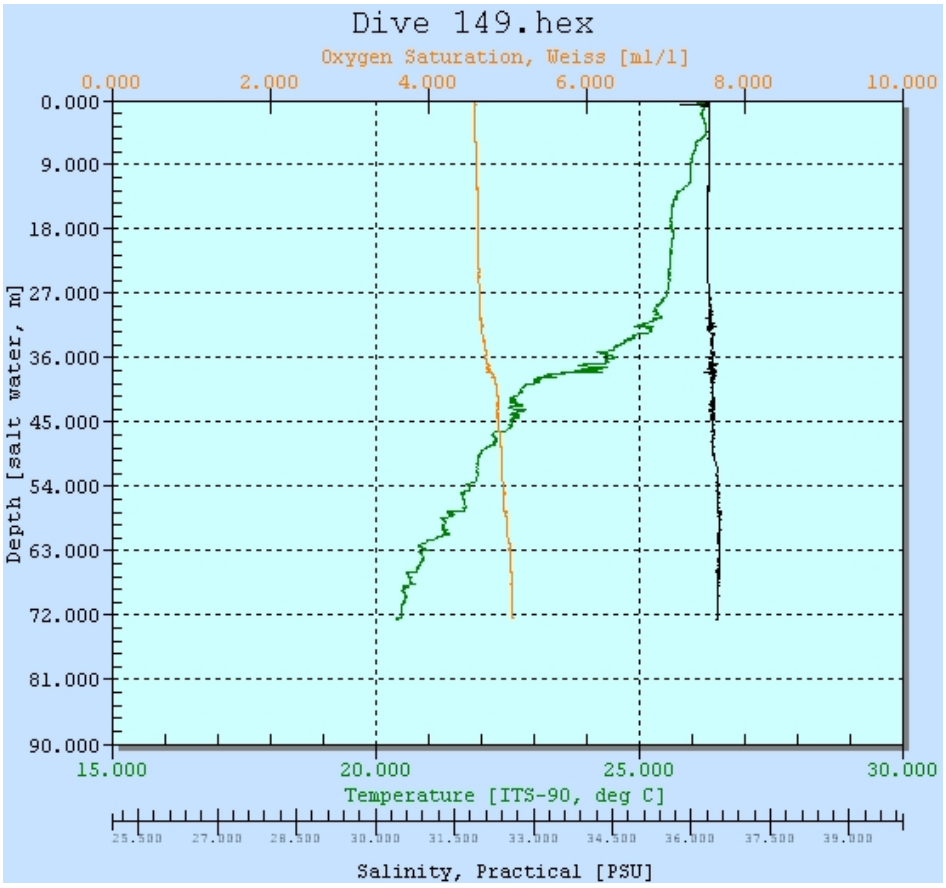
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	None Available
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/10/2015
Specimens:	21
Digital Photos:	81
DVD:	4
Hard Drive:	2

Dive Site: Gulf of Mexico, North Pulley Ridge, S. Forcepia Land, Reed Site P10, 85 m ledge; UNCW ROV Dive 149

Dive Data:

Minimum Bottom Depth (m):	69.5	**Total Transect Length (km):**	1.265
Maximum Bottom Depth (m):	75.6	**Surface Current (kn):**	0.2
On Bottom (Time- GMT):	13:09	**On Bottom (Lat/Long):**	25.28°N; -83.63°W
Off Bottom (Time- GMT):	17:07	**Off Bottom (Lat/Long):**	25.28°N; -83.63°W
Physical (bottom); Temp (°C):	20.58	**Salinity:** 36.51 **Visibility (ft):**	65.61 **Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-05 are as follows: Depth: 69.5-75.6 m, Temperature: 20.4-20.6 °C , Conductivity: 50200-50400 (µS/cm), Pressure: 101.4-110.2 (PSI), Salinity: 36.5-36.5 (PSU), Sound Velocity: 1525.5-1525.9 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1026.1-1026.1 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, S. Forcepia Land, Reed Site P10, 85 m ledge; UNCW ROV Dive 149

Dive Imagery:

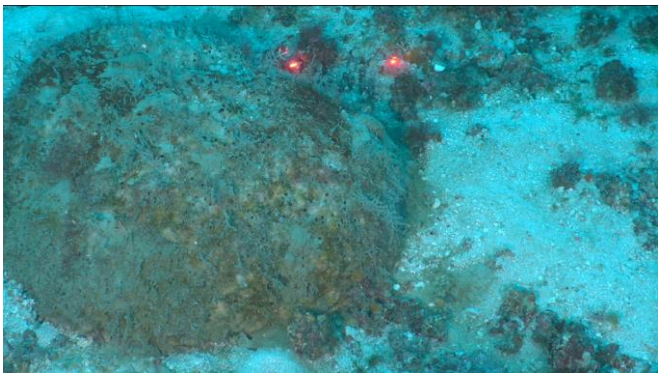


Figure 1: -73.2 m
Spongosorites siliquaria

Figure 2: -76.1 m
Madracis sp.

Figure 3: -76 m
Pink tube sponge

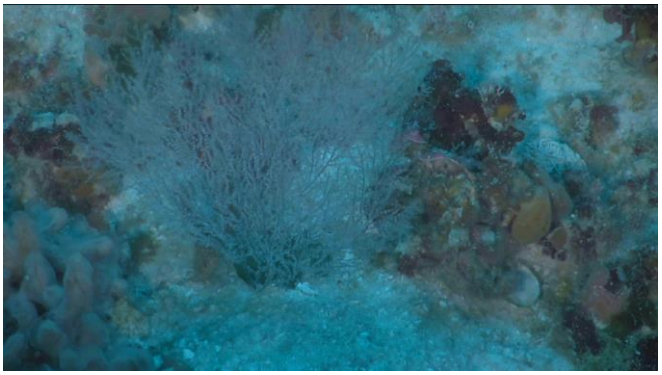


Figure 4: -76.2 m
Antipathes atlantica

Dive Site: Gulf of Mexico, North Pulley Ridge, S. Forcepia Land, Reed Site P10, 85 m ledge; UNCW ROV Dive 149

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-05, Site #-10-V-15-2, Mohawk Dive #149. Florida, North Pulley Ridge, South Forcepia land, Site P10. Ground truth: NOAA_Bathy_Chart_Pulley_Ridge_NG17_7, Live GPS Log- LiveLog_201505102.shp. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat/Biota:

Depth Range: 73.2- 76 m

Habitat was primarily flat, ~80% cover of 5 cm rubble/cobble. No ledges or outcrops. Dominant biota: Anadyomene, Verdigellas, Hydroida, small Porifera. Very low rugosity, fish very sparse, no lionfish. Total distance of collection transect was 500 m.

Photo transect: Headed east over previous collection transect. Took photos randomly, ~ 1/10 s. Total distance 245 m, in 18 minutes; total 50 photos.

Collected 14 samples: 13 Porifera, 1 Chlorophyta.

Common Species

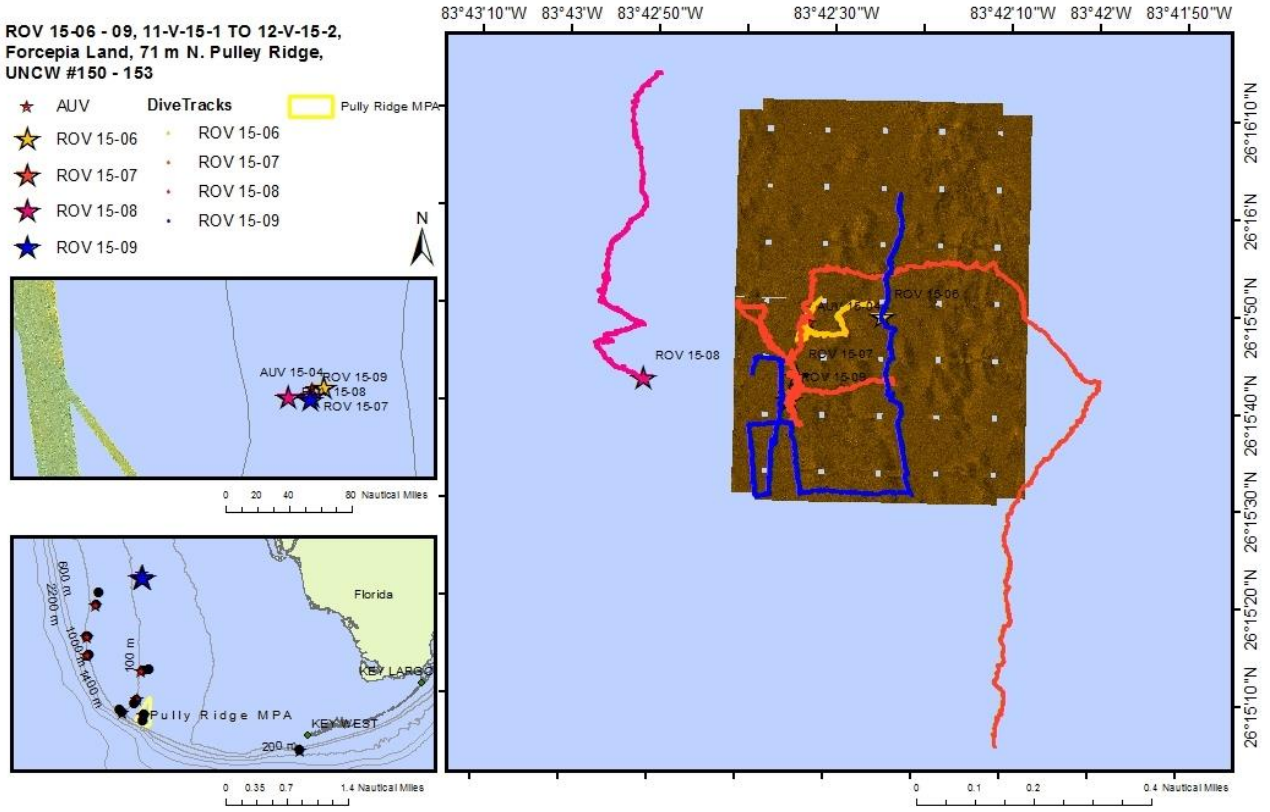
Algae- Chlorophyta; *Anadyomene menziesii*, Chlorophyta; *Verdigellas peltata*, Rhodophyta; *Halymenia* sp.

Coral- *Madracis* sp.

Fish- Greenband wrasse - *Halichoeres bathyphilus*, orangeback bass - *Serranus annularis*,

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 150

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

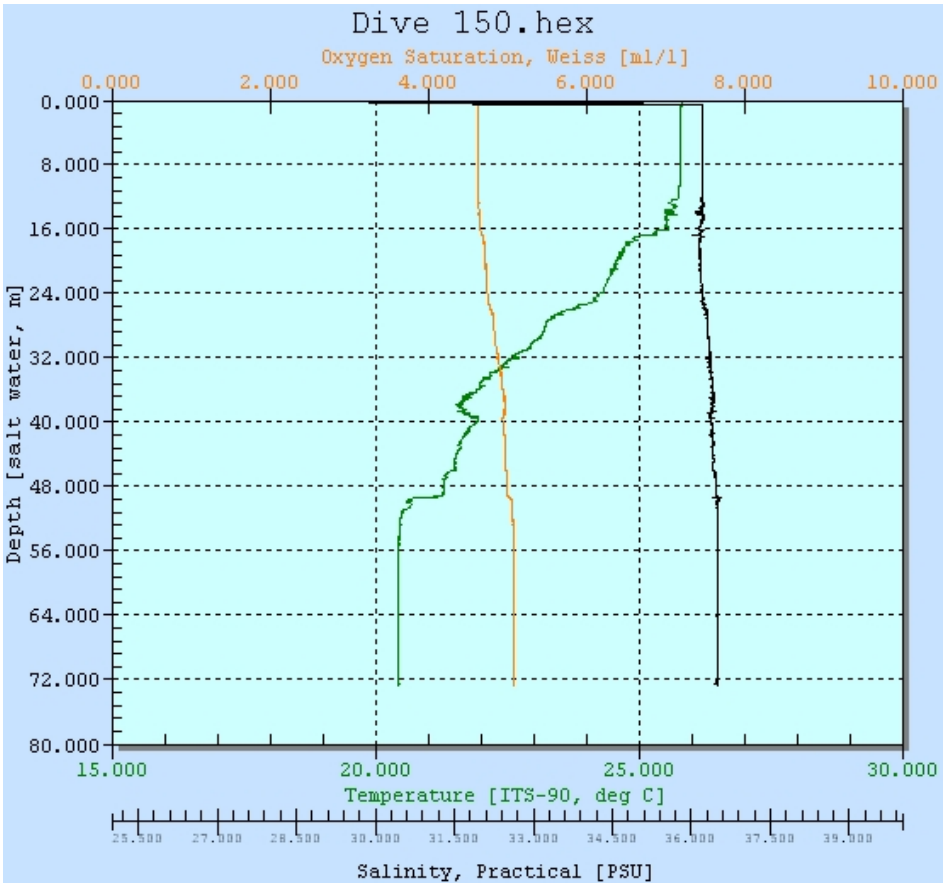
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-03
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/11/2015
Specimens:	13
Digital Photos:	170
DVD:	4
Hard Drive:	1

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 150

Dive Data:

Minimum Bottom Depth (m):	67.6	**Total Transect Length (km):**	0.751
Maximum Bottom Depth (m):	73.1	**Surface Current (kn):**	0.4
On Bottom (Time- GMT):	8:23	**On Bottom (Lat/Long):**	26.26°N; -83.71°W
Off Bottom (Time- GMT):	11:40	**Off Bottom (Lat/Long):**	26.26°N; -83.71°W
Physical (bottom); Temp (°C):	20.43	**Salinity:** 36.49 **Visibility (ft):** 30	**Current (kn):** 0.5

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-06 are as follows: Depth: 67.6-73.1 m, Temperature: 20.4-20.5 °C , Conductivity: 49900-50200 (µS/cm), Pressure: 98.5-106.7 (PSI), Salinity: 36.3-36.5 (PSU), Sound Velocity: 1525.3-1525.6 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1025.9-1026.1 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 150

Dive Imagery:

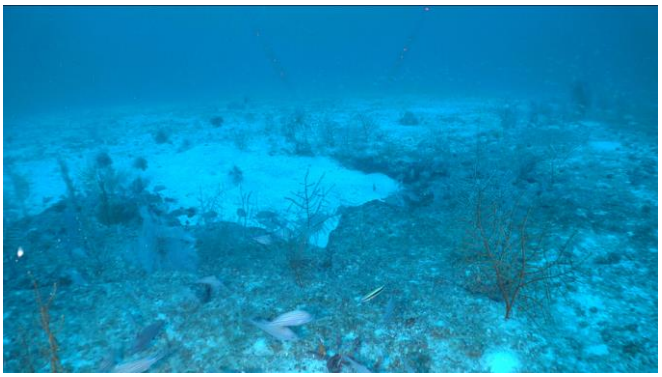


Figure 1: -73.5 m
Hard bottom pavement habitat

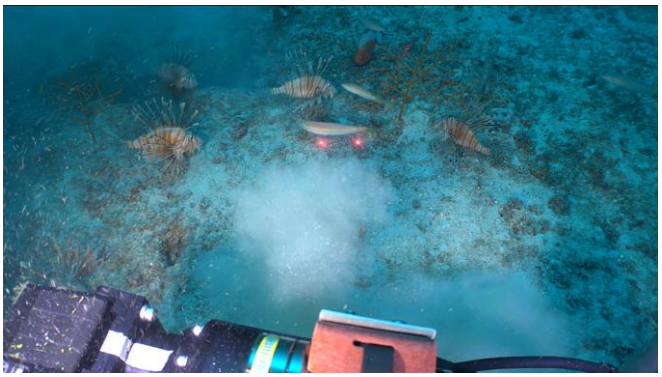


Figure 2: -72.9 m
Lionfish

Figure 3: -73 m
School

Figure 4: -71.8 m
Hardbottom habitat

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 150

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-06, Site #- 11-V-15-1, Mohawk Dive #150. Target Site: Gulf of Mexico, off SW Florida, Site P-2, BMR Shrek sponge site, Forcepia Land. New Bluefin 12 side-scan sonar of site. Ground truth sonar map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: 73.2-73.7 m.

Bluefin side-scan sonar shows several low relief features: 1) flat featureless areas; 2) N-S oriented linear dark features, look like possible sand waves or ledges; 3) very low relief, areas of small mounds or pits.

WP 1- 73.6 m; at P-2 location- on SSS is flat featureless; 100% sediment with dense red algae Martensia drift algae, and few small sponges <10 cm.

WP 2- 73.2 m; SSS- dark patch; sand, 10 cm mound bioturbation, 100% soft bottom with Martensia; 10% cover of 5 cm rock rubble/cobble, sponges, Halimeda, Goniaster, small Rhodophyta.

WP 3- 73.2 m; SSS- on main part of dark ridge; flat sand, 5 cm bioturbation, barren.

WP 4- 73.6 m; SSS- flat featureless area; 100% soft bottom; dense Martensia 80% cover, 5-10 cm rubble sparse.

WP 5- 73.6 m; SSS- shows small outcrops or pits on flat featureless region; found 5 m wide scoured area with exposed rock pavement with 30 cm ledge; dense octocorals on rock- Swiftia exerta, black coral- Tanecetipathes, Antipathes furcate; dense lionfish, stripped grunt, cubbyu, bigeye; several flat top rock outcrops in area, all <1/2 m relief.

WP 6- 73.5 m; SSS- on second small outcrop/pit feature; found exposed rock pavement and scoured exposed rock ledges with 30 cm relief; oasis of fish, numerous lionfish, but sparse biota, few sponges; lionfish, yellowtail damsels, green band bass, blue angelfish, tomtates, short bigeye, bank butterfly, cubbyu.

WP 7- 73.5 m; SSS- pebbly zone near rock outcrop features; found flat pavement, 5 cm rubble, hard bottom with sand veneer; numerous and diverse small 5 cm sponges.

WP 8- Start quantitative photo/video transect; head north along SSS pebbly and pit/outcrop zone. Areas of rock pavement, sand veneer, sparse rubble, several scoured rock pits, rest soft bottom.

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 150

Collected 13 samples: 1- Ellisellidae, 1- Ascidiacea, 11 Porifera.

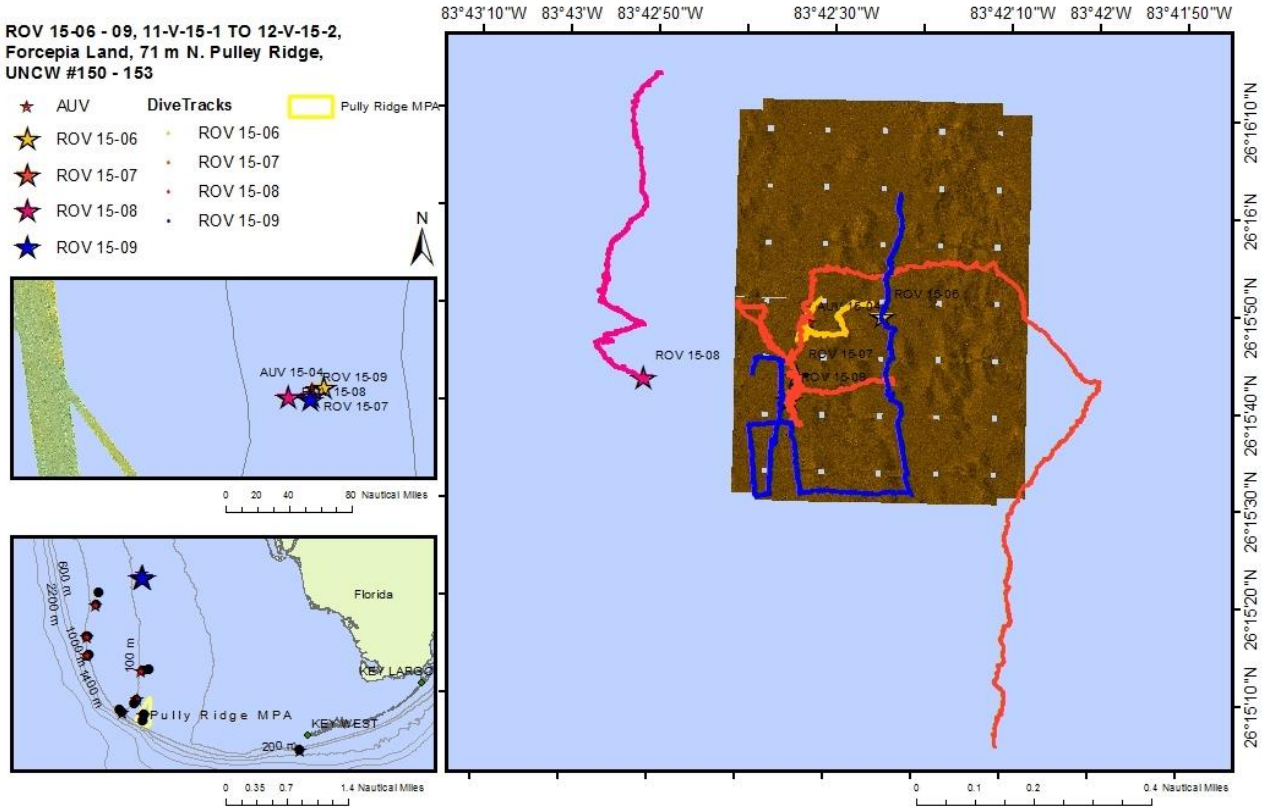
Common Species

Algae- Chlorophyta; *Halimeda* sp.

Fish- blue angelfish - *Holacanthus bermudensis*, Cardinalfish - Apogonidae, Cubbyu - *Pareques umbrosus*, Gag grouper - *Mycteroperca microlepis*, Goby - Gobiidae, Goldface puffer - *Canthigaster jamestyleri*, Greater amberjack - *Seriola dumerili*, Greenband wrasse - *Halichoeres bathyphilus*, Grunt - *Haemulon* sp., lionfish - *Pterois volitans*, Scamp - *Mycteroperca phenax*, Short Big Eye - *Pristigenys alta*, spotfin hogfish - *Bodianus pulchellus*, Tattler - *Serranus phoebe*, tomtate - *Haemulon aurolineatum*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 151

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

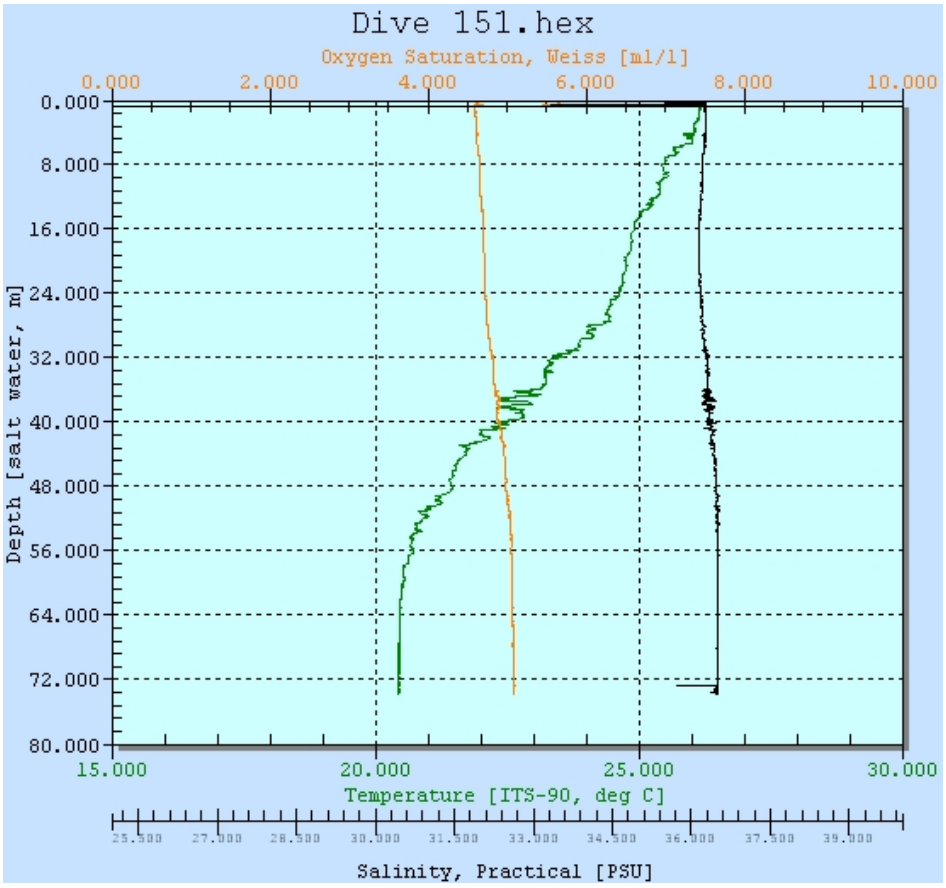
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-03
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/11/2015
Specimens:	4
Digital Photos:	99
DVD:	5
Hard Drive:	2

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 151

Dive Data:

Minimum Bottom Depth (m):	64.8	**Total Transect Length (km):**	4.162
Maximum Bottom Depth (m):	73.8	**Surface Current (kn):**	0.5
On Bottom (Time- GMT):	13:14	**On Bottom (Lat/Long):**	26.26°N; -83.71°W
Off Bottom (Time- GMT):	17:44	**Off Bottom (Lat/Long):**	26.25°N; -83.7°W
Physical (bottom); Temp (°C):	20.48	**Salinity:** 36.50 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-07 are as follows: Depth: 64.8-73.8 m, Temperature: 20.4-20.5 °C , Conductivity: 50100-50300 (µS/cm), Pressure: 94.6-107.6 (PSI), Salinity: 36.4-36.5 (PSU), Sound Velocity: 1525.4-1525.6 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1026-1026.1 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 151

Dive Imagery:

Figure 1: -73.9 m
Lionfish

Figure 2: -74 m
High-hat

Figure 3: -73.9 m
Shrek sponge

Figure 4: -73.7 m
Yellow tube sponge

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 151

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-07, Site #- 11-V-15-2, Mohawk Dive #151. Target Site: Gulf of Mexico, off SW Florida, Site P-2, BMR Shrek sponge site, Forcepia Land. New Bluefin 12 side-scan sonar of site. Ground truth sonar map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2” diameter suction hose.

Site Description/Habitat

Depth range: 73.4-74.2 m.

WP 1- 74.2 m; SSS- flat sand area; found 100% soft bottom, with Martensia, sparse 5 cm rubble/cobble.

WP 2- 73.8 m; quantitative photo/video transect- flat sand, Martensia, photo every 30 seconds.

WP 3- 74.3 m; SSS- dark ridge; found 100% soft bottom.

WP 5- 74.3 m; SSS- sand plain; found 100% soft bottom; 50% cover Martensia detritus, sparse rubble. End photo transect.

WP 6- 74.0 m; SSS- pebbly zone; found patchy hard bottom, rock pavement, sand veneer, some scoured 30 cm ledges; Ellisellidae, Swiftia exerta; lionfish, tomtate, cubbyu, green back bass, spotfin hogfish, sharpnose puffer, reef butterfly, dozens of jackknife fish.

WP 7- Sample 2- 13:49, 74.0 m; Shrek sponge, 15 cm spherical base, two hollow tubes, 5-10 cm on top; Haplosclerid over growing large spherical astrophorid?

WP 8- 73.6 m; SSS- on flat sand area approaching large region of dark features on east side of map; sand flat area- found 100% soft bottom, 10% cover Martensia detritus.

WP 9- 73.6 m; SSS- on dark features; found 100% soft bottom, absolutely no change in habitat or depth from previous SSS zone.

Head off AUV chart; no bathymetry.

WP 10- Retrace JSL transect made in 1999; Milsortcode- 199908152; JSL start depth 70.1 m, have start and end point, 1200 m long transect; dive notes showed Forcepia very common.

Photo transect of dive track- photo every 30 seconds, but close to bottom, not 1.3 m height; 37 photos total. Starting point, we found depth of 73.3 m instead of 70.1 m; we transected 640 m; entire transect was 100% soft bottom, 10% Martensia detritus in places, other parts barren, few 5-10 cm sponges. End depth- 74 m. Did hurricane scour 3 m of sand depopulating Forcepia land?

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P2, 71 m; UNCW ROV Dive 151

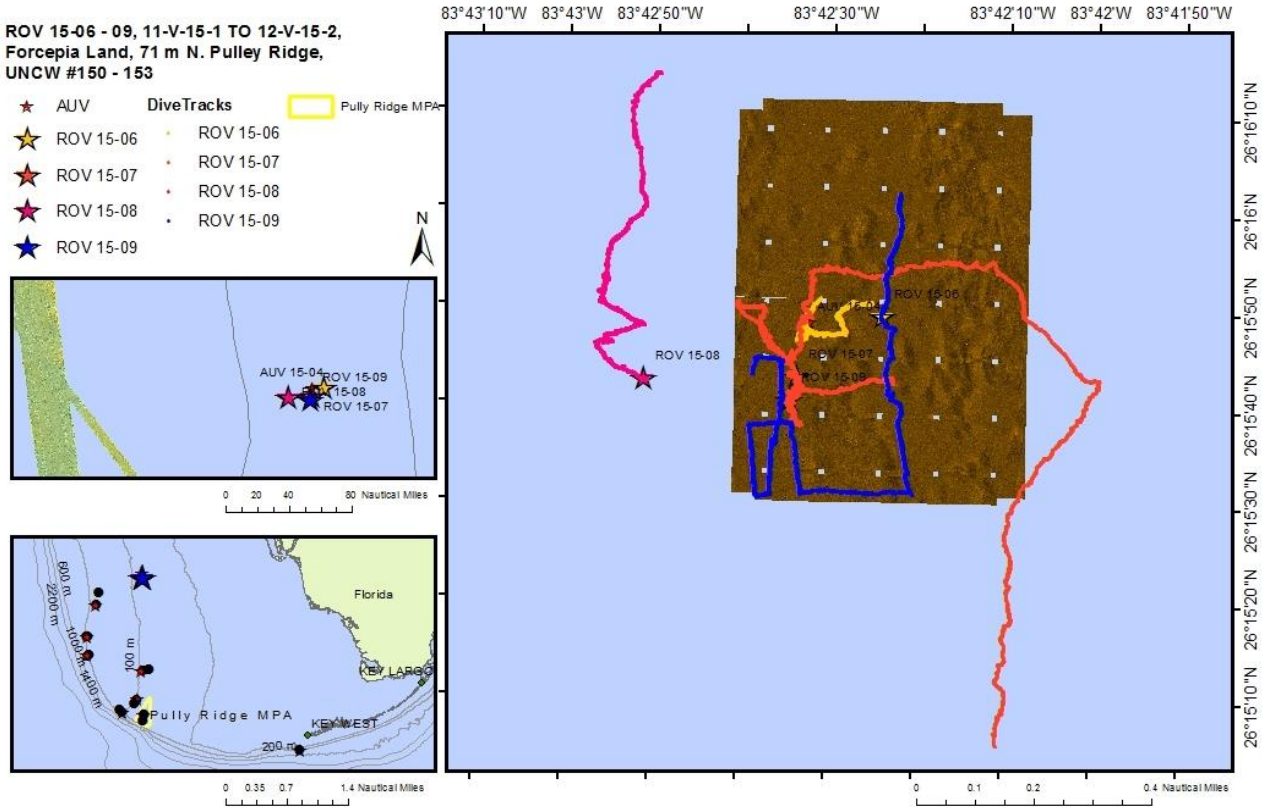
Collected 4 samples: 1- Shrek sponge, 2 other demosponges, 1 Ellisellidae.

Common Species

Fish- blue angelfish - Holacanthus bermudensis, Deepwater squirrelfish - *Sargocentron bullisi*, Greenband wrasse - *Halichoeres bathyphilus*, Jackknife-fish - *Equetus lanceolatus*, lionfish - *Pterois volitans*, Pufferfish - Tetraodontidae, Reef butterflyfish - *Chaetodon sedentarius*, Short Big Eye - *Pristigenys alta*, spotfin butterflyfish - *Chaetodon ocellatus*, spotfin hogfish - Bodianus *pulchellus*, Tattler - *Serranus phoebe*, Yellowtail reeffish - *Chromis enchrysura*,

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P5 to P6, 2 m ledge, 75 m; UNCW ROV 152

General Location and Dive Track:



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Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	None Available
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/12/2015
Specimens:	9
Digital Photos:	190
DVD:	4
Hard Drive:	1

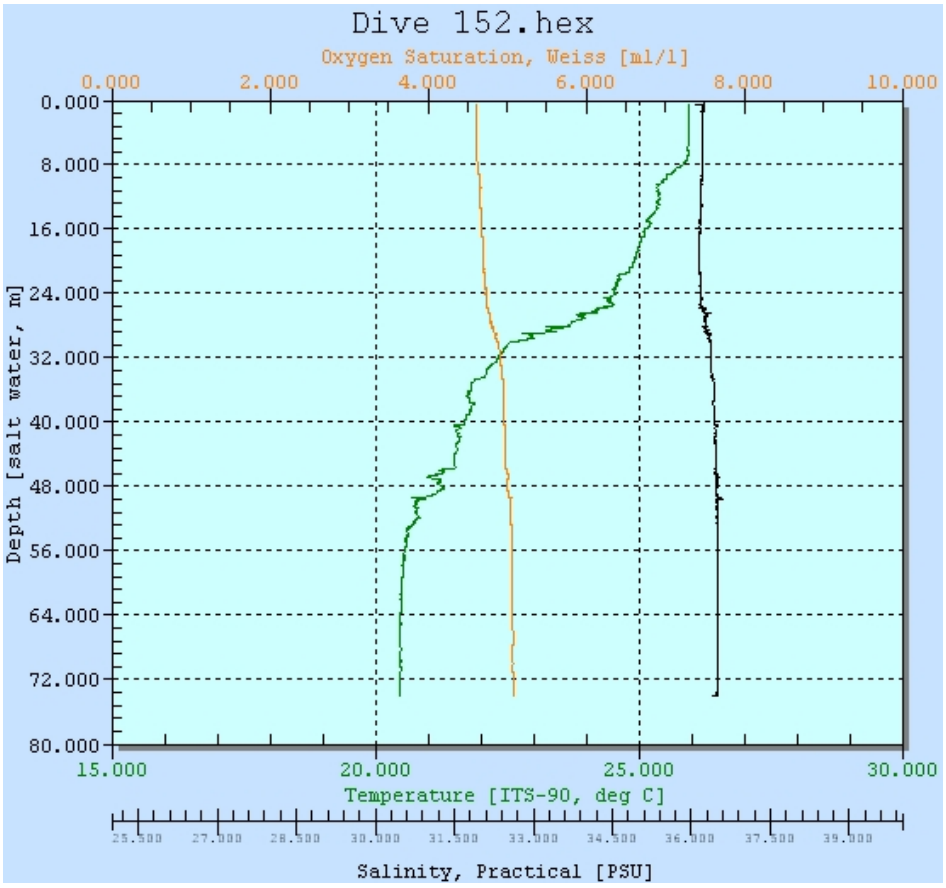
Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P5 to P6, 2 m ledge, 75 m; UNCW ROV 152

Dive Data:

Minimum Bottom Depth (m):	68.2	**Total Transect Length (km):**	1.506
Maximum Bottom Depth (m):	76.2	**Surface Current (kn):**	0.5
On Bottom (Time- GMT):	8:14	**On Bottom (Lat/Long):**	26.26°N; -83.71°W
Off Bottom (Time- GMT):	11:46	**Off Bottom (Lat/Long):**	26.27°N; -83.71°W

Physical (bottom); Temp (°C): **Salinity:** **Visibility (ft):** 30 **Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-08 are as follows: Depth: 68.2-76.2 m, Temperature: 20.4-20.5 °C , Conductivity: 50200-50300 (µS/cm), Pressure: 99.5-111.1 (PSI), Salinity: 36.4-36.5 (PSU), Sound Velocity: 1525.5-1525.9 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1026.1-1026.1 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P5 to P6, 2 m ledge, 75 m; UNCW ROV 152

Dive Imagery:

Figure 1: -76.8 m
Xestospongia creeping sponge

Figure 2: -76.2 m
Didemnidae

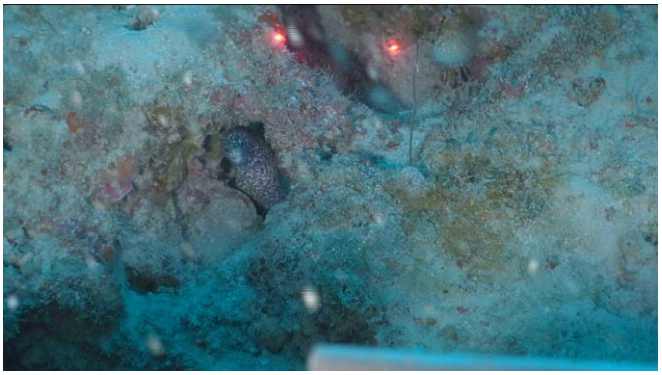


Figure 3: -76.2 m
Eel

Figure 4: -76.9 m
High-hat

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P5 to P6, 2 m ledge, 75 m; UNCW ROV 152

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-08, Site #- 12-V-15-1, Mohawk Dive #152. Target Site: Gulf of Mexico, off SW Florida, Transect from Site P5 toward P6, N-S linear ridge west of Forcepia Land. No multibeam sonar maps or bathymetric maps available. Dive site from previous JSL dive and trawl. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses. Primary objective to collect more Shrek sponge.

ROV Setup/Dive Events: Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: 74.5-76.8 m.

75 m- flat 100% soft bottom, sand, with 70% cover loose Martensia red algae. Diverse and dense small sponges, mostly 5-10 cm diameter, some large 30 cm spherical Astrophorids. Conducted periodic quantitative photo transects during collection dive.

76.2 m- near ledge area; 100% cover hard bottom pavement.

76.0-76.9 m: ledge dropoff, no real ledge but 20o rock slope to west over 5 m width. Slope of ledge eroded with circular solution holes 20-30 cm deep. West of ledge is flat sand. Top of ledge is flat rock pavement with some small holes.

All hard bottom areas and ledge fauna: dense 50 cm Swiftia exerta, Muricea, diverse sponges. Antipathes white fan, Tanacetipathes, Antipathes furcata, lobster, Swiftia exerta, Muricea, Narcissia trigonaria, Astrophorid sponges, hydroids. Lionfish, porgy, green band bass, spotfin butterfly, red grouper 40 cm, scamp, Spanish hogfish, bigeye, reef butterfly, yellowtail reeffish, morays. Lionfish present but not as dense as previous day.

Zigzag north toward Site P-6, from 74-76 m. Hard bottom areas along ridge region, 75.3 m.

East of ridge is flat pavement for short distance then goes to 100% sediment with Martensia, some 5-10 cm rubble, and diverse small sponges. Petrosids, Callyspongia, Astrophorida, Axinellids, Cinachyra, Verongida. 20 cm sand mounds with apical hole- home of blue dart fish; grey triggerfish.

Collected 9 samples: No Shrek sponges found; 1- Hydroida, 1- Martensia algae, 7- Porifera.

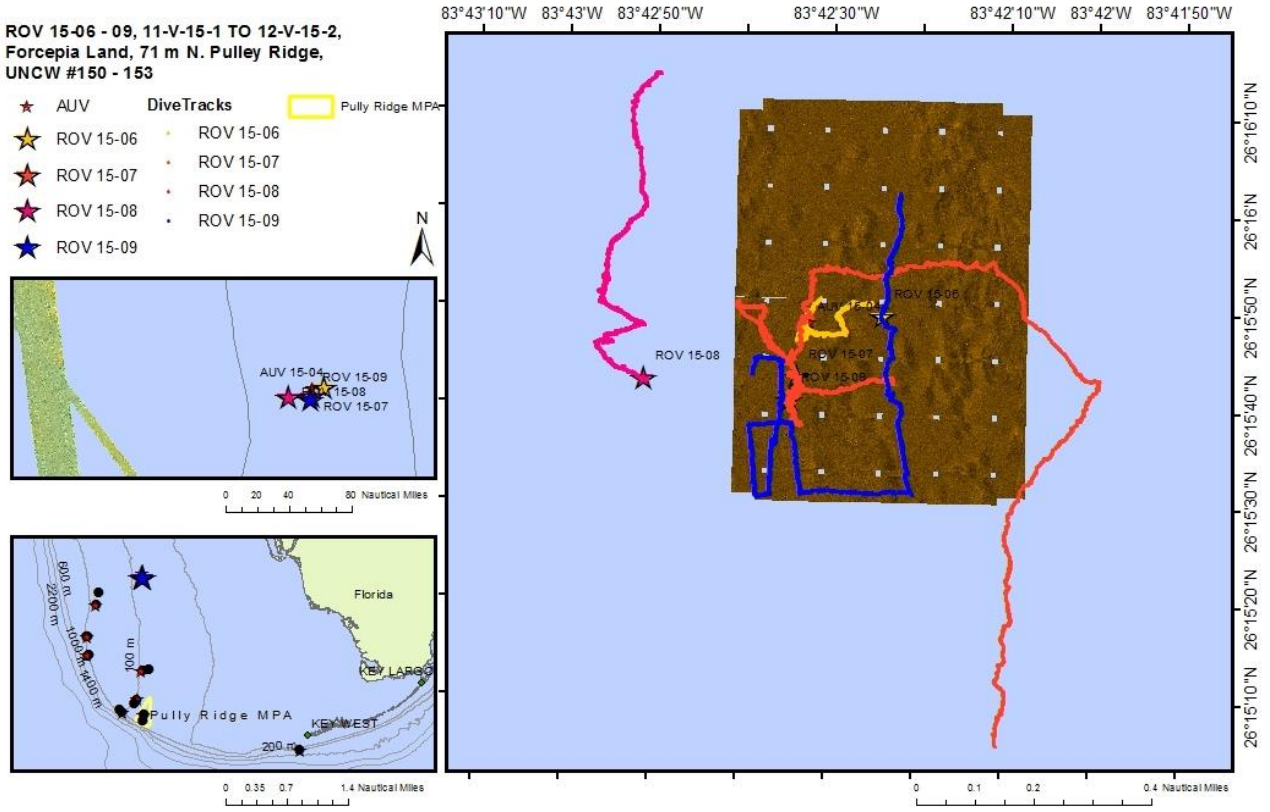
Common Species

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Reed Site P5 to P6, 2 m ledge, 75 m; UNCW ROV 152

Algae- Chlorophyta; *Halimeda* sp., Rhodophyta; *Martensia pavonia*
Cnidaria- Antipatharia; *Antipathes* sp.
Fish- Bigeye - *Priacanthus arenatus*, blue angelfish - *Holacanthus bermudensis*, Goby - Gobiidae, Greater amberjack - *Seriola dumerili*, Greenband wrasse - *Halichoeres bathyphilus*, lionfish - *Pterois volitans*, porgy - *Calamus* sp., Red grouper - *Epinephelus morio*, Reef butterflyfish - *Chaetodon sedentarius*, sharpnose puffer - *Canthigaster rostrata*, Short Big Eye - *Pristigenys alta*, spotfin butterflyfish - *Chaetodon ocellatus*, spotfin hogfish - *Bodianus pulchellus*, Squirrelfish - *Holocentrus adscensionis*, sunshine fish - *Chromis insolata*, Tattler - *Serranus phoebe*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*
Porifera- Demospongiae

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Shrek Site, Reed Site P2, 75m; UNCW ROV Dive 153

General Location and Dive Track:



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Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

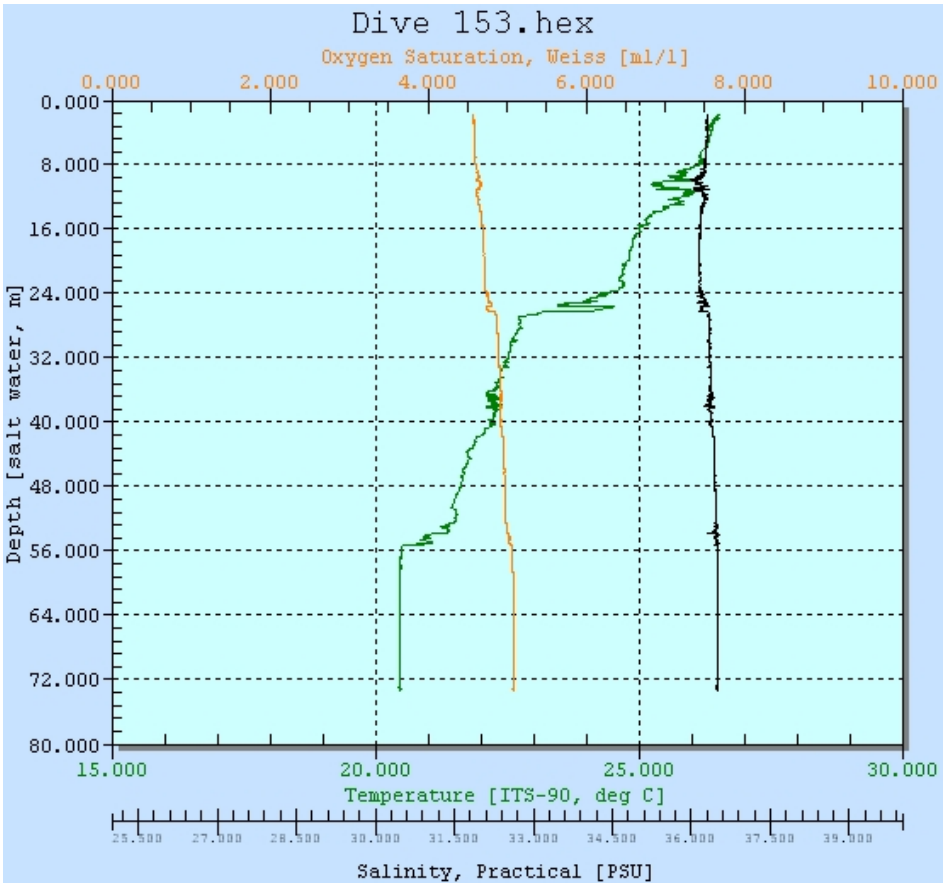
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-03
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/12/2015
Specimens:	1
Digital Photos:	71
DVD:	3
Hard Drive:	2

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Shrek Site, Reed Site P2, 75m; UNCW ROV Dive 153

Dive Data:

Minimum Bottom Depth (m):	66.6	**Total Transect Length (km):**	2.501
Maximum Bottom Depth (m):	74.1	**Surface Current (kn):**	0.6
On Bottom (Time- GMT):	13:34	**On Bottom (Lat/Long):**	26.26°N; -83.71°W
Off Bottom (Time- GMT):	17:15	**Off Bottom (Lat/Long):**	26.27°N; -83.71°W
Physical (bottom); Temp (°C):	20.45	**Salinity:** 36.49 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-09 are as follows: Depth: 66.6-74.1 m, Temperature: 20.4-20.5 °C , Conductivity: 50200-50300 (µS/cm), Pressure: 97.1-108.1 (PSI), Salinity: 36.4-36.5 (PSU), Sound Velocity: 1525.5-1525.7 (m/s), Oxygen Saturation: 5.1-5.1 (ml/l), Density: 1026.1-1026.1 (Kg/m^3), Nitrogen Saturation: 9.3-9.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Shrek Site, Reed Site P2, 75m; UNCW ROV Dive 153

Dive Imagery:

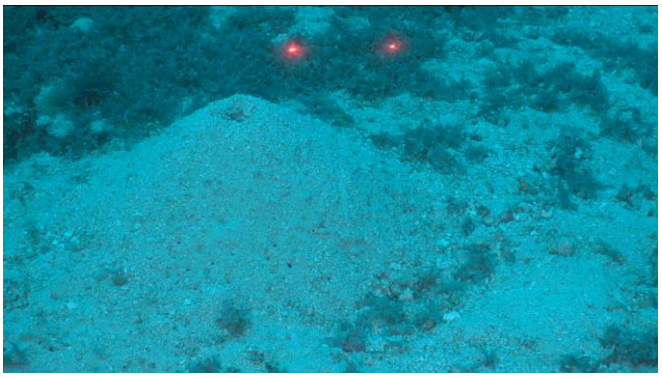


Figure 1: -73.8 m
Volcano from fish

Figure 2: -73.2 m
Eels

Figure 3: -73.1 m
Orange tube sponge

Figure 4: -73.2 m
Scorpionfish

Dive Site: Gulf of Mexico, North Pulley Ridge, Forcepia Land, Shrek Site, Reed Site P2, 75m; UNCW ROV Dive 153

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-09, Site #- 12-V-15-2, Mohawk Dive #153. Target Site: Gulf of Mexico, off SW Florida, Site P2, started at Shrek Sponge site, Forcepia Land. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses. Primary objective to collect more Shrek sponge.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: 73.2-74.8 m.

Mostly tried to stay around 74 to 74.5 m depth within 100% sediment with dense Martensia, as this was the habitat where collected Shrek sponge on previous dive ROV 15-7. Went over much of the SSS map, and found none. Same biota on soft bottom as previous dive. Very diverse and dense small sponges of 5-10 cm, 30 cm Astrophorids common. Few fish. No ledges and sparse, small patches of hard bottom.

SSS ground truth- crossed large dark feature- 100% soft bottom, little or no Martensia and very barren. When went out of this feature into the bare featureless area of SSS, the only change was to 100% soft bottom with 30-80% cover of Martensia.

Collected 1 sample- 1- Porifera. No Shrek sponges seen, crossed directed over and all around where found one on ROV 15-6 and also over JSL dive in 1999 where found first Shrek sponge.

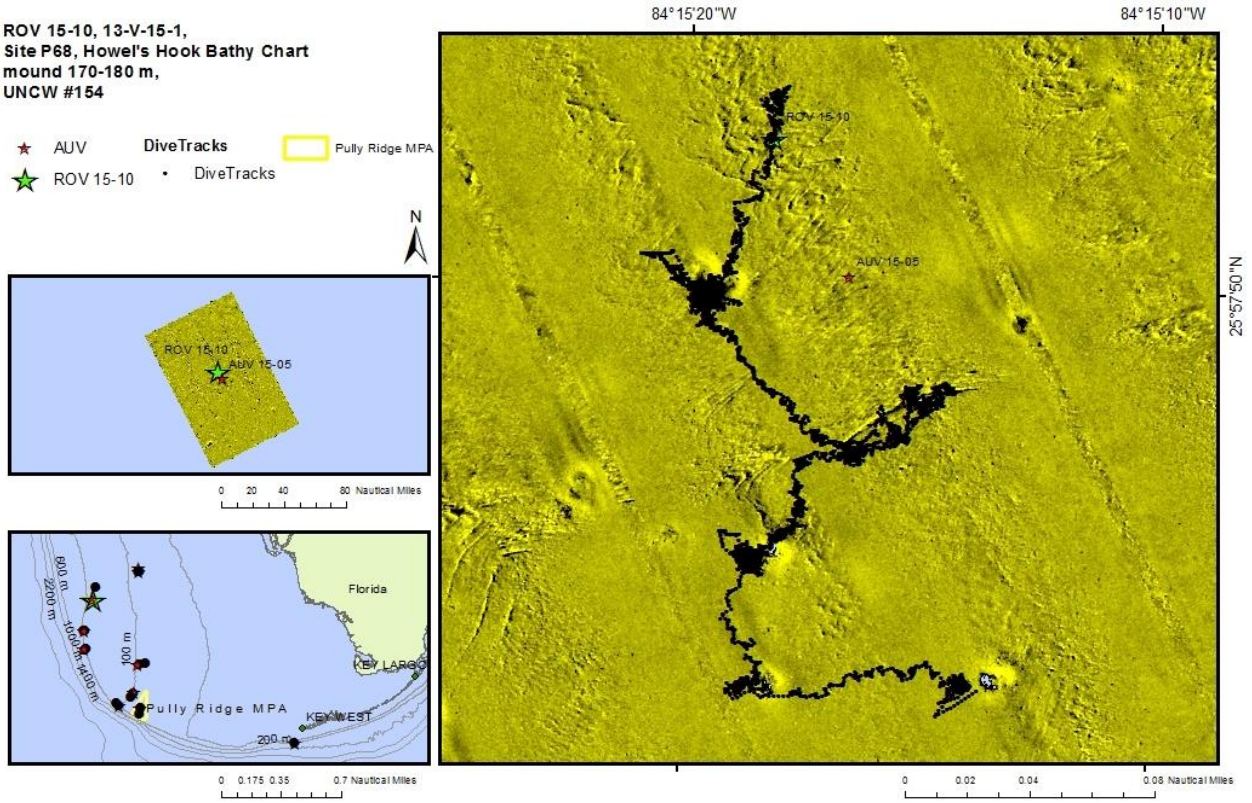
Common Species

Fish- Blue dartfish - *Ptereleotris calliura*, Goby - Gobiidae, Greenband wrasse - *Halichoeres bathyphilus*, lionfish - *Pterois* volitans, Pufferfish - Tetraodontidae, spotfin hogfish - *Bodianus pulchellus*, Squirrelfish - *Holocentrus adscensionis*, Tattler - *Serranus phoebe*, twospot cardinalfish - *Apogon pseudomaculatus*, Yellowtail reeffish - Chromis enchrysura,

Porifera- Demospongiae; *Verongida* sp.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P68, Howell's Hook mound, 170-180 m; UNCW ROV Dive 154

General Location and Dive Track:



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Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

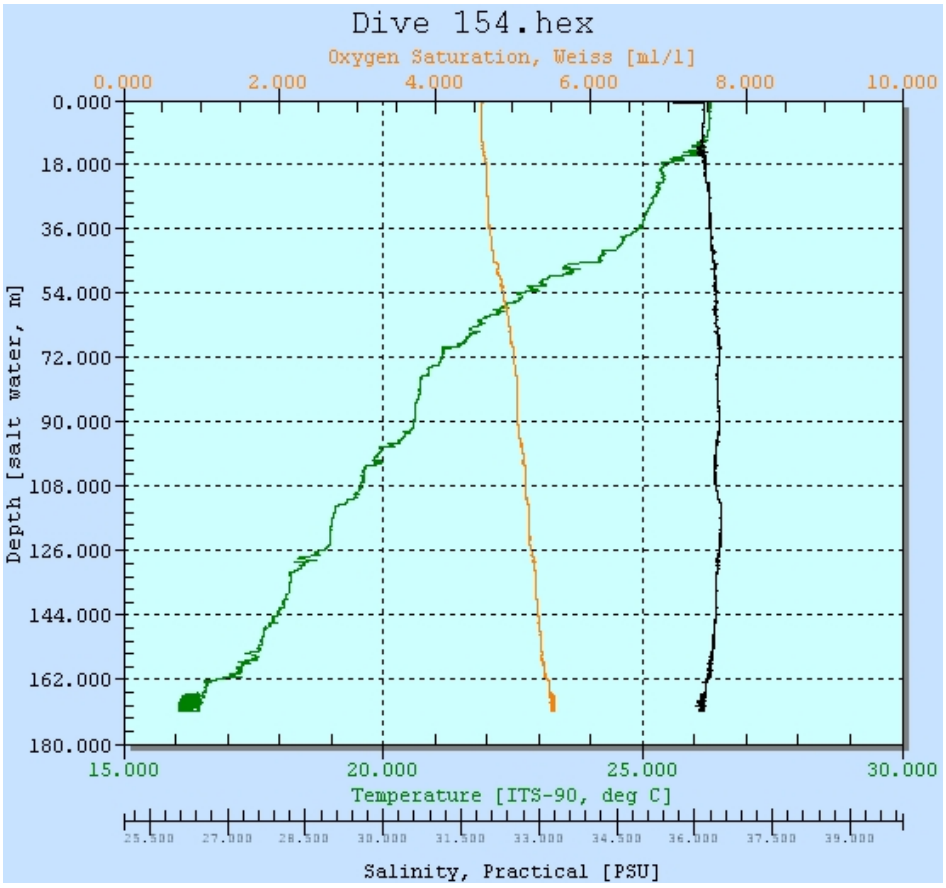
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-05
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/13/2015
Specimens:	7
Digital Photos:	156
DVD:	4
Hard Drive:	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P68, Howell's Hook mound, 170-180 m; UNCW ROV Dive 154

Dive Data:

Minimum Bottom Depth (m):	164.1	**Total Transect Length (km):**	1.185
Maximum Bottom Depth (m):	170.8	**Surface Current (kn):**	0.1
On Bottom (Time- GMT):	8:18	**On Bottom (Lat/Long):**	25.96°N; -84.25°W
Off Bottom (Time- GMT):	11:42	**Off Bottom (Lat/Long):**	25.96°N; -84.25°W
Physical (bottom); Temp (°C):	16.13	**Salinity:** 36.12 **Visibility (ft):** 15	**Current (kn):** 0.1

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-10 are as follows: Depth: 164.1-170.8 m, Temperature: 15.6-16.5 °C , Conductivity: 44000-45800 (µS/cm), Pressure: 239.4-249.2 (PSI), Salinity: 35.4-36.2 (PSU), Sound Velocity: 1511.7-1515.4 (m/s), Oxygen Saturation: 5.5-5.6 (ml/l), Density: 1026.8-1027.4 (Kg/m^3), Nitrogen Saturation: 10-10.2 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P68, Howell's Hook mound, 170-180 m; UNCW ROV Dive 154

Dive Imagery:

Figure 1: -170.5 m
Fish

Figure 2: -170.4 m
Speckled hind

Figure 3: -170.6 m
Anthiids

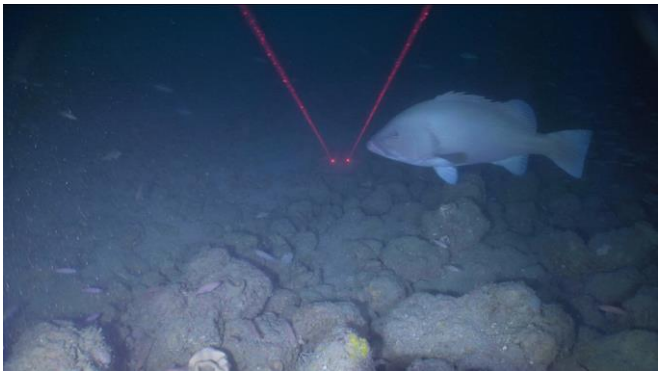


Figure 4: -168.9 m
Speckled hind

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P68, Howell's Hook mound, 170-180 m; UNCW ROV Dive 154

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-10, Site #- 13-V-15-1, Mohawk Dive #154. Target Site: Gulf of Mexico, off SW Florida, NOAA Howell Hook Bathymetric Chart Mound. Ground truth AUV SSS from previous night. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: NE corner of SSS map, at base of NOAA map, 181 m. ROV dive: 172.5 to 167.5 m; conducted in SW quadrant of map.

172.5 m- on bottom near center of map. Flat, 100% soft bottom, very silty sand, barren. Oh-oh.
Tatler fish, Parthenope crab, and few Crinometra brittlestars on sparse small rock rubble, few 20-50 cm pits.
SSS WP- pair of 8 m diameter (15 m across both) pits, about ½-1 m deep. 170.3 m at top edge, 170.7 m at bottom. Grouper burrow, rock outcrops on sides and bottom, very rugged eroded limestone, 30-50 cm ledges or outcrops. Dense cover of 10-20 cm cobble/boulders, rounded rock piled up between the pits. Two large (estimated with laser at 75 and 70 cm TL) speckled hind (NOAA Fisheries Critically Endangered Species). Biota: rocks; fairly barren, but sponges common- 5-10 cm stalked cups and plate sponges (Corallistidae); Crinometra brittlestar dense on cobble on upper rim; Junonia gastropod; Perotrochus amabilis slit shell; Madracis myriaster coral (white, 8 cm). Roughtongue bass (anthiids), red barbier, scorpion fish, 2 speckled hind.
SSS WP- chevron feature. Nothing there. West end 169 m; transected along apparent feature of map. Only found a few apparent blueline tilefish burrows- 30-100 m diameter, 10-20 cm deep, and few had vertical shaft like tilefish burrow, but non observed. No evidence of anything or depth change to make the chevron. One burrow- 50 cm, with 10 cm shaft. One pit, 1 m diameter with 5-10 cm cobble in bottom. Biota- Conolampus? Sea urchin, spherical with flat bottom, looks bare of spines.
SSS WP- 50 m long low relief mound or ridge below center of map and 10 m diameter pit near base. Top of ridge, 168.6 m, 100% soft sediment; base of feature 168.3 m (so really top of it?).
SSS WP- 168.3 m, Grouper pit, ~8 m diameter. Same pit structure as previous. 20 cm cobble around top edge. Biota: Two large speckled hind (60-75 cm TL), Anthiids, Chaetodon aya, cardinal soldierfish or bigeye

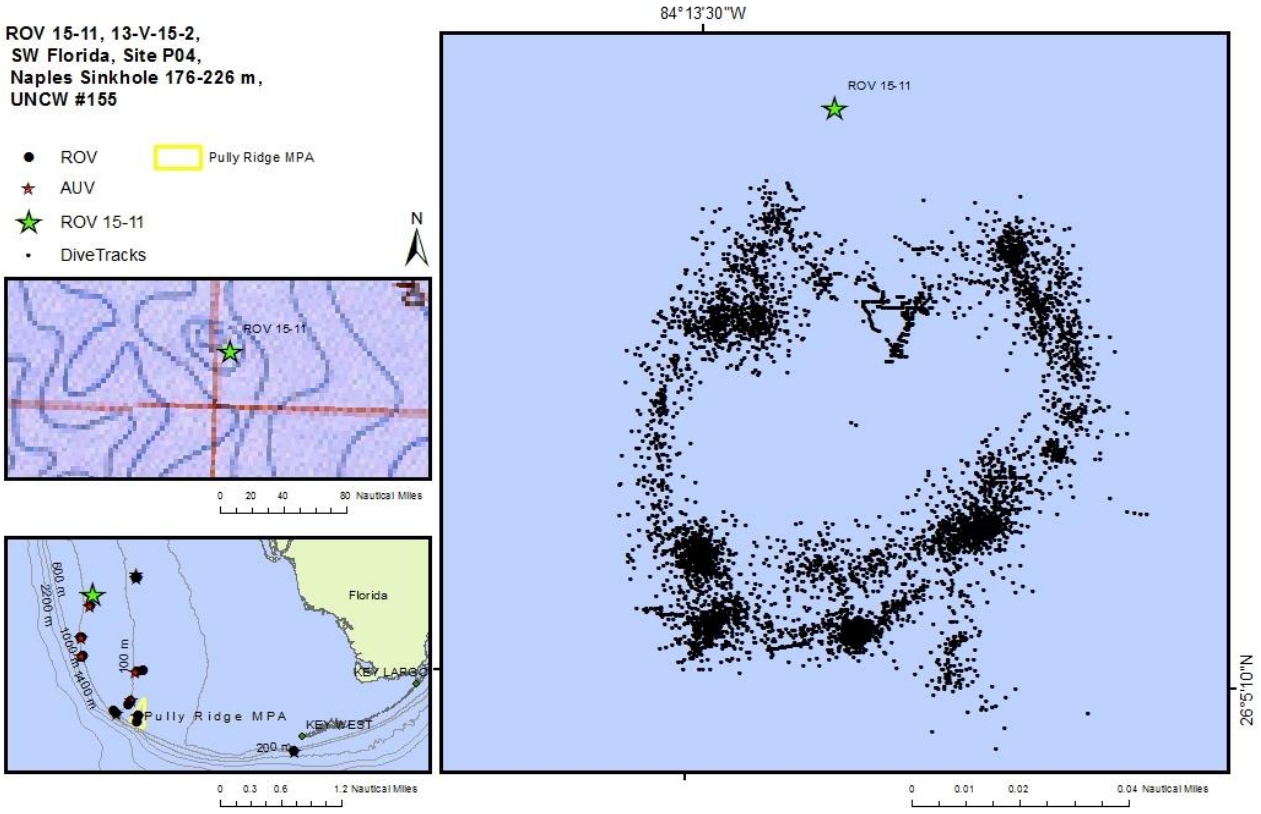
soldier. Sponges- Leiodermatium sponges, Corallistidae cup and plate sponges. No coral, octocorals or black coral.
Transect to third grouper pit 72 m south.
SSS WP- 168.6 m, grouper pit, 7.5 m diameter. Same structure as previous. Biota- same sponges. Fish- 60 cm speckled hind.
Transect east 138 m to next grouper pit.
SSS WP- 168.5 m base of pit, 167.5 m top rim, 12 m diameter. Same structure, but larger and more exposed rock ledges to ½ m, very eroded rugged rock. Fish- 60 cm speckled hind, blueline tilefish in rock hole, anthiids.

Collected 6 samples: 2 Crinometra (light orange; dark purple), 1- conglomerate rock cobble (from grouper pit), 1- Madracis myriaster, 2 Porifera- Leiodermatium.

Common Species
Cnidaria- Octocorallia;
Fish- Bank butterflyfish - *Chaetodon* (*Prognathodes*) *aya*, Lizardfish - *Synodus* sp., Red barbier - *Hemanthias vivanus*, Roughtongue bass - *Pronotogrammus martinicensis*, Saddle bass - *Serranus notospilus*, Scorpionfish - Scorpaenidae, soldierfish - Holocentridae, speckled hind - *Epinephelus drummondhayi*, Wrasse bass - *Liopropoma eukrines*
Porifera- Demospongiae; *Corallistes* sp.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P4, Naples Sinkhole, 176-226 m; UNCW ROV Dive 155

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

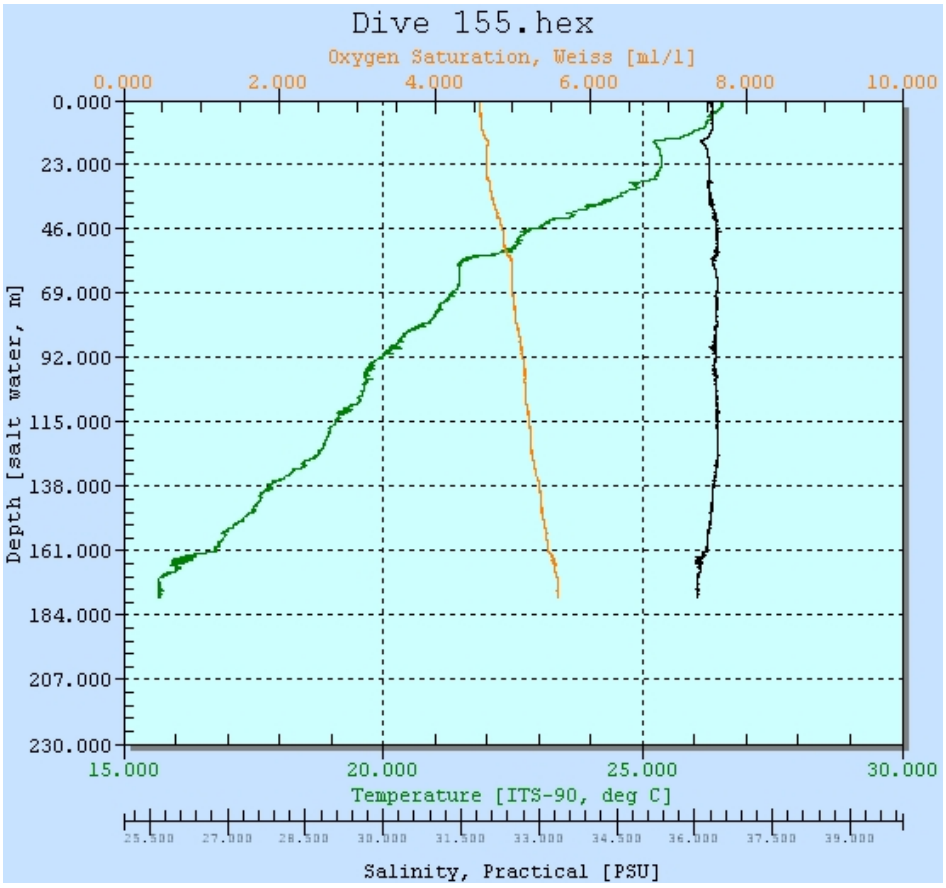
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	None Available
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/13/2015
Specimens:	8
Digital Photos:	113
DVD:	4
Hard Drive:	2

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P4, Naples Sinkhole, 176-226 m; UNCW ROV Dive 155

Dive Data:

Minimum Bottom Depth (m):	170.1	**Total Transect Length (km):**	1.497
Maximum Bottom Depth (m):	221.7	**Surface Current (kn):**	0.4
On Bottom (Time- GMT):	13:33	**On Bottom (Lat/Long):**	26.09°N; -84.22°W
Off Bottom (Time- GMT):	17:27	**Off Bottom (Lat/Long):**	26.09°N; -84.22°W
Physical (bottom); Temp (°C):	15.68	**Salinity:** 36.06 **Visibility (ft):**	**Current (kn):** 0.1

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-11 are as follows: Depth: 170.1-221.7 m, Temperature: 15.7-15.9 °C , Conductivity: 44800-45100 (µS/cm), Pressure: 248.2-323.5 (PSI), Salinity: 36-36.1 (PSU), Sound Velocity: 1512.9-1513.8 (m/s), Oxygen Saturation: 5.6-5.6 (ml/l), Density: 1027.4-1027.6 (Kg/m^3), Nitrogen Saturation: 10.1-10.2 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P4, Naples Sinkhole, 176-226 m; UNCW ROV Dive 155

Dive Imagery:

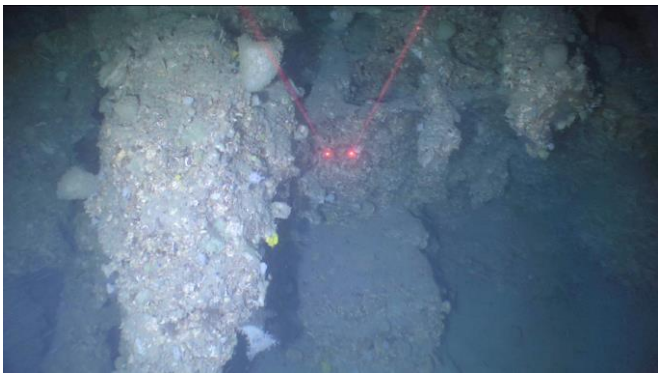


Figure 1: -197.6 m
Wall of the sinkhole

Figure 2: -193.9 m
Phycallia sp. sponge

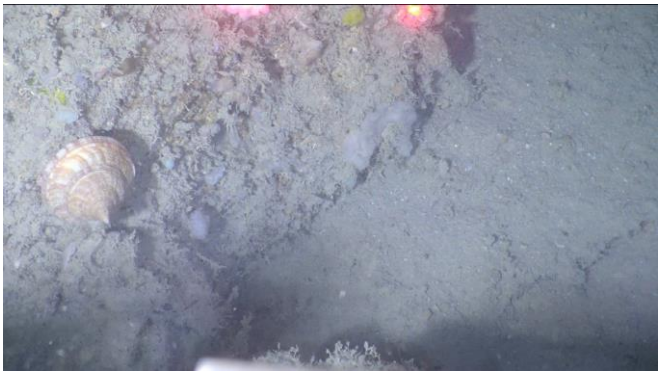


Figure 3: -179.5 m
Slit shell

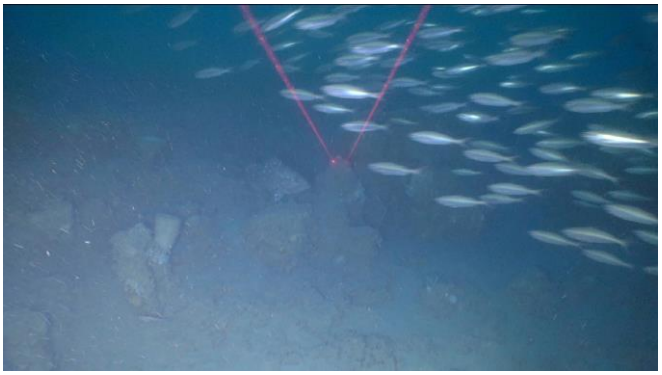


Figure 4: -177.6 m
School of fish

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P4, Naples Sinkhole, 176-226 m; UNCW ROV Dive 155

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-11, Site #- 13-V-15-2, Mohawk Dive #155. Target Site: Gulf of Mexico, off SW Florida, Naples Sinkhole. Naples Sinkhole- coordinates from previous JSL cruise: South rim- 26o 05.182'N, 84o13.462'W, 575 ft; North rim- 26o 05.273'N, 84o 13.461'W, 585 ft. Maximum relief- 176-226 m. No AUV or MB data. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat

Depth range: 175.7 m south top rim, 223 m base at south side.

175.6 m- Top edge of sinkhole at south rim. Flat pavement with sediment veneer on top. Boulder field extends about 10-20 m from rim. Boulders and rugged rock outcrops along the top rim, 20-30 cm relief, flat pavement between.
At end of dive ran a photo transect along top edge from south rim to west rim; 180.4 m start, 179 m end; 56 photos in 10 minutes.
Majority of dive collectiond and video of wall. Started at top of south rim, worked down wall to base, and up SW and W wall up to north rim top, then circumnavigated along upper rim from N rim, east side and back to starting point on south rim.

South Rim, south wall to base: Top of S rim 175.7 m. 20-50% cover of 20-30 cm rugged rock outcrops and boulders along top edge.
176.9 m- 100 ft south of rim on top- flat pavement with sediment, barren, some Holothuria lentigenosa enodis sea cucumber. At rim edge, vertical rugged escarpment then narrow shelf at 179 m. Rugged vertical to180.5 m then another shelf. Vertical at 183 to 186, then undercut and very eroded. 195 m- vertical, very eroded, undercut 1-2 m. 195-206 m- fairly smooth rock 70-90o slope. 206 m- vertical, eroded, rugged. 206-215 m- smooth 90o rock. 215-223 m- vertical rugged, eroded. 223 m- base of S wall; flat sediment.
Transect back up wall, up SW face. 187m- shelf and eroded vertical. 178 m top north rim.
East rim and upper wall- Similar as west and south rim. Series of shelves and vertical rugged escarpments.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P4, Naples Sinkhole, 176-226 m; UNCW ROV Dive 155

Biota: similar at all areas and depths. Probably more density on upper slope and rim edge. Fish much more abundant along top rim and upper slope. Sponges- Leiodermatium common, 10-20 cm; Corallistidae cups and plates abundant; various other demosponges, spherical yellow, blue and yellow encrusting- Hymedesmia?, Iophyton Hexactinellid- abundant (4 cm to 25 cm).
Crinometra- abundant; Octocorallia- uncommon, 15 cm white sparseless branched; Stylocidaris urchins; Holothuria lentigenosa sea cucumber; Perotrochus amabilis slit shell.

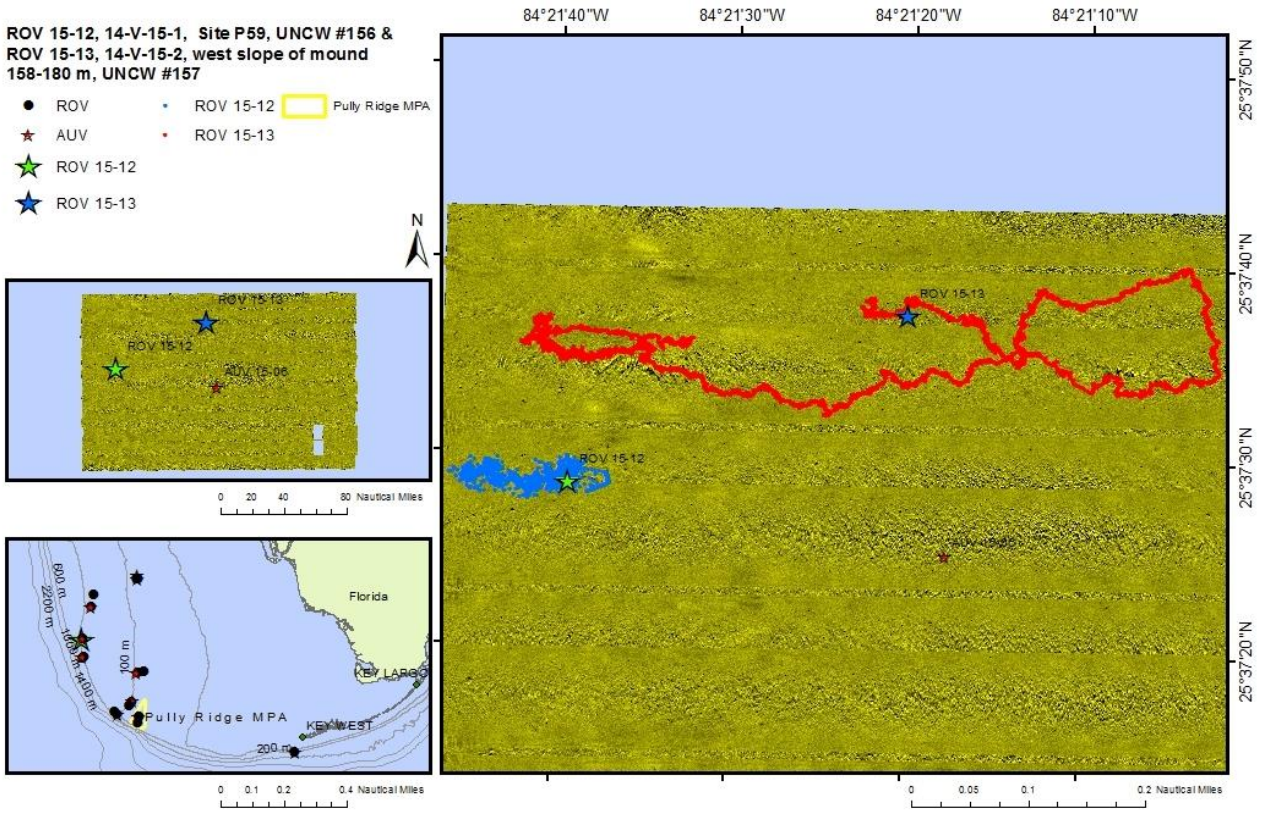
Fish- Speckled hind- several (50+ cm), snowy grouper- most common (20-30??), scamp- few, roughtongue and red barbier, scorpion fish (some 30 cm, not black belly), Chaetodon aya, yellowfin basslet, 1 m warsaw? (Melissa P. thinks not), red queen snapper- numerous (30-40 cm), snipefish, black bar drum, 10- 30 cm scorpion fish.

Collected 8 samples: 1 Perotrochus amabilis, 7 Porifera- Leiodermatium, Iophyton, other demosponges.

<u>Common Species</u>
Echinodermata- Holothuroidea; Holothuria lentiginosa enodis
Fish- Anthiinae, Grouper - Epinephelinae, Queen snapper - *Etelis oculatus*, Red barbier - *Hemanthias vivanus*, Red hogfish - *Decodon puellaris*, Roughtongue bass - *Pronotogrammus martinicensis*, Scamp - *Mycteroperca phenax*, Scorpionfish - Scorpaenidae, Snowy Grouper - *Epinephelus niveatus*, soldierfish - Holocentridae, speckled hind - *Epinephelus drummondhayi*, Wrasse bass - *Liopropoma eukrines*, Yellowfin bass - *Anthias nicholsi*
Porifera- Hexactinellida;

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 175 m; UNCW ROV Dive 156

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

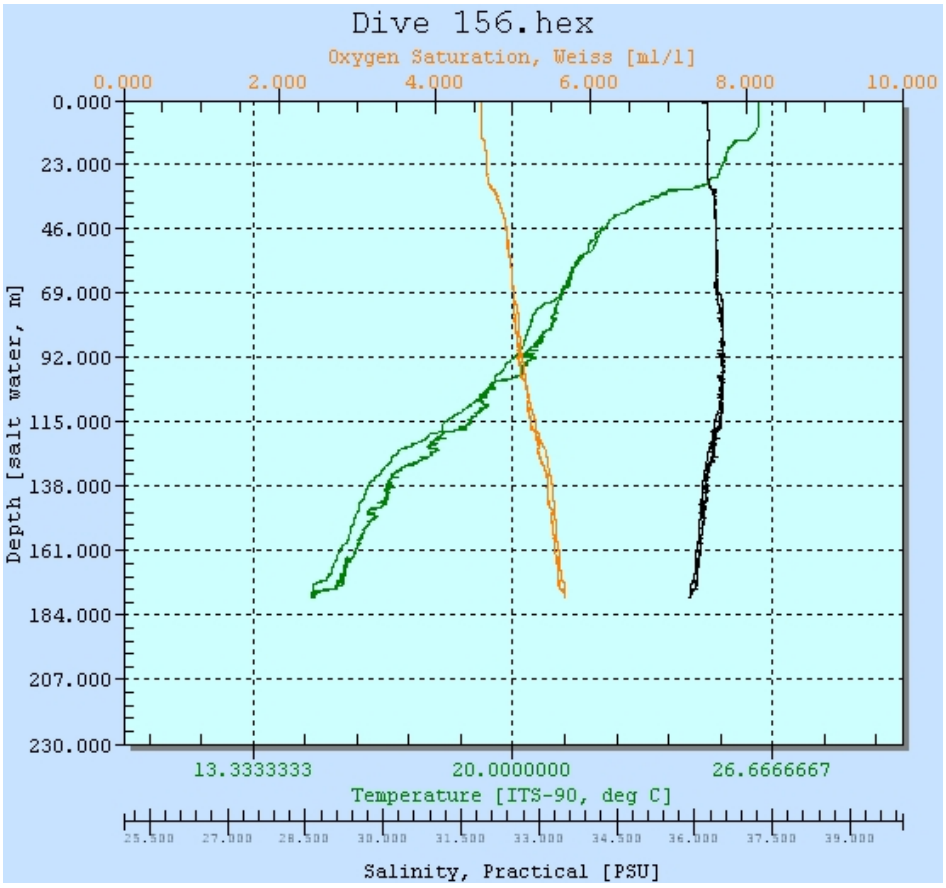
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-06
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/14/2015
Specimens:	3
Digital Photos:	150
DVD:	2
Hard Drive:	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 175 m; UNCW ROV Dive 156

Dive Data:

Minimum Bottom Depth (m):	163.2	**Total Transect Length (km):**	0.888
Maximum Bottom Depth (m):	177.7	**Surface Current (kn):**	0.2
On Bottom (Time- GMT):	8:25	**On Bottom (Lat/Long):**	25.62°N; -84.36°W
Off Bottom (Time- GMT):	9:37	**Off Bottom (Lat/Long):**	25.62°N; -84.36°W
Physical (bottom); Temp (°C):	15.48	**Salinity:** 36.03 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-12 are as follows: Depth: 163.2-177.7 m, Temperature: 14.8-15.8 °C , Conductivity: 43800-44900 (µS/cm), Pressure: 238.2-259.2 (PSI), Salinity: 35.9-36.1 (PSU), Sound Velocity: 1510.2-1513 (m/s), Oxygen Saturation: 5.6-5.7 (ml/l), Density: 1027.4-1027.5 (Kg/m^3), Nitrogen Saturation: 10.2-10.3 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 175 m; UNCW ROV Dive 156

Dive Imagery:

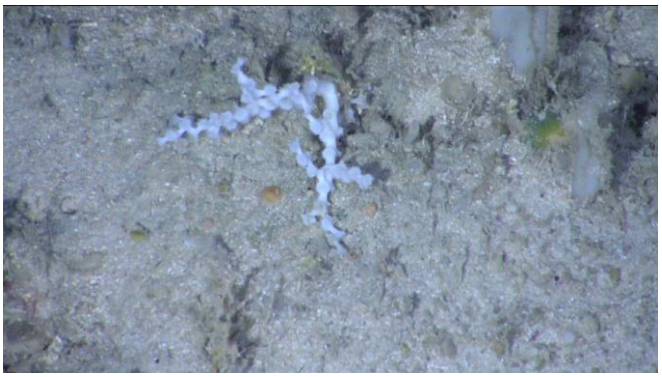


Figure 1: -174.9 m
Madrepora sp.

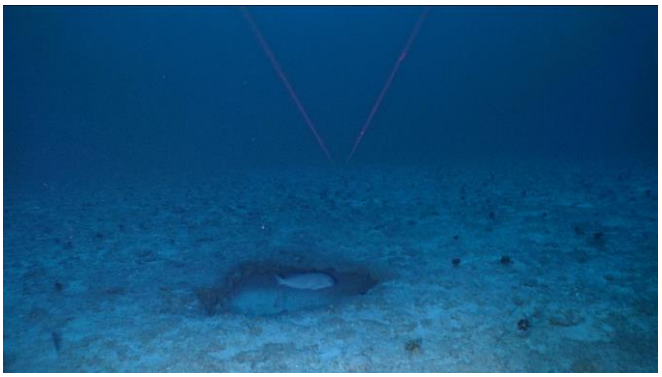


Figure 2: -174.8 m
Tilefish under ledge

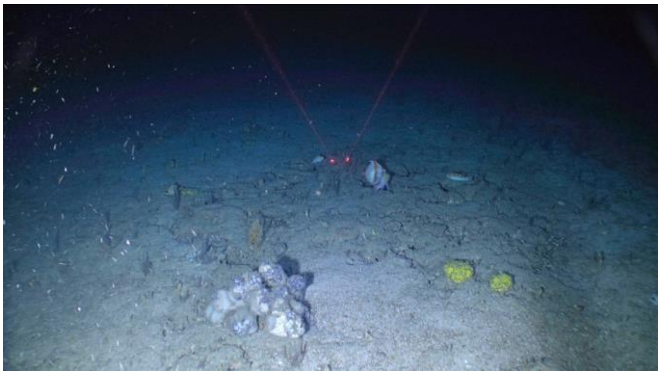


Figure 3: -176.1 m
Bore fish

Figure 4: -177.9 m
Tilefish

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 175 m; UNCW ROV Dive 156

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-12, Site #- 14-V-15-1, Mohawk Dive #156. Target Site: Gulf of Mexico, off SW Florida, Site P-59, west slope of mound. NOAA Bathymetric Chart Howell Hook, oval mound oriented N-S. Previous AUV SSS map of dive site on west slope of mound. Ground truth SSS map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Dive was aborted after 1 hour due to manipulator broke a bolt on the shoulder joint making it inoperable. This was fixed in a couple hours by the fantastic ship and ROV crew.

Site Description/Habitat

Depth range: 174.5- 178.7 m. Dived at NW corner of map, on lower slope of west slope of mound. Bottom habitat in this small area was 100% hard bottom, rock pavement, with some small 10 cm cobble, and coarse sand and rubble on the rock pavement. The biota was dense and diverse for a deep site.

SSS WP- 3 m diameter pit on the side scan. Depth 176, was actually a 1 m diameter pit, scoured in rock pavement, with 25 cm relief rock ledge along edges. Biota: very little macrobenthic fauna arouind the pit, but lots of fish. Boarfish, red hogfish, large red fish (some kind of snapper), long tail bass (Hemanthias leptpos?).

SSS- Shows 3 m pit. Actual- 178 m, 2 m diameter pit in 100% rock pavement, ½ m relief and ledges along ledge. 50 cm blueline tilefish, long tail bass, boarfish.

SSS- Irregular shaped 3 m pit. Actual- 178.7 m, 2 ½ m diameter pit, 20 cm hole. Rough tongue bass, Chaetodon aya, soldierfish, red hogfish, moray eel, Mithrax crab eating Pyrosoma.

1-2 m pits were every 25-100 m.

In between pits was flat pavement with following biota:

Sponges- vase Astrophorida, thick plate and irregular Astrophorida, various species of Hexactinellida, Corallistes cup and plates, Spongosorites siliquaria? (yellow cake, with Sililquaria mollusks).

Coral- Madrepora oculata (5-10 cm) common; black coral – at least 4 species abundant- Tanacetipathes tanecetum (coon tail, single stalk), Elatophathes abienta (bushy yellow-green), Tanacetipathes barbadensis

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 175 m; UNCW ROV Dive 156

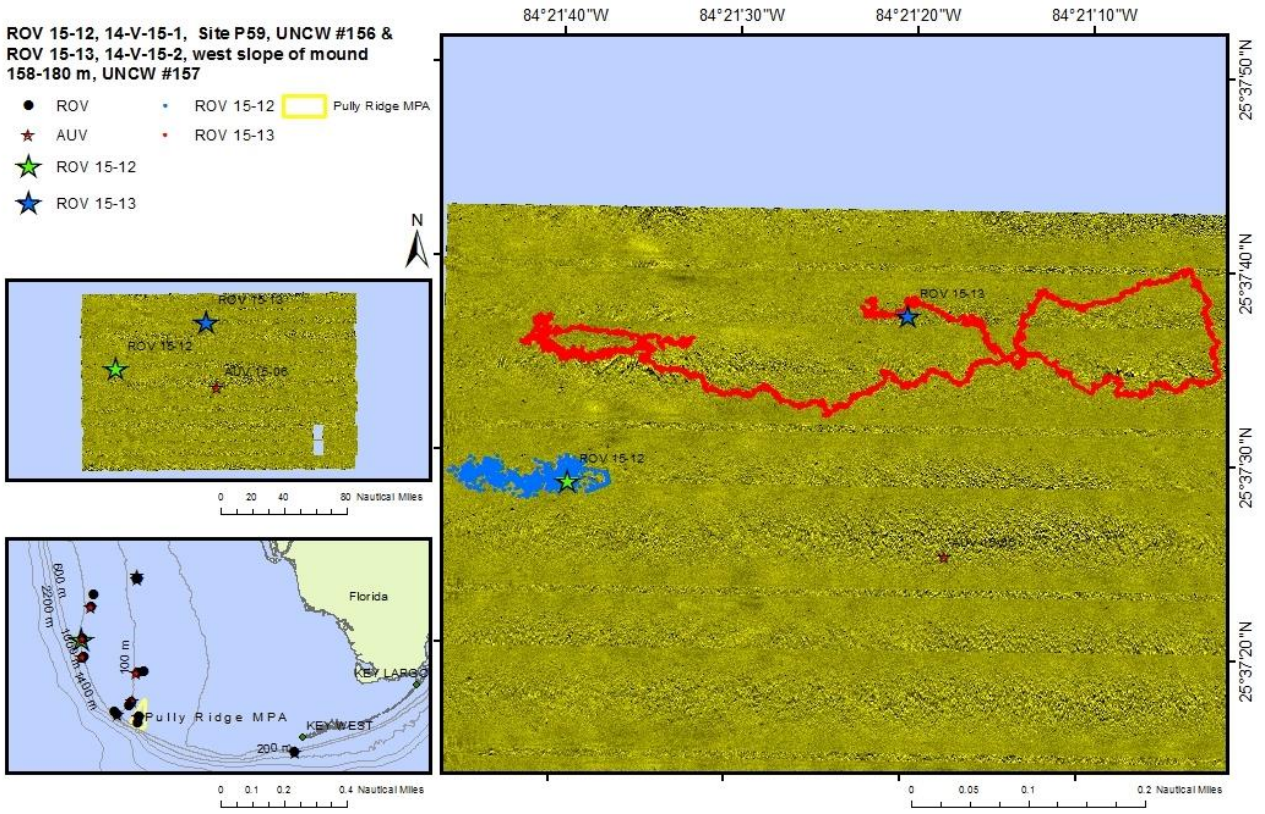
(bushy white or grey), and Antipathes sp. mesh fan, 30 cm; Octocorals- Nicella guadalupensis common; Stylaster, pink fan S. filograneus? Purple crustose coralline algae on rock.
Other species- Crinometra (color morphs- brown, stripped brown/white, yellow), 30 cm Mithrax spider crabs, numerous hermit crabs.

Collected 2 samples: 1- Octocoral- Nicella guadalupensis, 1- Astrophorid.

Common Species
Fish- Deepbody boarfish - *Antigonia capros*, Red hogfish - *Decodon puellaris*, Roughtongue bass - *Pronotogrammus martinicensis*, Scorpionfish - Scorpaenidae

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 158-180 m; UNCW ROV Dive 157

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

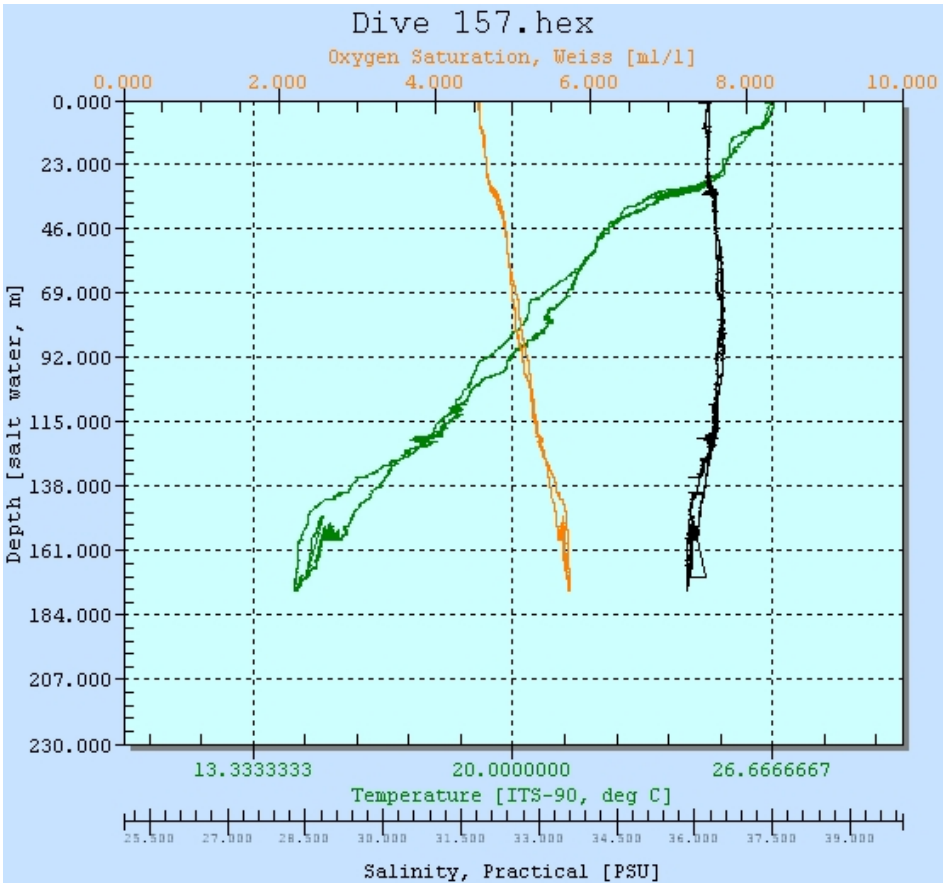
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-06
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/14/2015
Specimens:	8
Digital Photos:	187
DVD:	5
Hard Drive:	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 158-180 m; UNCW ROV Dive 157

Dive Data:

Minimum Bottom Depth (m):	148.4	**Total Transect Length (km):**	2.555
Maximum Bottom Depth (m):	175	**Surface Current (kn):**	0.3
On Bottom (Time- GMT):	13:00	**On Bottom (Lat/Long):**	25.62°N; -84.36°W
Off Bottom (Time- GMT):	17:39	**Off Bottom (Lat/Long):**	25.58°N; -84.36°W
Physical (bottom); Temp (°C):	15.26	**Salinity:** 35.98 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-13 are as follows: Depth: 148.4-175 m, Temperature: 14.4-15.5 °C , Conductivity: 43300-44700 (µS/cm), Pressure: 216.5-255.4 (PSI), Salinity: 35.8-36 (PSU), Sound Velocity: 1508.6-1512.2 (m/s), Oxygen Saturation: 5.6-5.7 (ml/l), Density: 1027.3-1027.5 (Kg/m^3), Nitrogen Saturation: 10.2-10.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 158-180 m; UNCW ROV Dive 157

Dive Imagery:

Figure 1: -158.6 m
Pit in pavement

Figure 2: -158.2 m
Mithrax crab

Figure 3: -157.8 m
Blueline, golden tilefishes and grouper

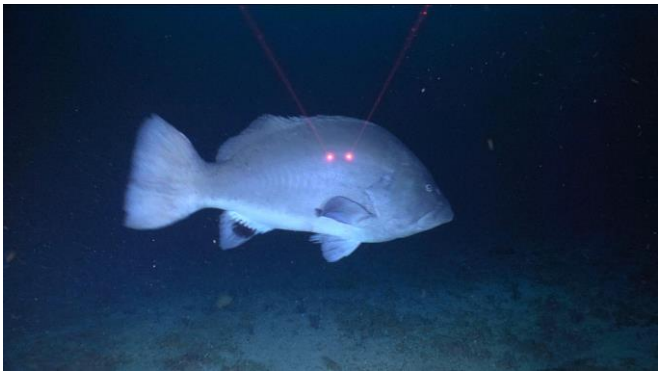


Figure 4: -174 m
Grouper

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 158-180 m; UNCW ROV Dive 157

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-13, Site #- 14-V-15-2, Mohawk Dive #157. Target Site: Gulf of Mexico, off SW Florida, Site P-59. Same site as dive 15-12. NOAA Bathymetric Chart Howell Hook, oval mound oriented N-S. Previous AUV SSS map of dive site on west slope of mound. Ground truth SSS map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat:

Depth range: 156.6-176.2 m. Transected almost length of map, starting near middle, headed up slope to east end, then made fast photo transect the length of the map (~1600 m to base of west slope of mound). Bottom habitat is 100% hard bottom, rock pavement, with some small 10 cm cobble, and coarse sand and rubble on the rock pavement in the 165-175 m zone on the lower slope. The biota was densest and most diverse within this deeper zone of 165 to 175 m. The middle and upper slope from 180 to 185 the bottom flattens out and biota is sparser on the open flat pavement areas. Throughout the entire slope however are numerous 1-3 m diameter pits as described in previous dive 15-12. Pits that had good ledges undercut (25-50 cm relief) usually had the larger fish (grouper, snapper, tilefish) in addition to the smaller fish. Pits without an exposed ledge or burrows usually lacked the big fish. Surveyed over 20 pits in both dives.

Benthic macrofauna (mostly on rock pavement), rather than the pits: Sponges- Spongosorites siliquaria, Astrophorida (several spp.), Hexactinellida (several spp.).
Coral- Madrepora oculata (5-10 cm, mostly >165 m); Octocorallia- Nicella guadalupensis (20 cm orange fans), whips- Ellisellidae, unidentified gorgonian; Stylaster, pink fan S. filograneus?; black coral- Tanacetipathes tanecetum (coon tail, single stalk), Elatophathes abienta (bushy yellow-green), Tanacetipathes barbadensis (bushy white or grey), and Antipathes sp. mesh fan, 30 cm; Cryptonephyea soft coral
Other spp- Crinometra (abundant), purple crustose coralline algae on rock, Pyrosoma salp, Lysmata shrimp, brittlestars

Fish associated with pits: Blueline tilefish (30 cm, 50 cm), golden tilefish (50 cm, one hole had both side by side), Warsaw grouper (two holes, ~1.5 m TL), snowy grouper, yellowedge grouper? (50 cm), scamp, 30 cm

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P59, Howell's Hook mound, 158-180 m; UNCW ROV Dive 157

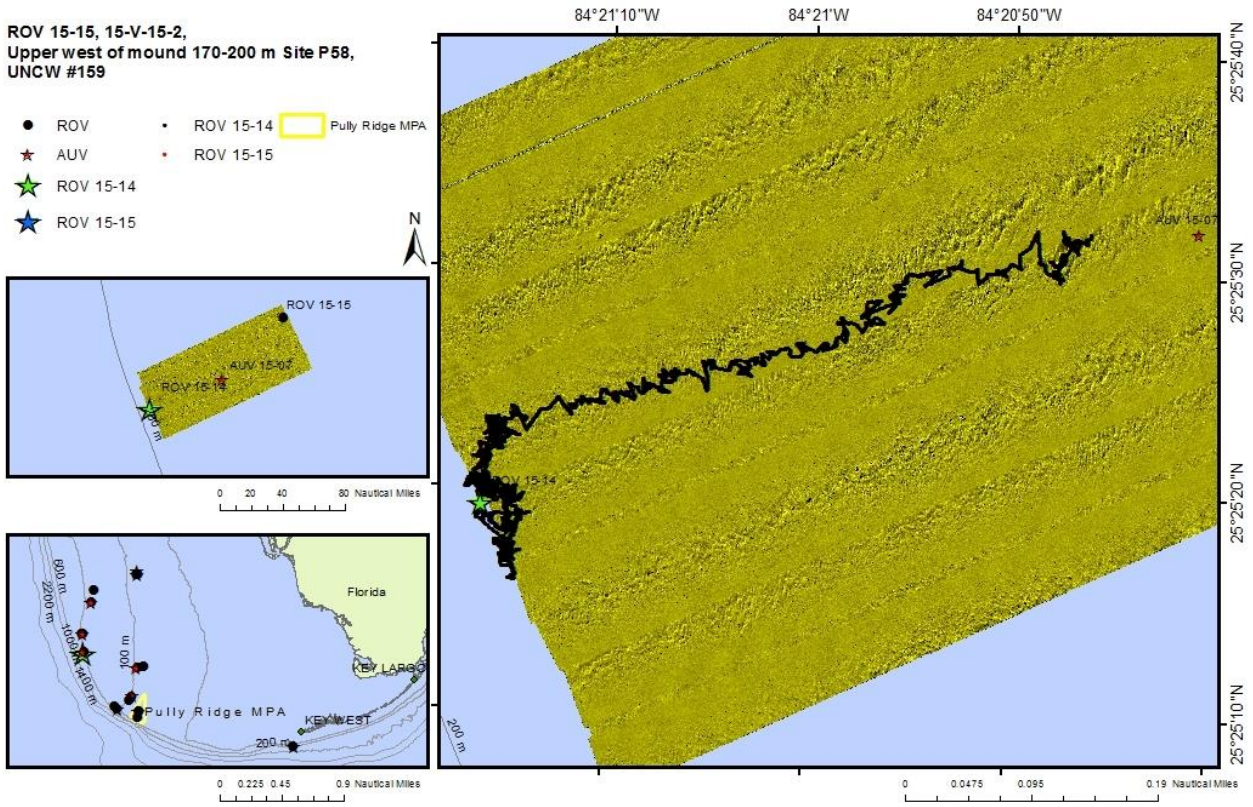
red queen snapper?, vermillion snapper?. Reef fish- Roughtongue bass, red barbier, Chaetodon aya, boarfish, saddleback, soldierfish, red hogfish, almaco jacks, short bigeye, moray eels.
NO LIONFISH past two days!

Samples collected 8: 1- Crinometra, 1- Pyrosoma, 1- Octocoral, 1- Spongosorites, 1-Madrepora oculata, 1- Tanacetipathes barbadensis?, 1- Elatopathes abienta?, 1- brittlestar.
Total quantitative photos- 99.

Common Species
Cnidaria- Antipatharia; *Elatopathes abietina*
Fish- Anthiinae, Bank butterflyfish - Chaetodon (*Prognathodes*) *aya*, Deepbody boarfish - *Antigonia capros*, Red barbier - *Hemanthias vivanus*, Red hogfish - *Decodon puellaris*, Roughtongue bass - *Pronotogrammus martinicensis*, Saddle bass - *Serranus notospilus*, Scamp - *Mycteroperca phenax*, Scorpionfish - Scorpaenidae, Short Big Eye - *Pristigenys alta*, Snapper - Lutjanidae, soldierfish - Holocentridae, Tattler - *Serranus phoebe*, Wrasse - Labridae
Porifera- Demospongiae; Pachastrellidae

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 144-200 m; UNCW ROV Dive 158

General Location and Dive Track:



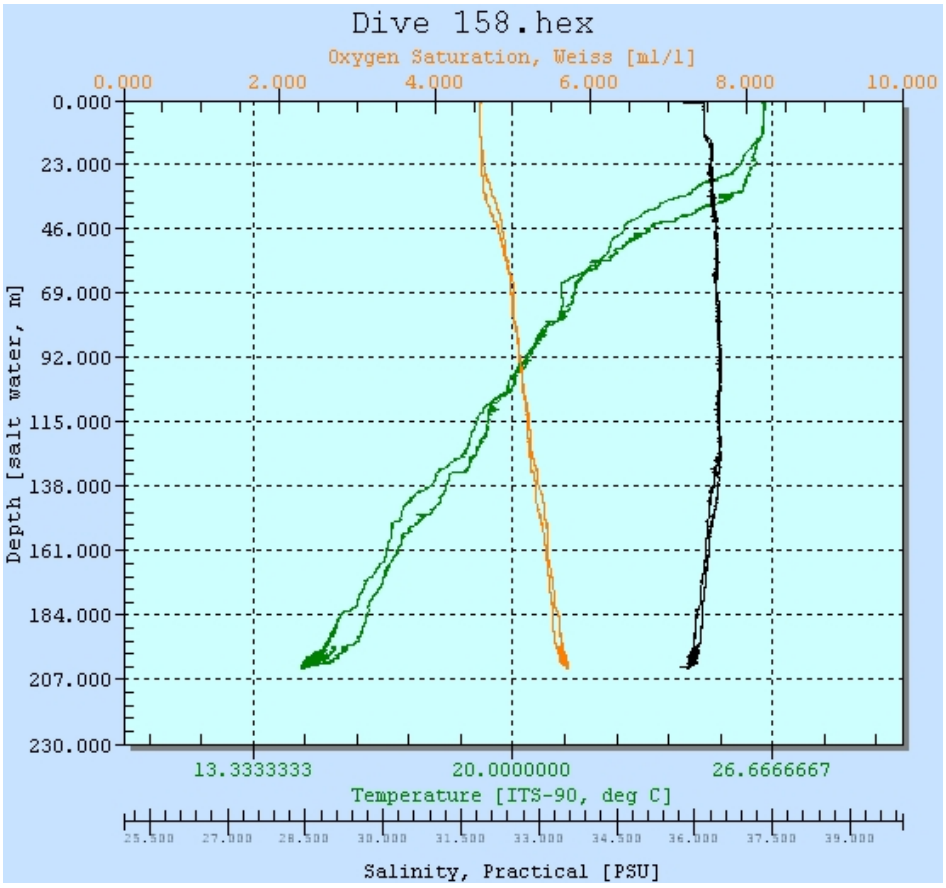
Site Overview:		**Dive Overview:**	
Project:	CIOERT GOM Cruise	**Vessel:**	University of Miami R/V Walton Smith- Cruise No.: WS15125
Principal Investator:	John Reed	**Sonar Data:**	15-07
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946	**Purpose:**	Exploration and Collections
Website:	www.fau.edu/hboi/cioert/index.php	**ROV:**	Mohawk ROV
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington	**ROV Sensors:**	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Data Management:	Access Database	**Date of Dive:**	5/15/2015
ROV Navigation Data:	Trackpoint II	**Specimens:**	
Ship Position System:	DGPS	**Digital Photos:**	69
Report Analyst:	John Reed, Stephanie Farrington	**DVD:**	3
Date Compiled:	9/23/2015	**Hard Drive:**	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 144-200 m; UNCW ROV Dive 158

Dive Data:

Minimum Bottom Depth (m):	187.1	**Total Transect Length (km):**	1.663
Maximum Bottom Depth (m):	202.9	**Surface Current (kn):**	0.7
On Bottom (Time- GMT):	8:24	**On Bottom (Lat/Long):**	25.42°N; -84.85°W
Off Bottom (Time- GMT):	10:26	**Off Bottom (Lat/Long):**	25.43°N; -84.35°W
Physical (bottom); Temp (°C):	14.74	**Salinity:** 35.91 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-14 are as follows: Depth: 187.1-202.9 m, Temperature: 14.6-15.5 °C , Conductivity: 43500-44600 (µS/cm), Pressure: 273-296.1 (PSI), Salinity: 35.9-36 (PSU), Sound Velocity: 1509.7-1512.6 (m/s), Oxygen Saturation: 5.6-5.7 (ml/l), Density: 1027.5-1027.7 (Kg/m^3), Nitrogen Saturation: 10.2-10.4 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 144-200 m; UNCW ROV Dive 158

Dive Imagery:

Figure 1: -203.8 m
Grouper

Figure 2: -203.9 m
Blueline tilefish

Figure 3: -203.9 m
Grouper

Figure 4: -203.4 m
Tilefish

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 144-200 m; UNCW ROV Dive 158

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-14, Site #- 15-V-15-1, Mohawk Dive #158. Target Site: Gulf of Mexico, off SW Florida, Site P-58. NOAA Bathymetric Chart Howell Hook, oval mound oriented N-S. AUV Dive 7 SSS map of dive site on west slope of mound. Ground truth SSS map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Dive was aborted after 1 hour due to manipulator broke a bolt on the shoulder joint making it inoperable. This was fixed in a couple hours by the fantastic ship and ROV crew.

Site Description/Habitat:

Depth range: 204.7- 190 m.

204.7 m- on bottom near west end of map near base of mound. 100% soft bottom, smooth grey sand. Numerous ½ m pits on SSS map: all small depressions, ½ m to 1 m diameter, 15 cm deep, smooth bottom, no shaft, some with rubble and detritus in bottom; no fish in them.

SSS WP- near west side of map, area of 7 pits, 5-10 m diameter.

204 m- 2.5 m diameter smooth pit, 30 cm deep. No shaft. 204 m- 3 m diameter pit, 30 cm deep, few fish, anthiids, scorpion fish, 50 cm grouper, yellow fin bass, red barbier, 70 cm snowy grouper.

SSS WP- 3 m pit: 2 m x ½ m deep pit, 10-30 cm cobble in bottom, same fish species, snowy grouper 60-70 cm.

203.8 m- largest pit of SSS. 2 ½ m diameter, ½ m deep, large undercut ledge around edge, 70 cm snowy grouper, 60 cm blueline tilefish, green moray eel, soldier fish, bigeye, yellow fin bass, red barbier, rough tongue bass, scorpion fish, Rochinia crab. No sponges, octocorals, black coral. Serpulidae on rock, fairly barren rock.

SSS- WP- last big pit: 2 m diameter, 30 cm deep, 5-10 cm cobble in bottom, same small fish, spotted reticulate moray, shortnose greeneye, Crinometra.

Start photo xs upslope, head NE.

SSS-WP-191 m, rugose features, N-S linear ridge. Actual- 100% soft bottom, no change in bottom, Cerianthidae.

190 m- about half way up slope of map, end dive. No features left on map except the small 1 m pits until get

toward top. Redeploy ROV nearer top of slope.

Total transect distance- 1109 m; 48 quantitative photos.

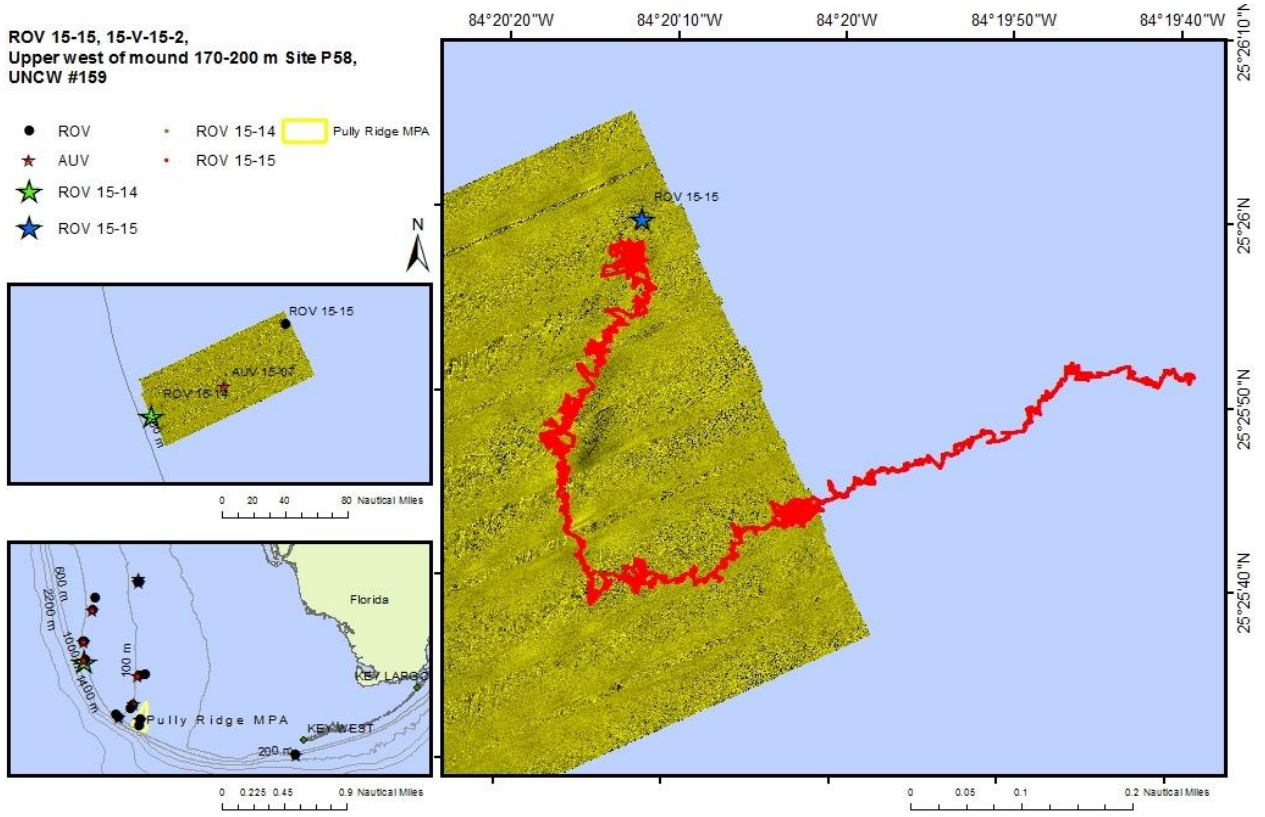
Total samples- 0.

Common Species

Fish- Red barbier - *Hemanthias vivanus*, Saddle bass - *Serranus notospilus*, Scorpionfish - Scorpaenidae

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 145-175 m; UNCW ROV Dive 159

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

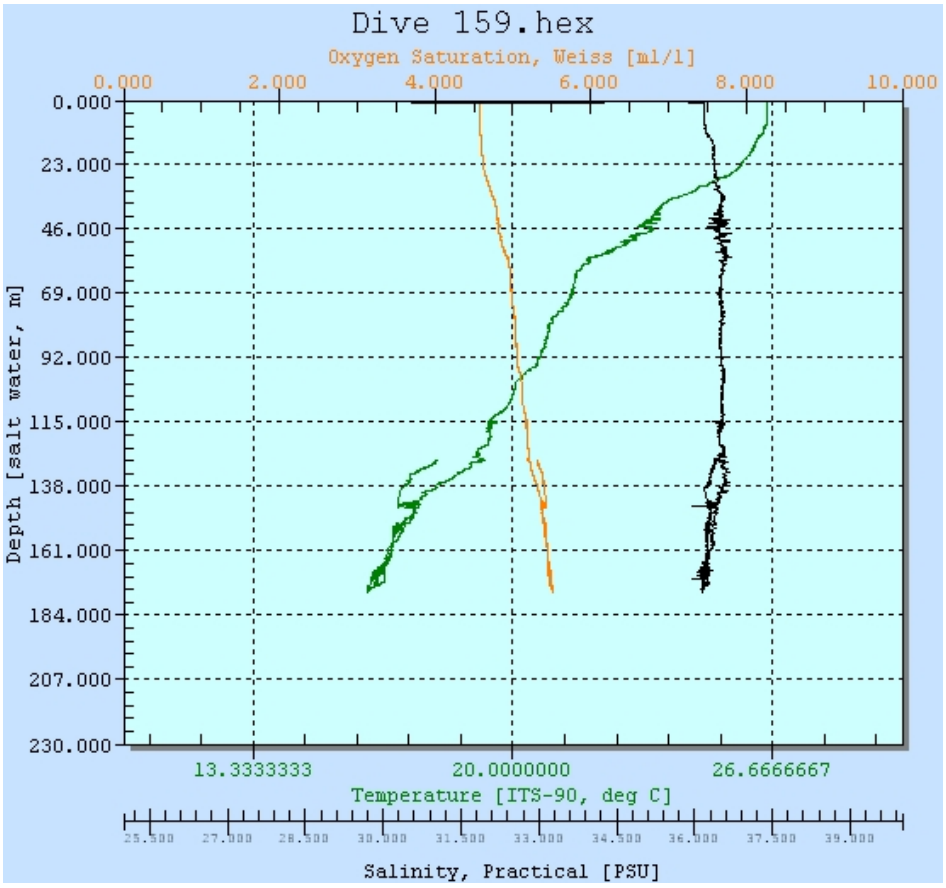
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-07
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/15/2015
Specimens:	9
Digital Photos:	175
DVD:	4
Hard Drive:	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 145-175 m; UNCW ROV Dive 159

Dive Data:

Minimum Bottom Depth (m):	143	**Total Transect Length (km):**	2.858
Maximum Bottom Depth (m):	175.9	**Surface Current (kn):**	0.4
On Bottom (Time- GMT):	11:36	**On Bottom (Lat/Long):**	25.43°N; -84.34°W
Off Bottom (Time- GMT):	15:09	**Off Bottom (Lat/Long):**	25.43°N; -84.33°W
Physical (bottom); Temp (°C):	16.63	**Salinity:** 36.27 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-15 are as follows: Depth: 143-175.9 m, Temperature: 16.3-17.5 °C , Conductivity: 45500-47000 (µS/cm), Pressure: 208.6-256.6 (PSI), Salinity: 36-36.4 (PSU), Sound Velocity: 1514.9-1518.3 (m/s), Oxygen Saturation: 5.4-5.5 (ml/l), Density: 1027-1027.4 (Kg/m^3), Nitrogen Saturation: 9.8-10.1 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 145-175 m; UNCW ROV Dive 159

Dive Imagery:

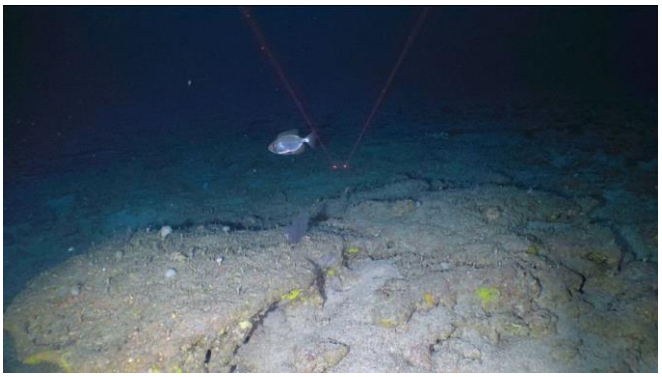


Figure 1: -174 m
Bigeye on pavement

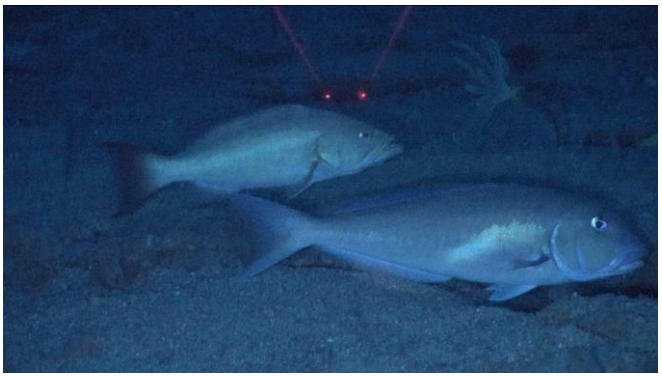


Figure 2: -176.6 m
Tilefish and grouper

Figure 3: -176.7 m
Tilefish and grouper

Figure 4: -176.7 m
Grouper

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 145-175 m; UNCW ROV Dive 159

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-15, Site #- 15-V-15-2, Mohawk Dive #159. Target Site: Gulf of Mexico, off SW Florida, Site P-58. NOAA Bathymetric Chart Howell Hook, oval mound oriented N-S. AUV Dive 7 SSS map of dive site on west slope of mound. Start on upper slope of mound. Ground truth SSS map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2” diameter suction hose.

Site Description/Habitat:

Depth range: 175.3- 145.7 m.

Upper slope and top of mound. Upper slope from 180 m to top at 150 m, steeper, 10o? (calculated at 3o) slope over 400 m width. NOAA Bathymetric chart shows top as oval flat plateau, 500 m wide, oriented NW-SE.

175.3 m- 100% hard bottom, low relief, rock pavement, scoured edges 10 -20 cm relief, 5-20 cm cobble. Dense sponges, 5-10 spp.

172 m- crustose coralline algae?

175 m- Transect along SSS ridge; dense Tanacetopathes black coral, 5-10 cm, Antipatharia- 3 spp, Porifera- 10 spp?,

SSS WP- 175.5 m, top edge of SSS ridge. Same habitat. Hexactinellida- 5-10 spp, Demosponges- 20 spp., yellow thin demosponges on rock. Madracis oculata, 5 cm. Two tilefish (60 cm), scamp (40 cm). Top rock rubble, pavement, low relief, flat.

160 m- near top of mound- more sponges, dense black coral, several per m, Octocorallia- 3 spp.

155 m- top of mound. Cup Hexactinellid, purple Madrepora, yellow encrusting demosponges, scamp.

152 m- 2 m pit, 30 cm relief with ledge around edge, red soldier fish, red shinny snapper?, koosh ball anemone.

148 m- top center of plateau, 100% pavement, sediment veneer, no ledges, sparse biota. 5 cm black coral, Crinometra, small sponges, no ledges, small rubble.

145.7 m- east edge of top plateau. Same habitat. 5-10 cm cobble, pavement. Crinoids, 5 cm Madrepora, few black coral, pink coral (Stylaster).

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P58, Howell's Hook mound, 145-175 m; UNCW ROV Dive 159

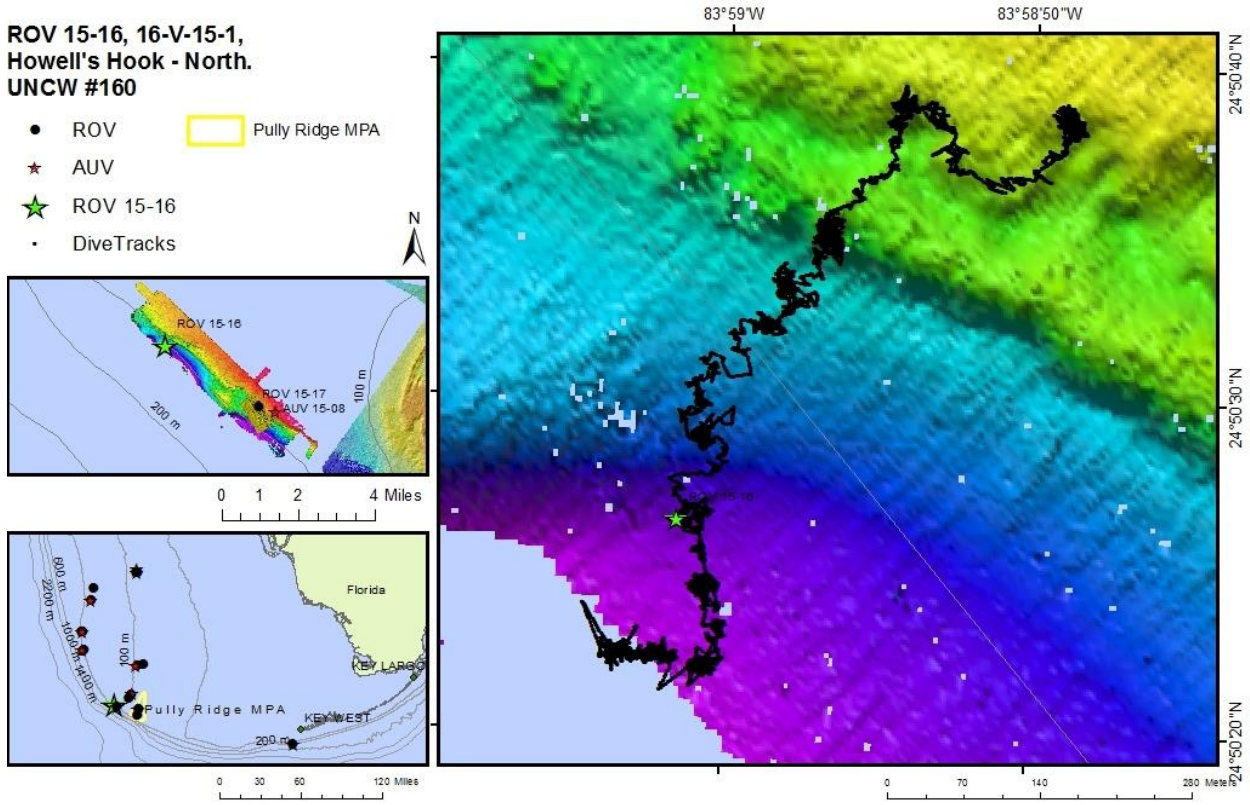
Biota:
Sponges- Pachastrellidae, Hexactinellida, tan Theonella, *Zyzzya*?, Euritidae?
Coral- *Madracis oculata*, 5 cm.
Octocoral- *Nicella guadalupensis*, *Ellisella* whip coral.
Black coral- *Antipathes atlantica* black mesh fan, *Elatopathes abienta*, *Tanacetipathes tanacetum*.
Other- *Goniaster tessalata*, koosh ball anemone, Crinometra.

Fish- bigeye, boarfish, small basslet, scamp, red soldier fish, red shiny snapper?

Total number samples: 9. 5 Porifera- *Zyzzya*, *Theonella*, cup Hexactinellida, yellow encrusting demosponge; starfish- *Goniaster tessalata*; coral: *Madrepora carolina*, 1- purple *Madrepora carolina*; 1- rock.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site north, 135-170 m; UNCW 160

General Location and Dive Track:



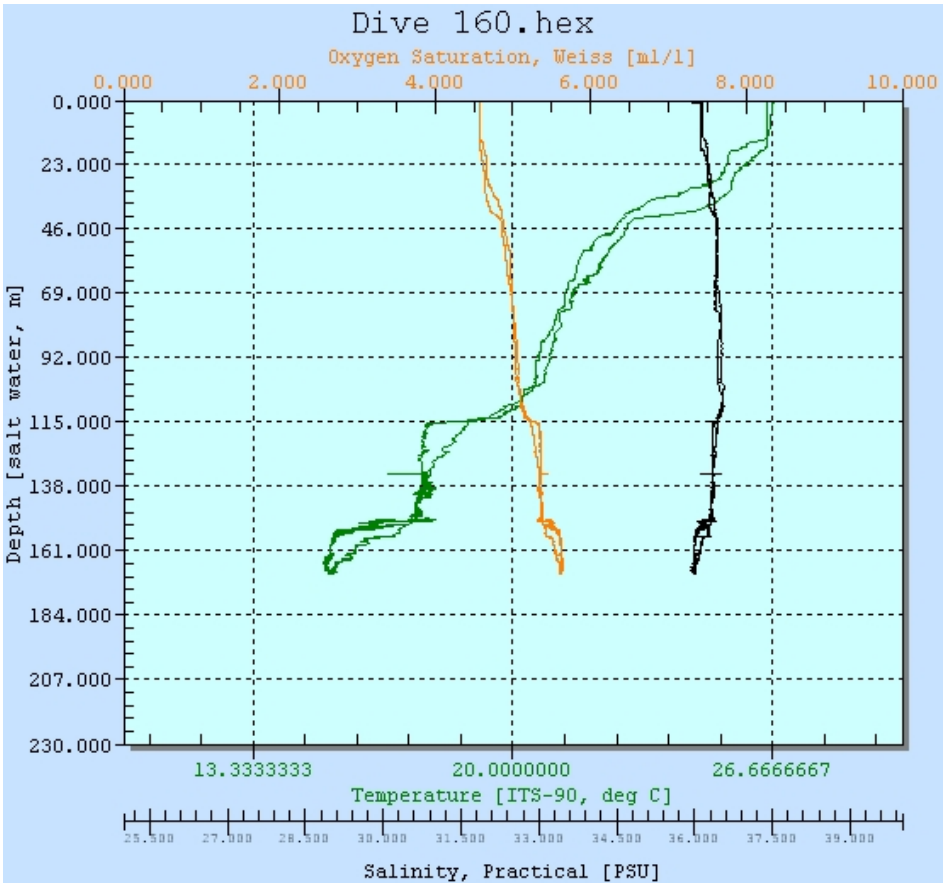
Site Overview:		**Dive Overview:**	
Project:	CIOERT GOM Cruise	**Vessel:**	University of Miami R/V Walton Smith- Cruise No.: WS15125
Principal Investator:	John Reed	**Sonar Data:**	Naar_2003_howells_hook
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946	**Purpose:**	Exploration and Collections
Website:	www.fau.edu/hboi/cioert/index.php	**ROV:**	Mohawk ROV
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington	**ROV Sensors:**	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Data Management:	Access Database	**Date of Dive:**	5/16/2015
ROV Navigation Data:	Trackpoint II	**Specimens:**	11
Ship Position System:	DGPS	**Digital Photos:**	227
Report Analyst:	John Reed, Stephanie Farrington	**DVD:**	3
Date Compiled:	9/23/2015	**Hard Drive:**	1

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site north, 135-170 m; UNCW 160

Dive Data:

Minimum Bottom Depth (m):	132.2	**Total Transect Length (km):**	1.652
Maximum Bottom Depth (m):	169.1	**Surface Current (kn):**	0.08
On Bottom (Time- GMT):	8:18	**On Bottom (Lat/Long):**	24.84°N; -83.83°W
Off Bottom (Time- GMT):	12:05	**Off Bottom (Lat/Long):**	24.84°N; -83.98°W
Physical (bottom); Temp (°C):	15.48	**Salinity:** 36.02 **Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-16 are as follows: Depth: 132.2-169.1 m, Temperature: 15.1-18 °C , Conductivity: 44200-47600 (µS/cm), Pressure: 192.9-246.8 (PSI), Salinity: 36-36.4 (PSU), Sound Velocity: 1511-1519.8 (m/s), Oxygen Saturation: 5.3-5.6 (ml/l), Density: 1026.9-1027.4 (Kg/m^3), Nitrogen Saturation: 9.7-10.3 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site north, 135-170 m; UNCW 160

Dive Imagery:

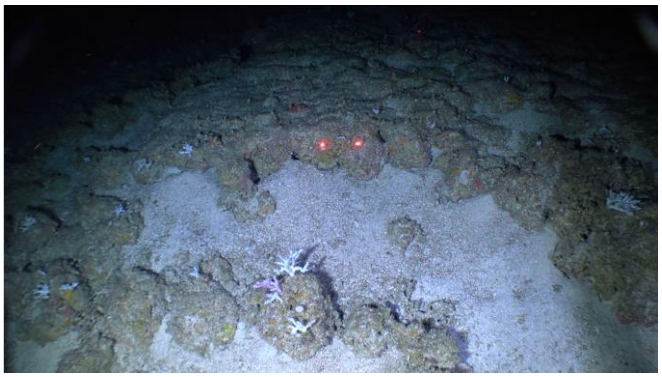


Figure 1: -158 m
Oculina sp. on rocky hardbottom

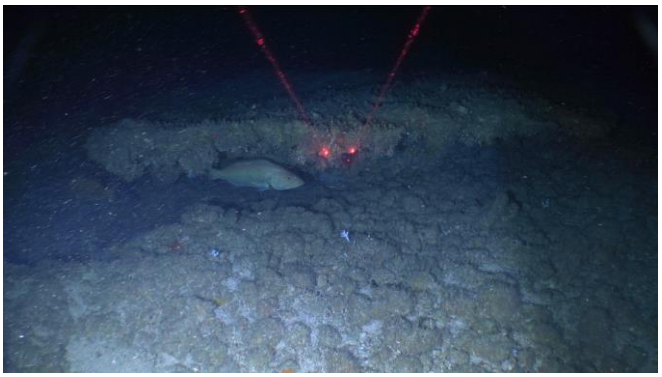


Figure 2: -149.7 m
Grouper under a ledge

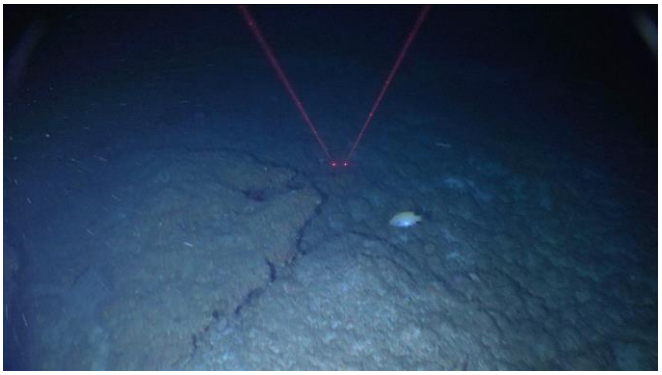


Figure 3: -149.7 m
Pavement

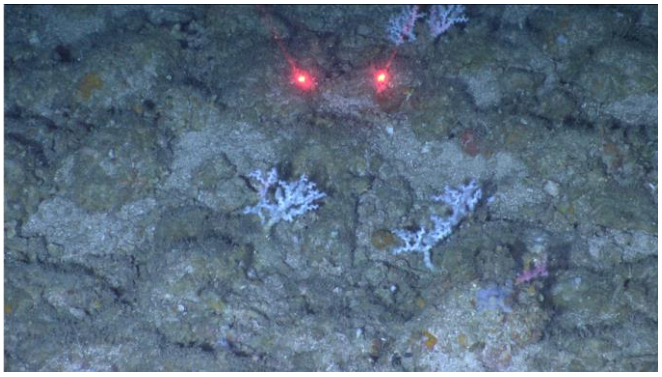


Figure 4: -159.1 m
Madracis sp.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site north, 135-170 m; UNCW 160

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-16, Site #- 16-V-15-1, Mohawk Dive #160. Target Site: Gulf of Mexico, off SW Florida, Site P66, NOAA Bathymetric Chart Howell Hook, and Naar Howell Hook multibeam. Ground truth Naar MB map. This is not the SSS site of AUV 8. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2” diameter suction hose.

Site Description/Habitat:

Depth range: 170.8- 134.7.

170.8 m- base of deep escarpment on MB. 100% rock pavement of conglomerate cobble. No ledges, coarse sediment, rock shell hash. Lots of thin encrusting sponges, 8 cm Madrepora carolina. Theonella red finger sponges, very common, 5-10 cm; ye-gn encrusting sponges, Goniaster tessalata, boarfish, Corallistes cup sponges, cup corals, wrasse bass, red hogfish, saddle back bass, Chaetodon aya, scorpion fish.

166 m- same conglomerate 5-10 cm cobble, Theonella common, sand diver lizardfish, Oceanpia common, Madracis myriaster or M. asperula.

164.5 m- MB foot of deep escarpment. Same habitat, 20 cm cobble. Dense Theonella on slope.

160 m-half way up escarpment, 20o slope. Roughtongue bass, Chaetodon aya, Madrepora, Madracis.

157.3 m- near top of deep escarpment. 80% hard bottom, with coarse sand between 10-30 cm conglomerated cobble, 30 cm ledges. 2 m flat rock with 30 cm relief ledges. Mostly 5 cm Madrepora, several per meter, bigeye, 2 scamp, 1 snowy grouper 40 cm TL.

154.5 m- shelf between deep escarpment and mid escarpment. Pavement of 20 cm conglomerate cobble, barren, no sponges or coral.

151.5 m- 100 m from mid-escarpment. 2-3 m diameter flat rock, ½ m relief, 30 cm-1 m boulders. Madrepora, solitary coral, long line fishing line, 30 cm queen snapper, several scamp, yellowouth grouper?, red encrusting Spirastrellidae, rough tongue bass, 2 scamp, snowy grouper 50 cm 2, black bar drum.

148 m- base of mid-escarpment, eroded, rugged rock, 1-2 m relief, jagged, undercut. Crustose coralline algae, scamp, anthiids, queen snapper, green band wrasse, red barbier, soldier fish, saddle back bass, Chaeton aya.

142 m- ½ way up slope, high rugosity, <30o slope. Hexactinellida, Scaphella gastropod, curtain sponge, 2

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site north, 135-170 m; UNCW 160

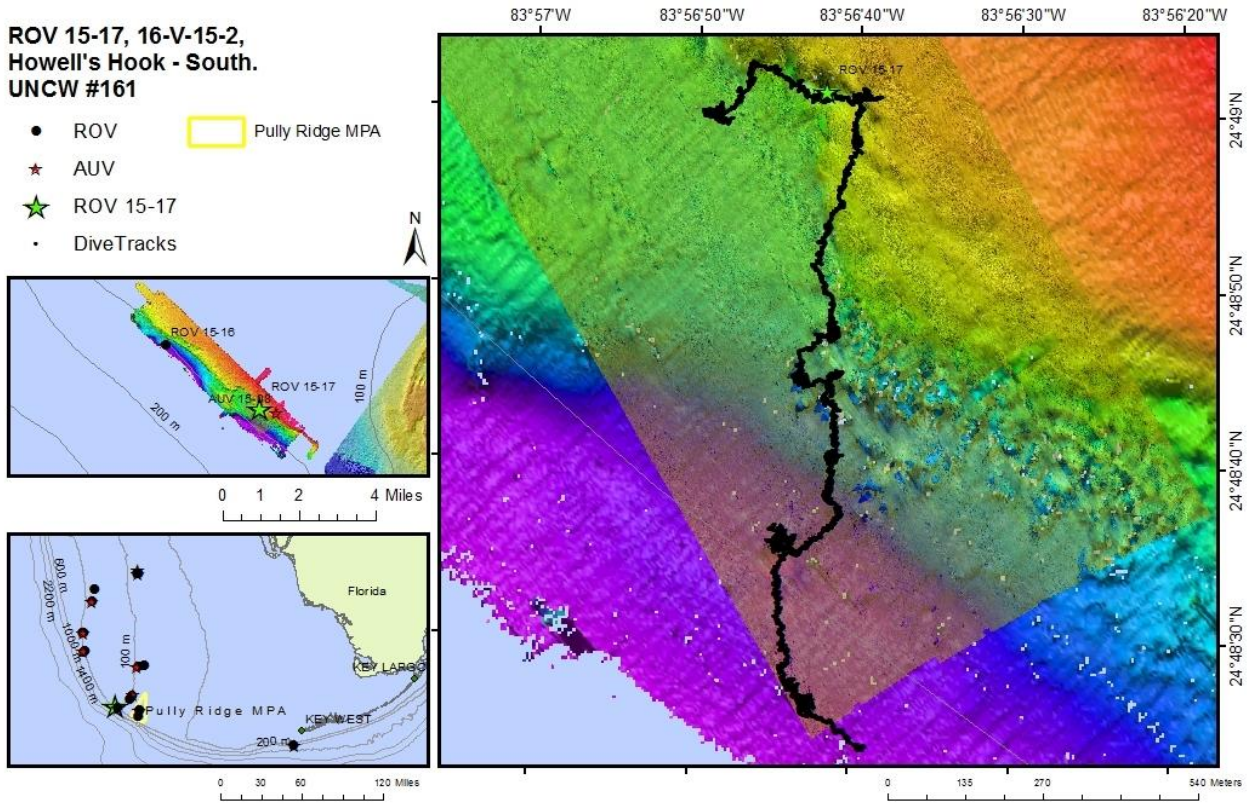
scamp, starfish, Holothuria lentigenosa, 40 cm scamp, red colored snapper.
138 m- top of mid-escarpment. Shelf between mid-escarpment and upper escarpment. 100% hard bottom, 20 cm cobble, boulders, low relief, pavement. Fan sponges, cup sponges, 5 cm Tanacetipathes tanacetum, Zyzzya, encrusting yellow sponges, Verdigellas green algae.
136 m- <10o slope, upper escarpment, 2 m outcrop, boulder. Areas of high rugosity, 1- 1 ½ m relief, undercut ledges, rugged. Dense sponges, Spirastrellidae, cutain sponges, wrasse bass, Spanish flag, anthiids, bigeye soldier, Hexactinellid fan, Pachastrellidae, Auletta, Chaetodon aya, Stylaster.
134.5 m- top of upper escarpment, plateau, pavement, low relief, ledges, one 5 cm white octocorals

Biota:
Sponges- numerous encrusting demosponges, *Theonella* red finger sponges (2 spp, T. atlantica, Rasta sponge), *Corallistes*, *Oceanapia*, Spirastrellidae, Hexactinellida, curtain sponge, fan sponges, cup sponges, *Zyzzya*, Hexactinellid fan, Pachastrellidae, *Auletta*,
Coral- *Madrepora carolina* 5-10 cm, cup corals 2-3 spp, *Madracis myriaster* or *M*. *asperula*, Stylaster
Octocoral- One 5 cm white octocorals
Black coral- Tanacetipathes tanecetum
Other- Goniaster tessalata, Mithrax spider crabs, Scaphella gastropod, hermit crab, Holothuria lentigenosa, starfish,Verdigellas, crustose coralline algae,
Fish- wrasse bass, red hogfish, saddleback bass, red hogfish, Chaetodon aya, scorpion fish, sand diver lizardfish, roughtongue bass, bigeye, scamp, snowy grouper, yellowmouth grouper?, black bar drum, snowy grouper, queen snapper, green band bass, red barbier, bigeye soldier fish, Spanish flag,

Total number of samples: 8. 5 Sponges- Theonella (3), curtain sponge, Zyzzya, 20 cm Lithistida (Acicullites?); Rock; Junonia gastropod with hermit crab (photographed on deck and returned).

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site south, 132-166 m; UNCW 161

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

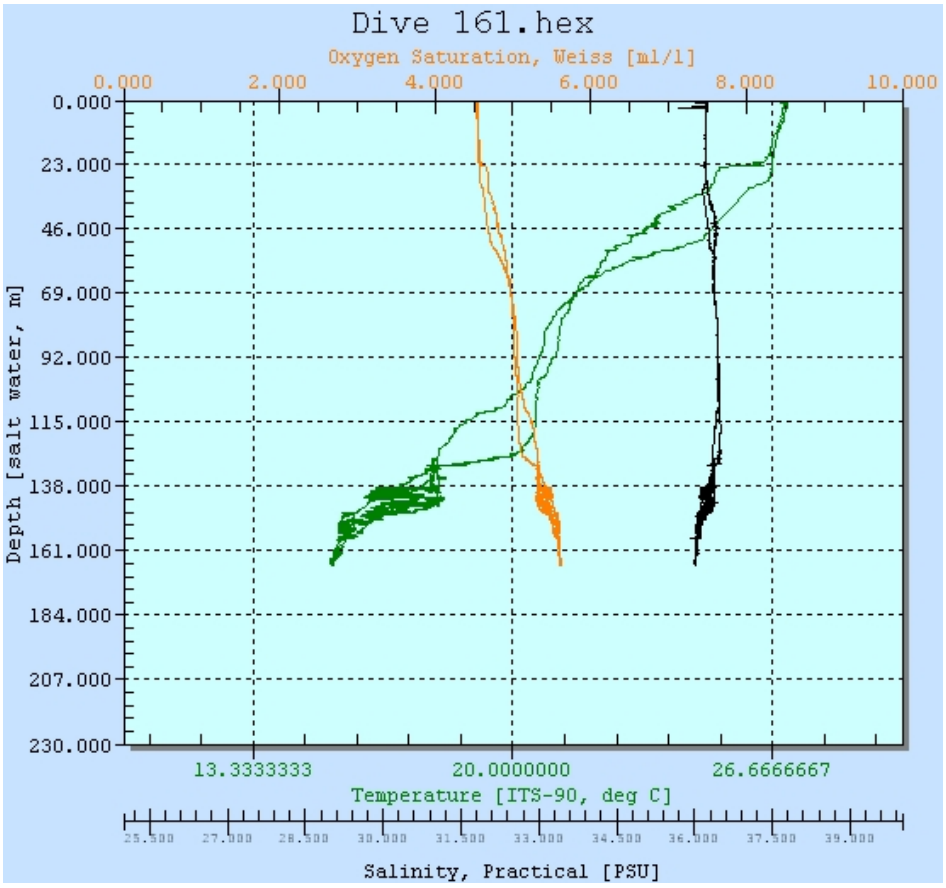
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-08
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/16/2015
Specimens:	7
Digital Photos:	165
DVD:	4
Hard Drive:	2

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site south, 132-166 m; UNCW 161

Dive Data:

Minimum Bottom Depth (m):	128	**Total Transect Length (km):**	2.092
Maximum Bottom Depth (m):	166.4	**Surface Current (kn):**	0.5
On Bottom (Time- GMT):	13:57	**On Bottom (Lat/Long):**	24.82°N; -83.95°W
Off Bottom (Time- GMT):	17:13	**Off Bottom (Lat/Long):**	24.81°N; -83.94°W
Physical (bottom); Temp (°C):	17.13	**Salinity:** 36.26 **Visibility (ft):**	**Current (kn):** 0.5

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-17 are as follows: Depth: 128-166.4 m, Temperature: 15.3-18.3 °C , Conductivity: 44400-47900 (µS/cm), Pressure: 186.8-242.8 (PSI), Salinity: 36-36.4 (PSU), Sound Velocity: 1511.6-1520.4 (m/s), Oxygen Saturation: 5.3-5.6 (ml/l), Density: 1026.9-1027.4 (Kg/m^3), Nitrogen Saturation: 9.7-10.2 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site south, 132-166 m; UNCW 161

Dive Imagery:

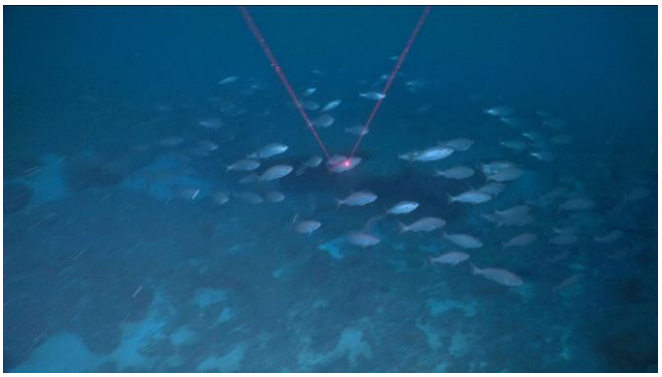


Figure 1: -133.7 m
School

Figure 2: -143.3 m
Yellow fish

Figure 3: -157.7 m
Madrepora sp.

Figure 4: -167.3 m
Tilefish

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site south, 132-166 m; UNCW 161

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

ROV 15-17, Site #- 16-V-15-2, Mohawk Dive #161. Target Site: Gulf of Mexico, off SW Florida, Site P66, NOAA Bathymetric Chart Howell Hook, and Naar Howell Hook multibeam. AUV Dive site 8, upper escarpment, "Alien Cocoon Pods", and deep slope. Ground truth Naar MB and AUV SSS maps. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2" diameter suction hose.

Site Description/Habitat:

Depth range: 129.5- 165.8 m.

144 m- On shelf below upper escarpment, 100 m from wall, 95% hard bottom, 10-30 cm cobble, flat pavement. Zyzzya very common, Madrepora, rough tongue bass, Theonella, curtain sponges, pink crustose coralline algae.

141 m- base of upper escarpment, 10o slope, pavement, flat rock, 20-30 cm relief, barren; no fish, no coral, no sponges, no black coral. Very odd. Some thin encrusting yellow and orange sponges only.

142 m- Chaetodon aya, wrasse bass, Ophioderma devanyi.

135.5 m- Transect on shelf above upper escarpment, 80% hard bottom, flat pavement with erosion holes 20-30 cm relief. Head south toward boulder zone. 2 m ridge- few sponges, anthiids, red barbieer, Tanacetipathes tanacetum.

129.5 m- Verdigellas, thin encrusting sponges, scamp, more sponges, black coral, low relief pavement, 30 cm ledges. Wrasse bass, AJ, >100 vermillion snapper.

145 m- Base of upper escarpment on transect heading south. Black bar drum, scamp

146.7 m- SSS WP- boulder zone. 20 m diameter boulder, not loose, but appears attached at bottom to pavement, smooth, rounded, not undercut- Lithoherm?. 146.7 m at base, 144.9 m on top. Fairly smooth top and sides, relatively barren, flat top. Some 5 cm Madrepora carolina, cidaroid urchins, wrasse bass, rough tongue bass, red barbier, green band bass, Spanish flag, bigeye soldier fish, scamp, Chaetodon aya.

Boulder- 153 m base, 151.5 m top, 13 m diameter. Boulder- base 154 m, top 152 m.

158 m- transect downslope to purple zone of MB. Chocolate drop sea cucumber, Madrepora carolina (pink and white morphs), crustose coralline algae, 100% hard bottom, 20 cm cobble, Astrophorida, cidaroids, rock pavement, short bigeye, reticulate eel.

Dive Site: Gulf of Mexico, SW Florida Shelf, Reed Site P66, Howell's Hook, Naar Site south, 132-166 m; UNCW 161

161 m- Theonella common 5-10 cm, Mithrax, hollow tube Pachastrella
163 m- SSS WP- low relief rugged area near bottom edge of map. 100% hard bottom, consolidated 20 cm cobble, smooth rock, ledges to 1 m, I m undercut ledge. Black bar drum, soldier fish, Chaetodon aya, scamp, brotula, scamp, yellowfin bass, Majidae, few 5 cm Madrepora, no Theonella..
165 m- SSS WP- Southeast corner of map, rugged area. 20-30 cm cobble, with pavement, more relief. Scattered boulders 20-30 cm. Scamp, red hogfish, Madrepora, Ophioderma devanyi, encrusting brown bryozoan, yellow headed wrasse?
167.5 m- blueline tilefish 40 cm, snowy grouper

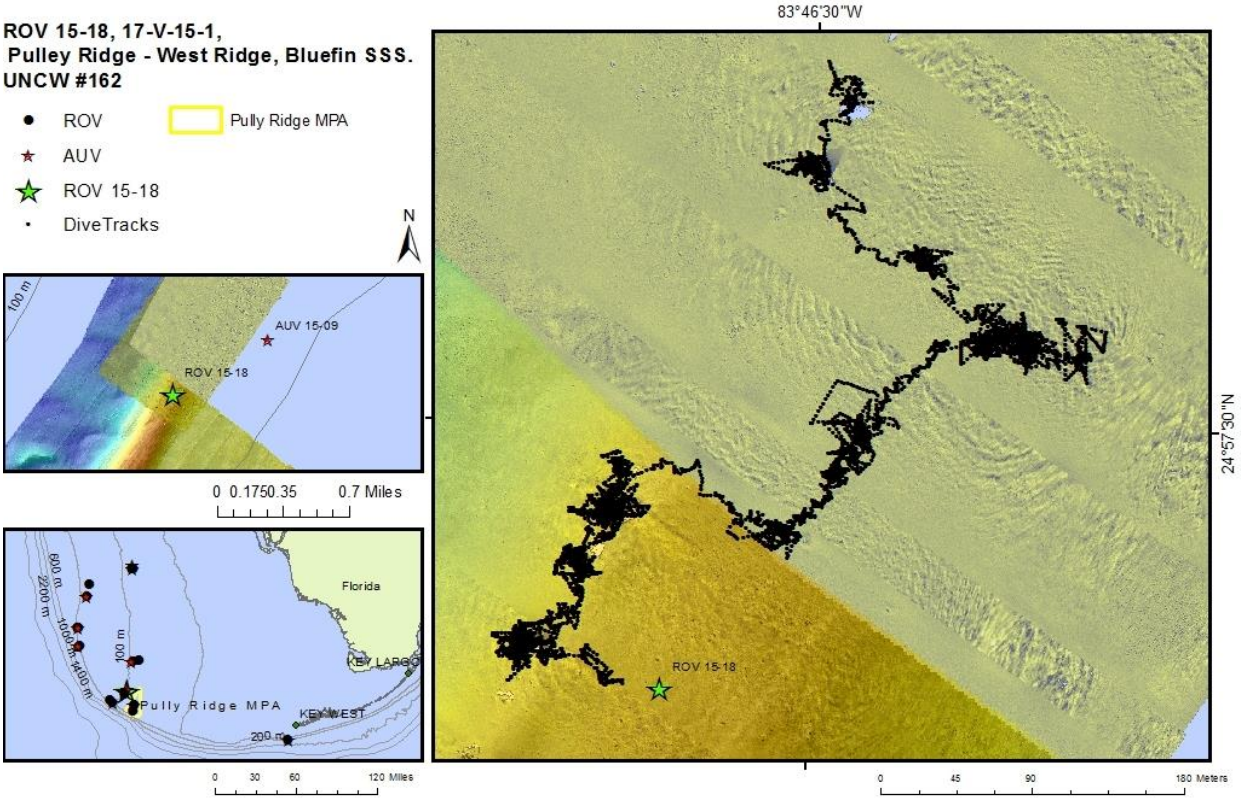
Biota:
Sponges- *Theonella*, curtain sponges, *Zyzzya*, encrusting pink sponges, Pachastrellidae
Coral- *Madrepora oculata*
Black coral- *Tanacetipathes tanacetum*
Other- crustose coralline algae, *Ophioderma devanyi*, *Verdigellas*, *Isosticopathes*, *Mithrax*, brown encrusting bryozoan,

Fish- Rough tongue bass, wrasse bass, Chaetodon aya, red barbier, scamp, 100+ vermilion snapper, black bar drum, red barbier, green band bass, Spanish flag, bigeye soldier fish, scamp, short bigeye, reticulate eel, yellow fin bass, brotula, red hogfish, yellow headed wrasse, blueline tilefish, snowy grouper.

Total number of samples: 7. 2 Porifera- Astrophorida, encrusting pink; rock, sediment; bryozoan; cup coral.

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, 82 m; UNCW ROV Dive 162

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-09
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/17/2015
Specimens:	15
Digital Photos:	248
DVD:	2
Hard Drive:	1

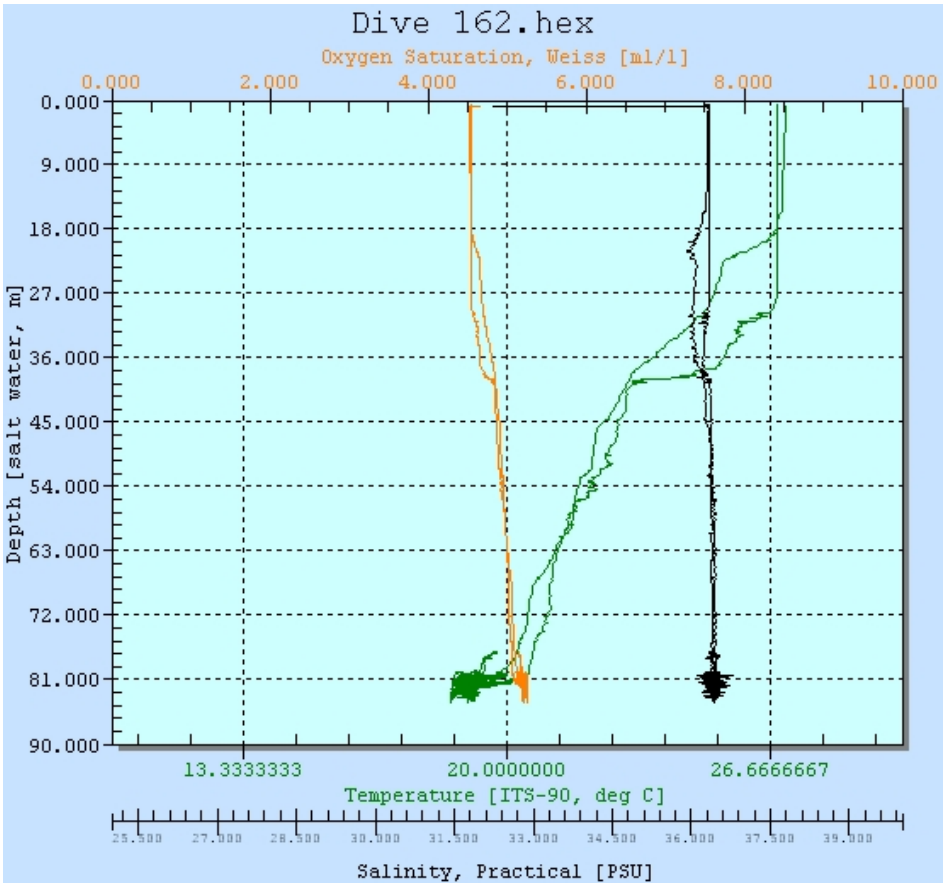
Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, 82 m; UNCW ROV Dive 162

Dive Data:

Minimum Bottom Depth (m):	76.1	**Total Transect Length (km):**	1.570
Maximum Bottom Depth (m):	84.2	**Surface Current (kn):**	
On Bottom (Time- GMT):	8:16	**On Bottom (Lat/Long):**	24.96°N; -83.78°W
Off Bottom (Time- GMT):	11:52	**Off Bottom (Lat/Long):**	24.96°N; -83.77°W

Physical (bottom); Temp (°C):	**Salinity:**	**Visibility (ft):**	**Current (kn):**

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-18 are as follows: Depth: 76.1-84.2 m, Temperature: 18.6-20.7 °C , Conductivity: 48200-50400 (µS/cm), Pressure: 111-122.8 (PSI), Salinity: 36.1-36.6 (PSU), Sound Velocity: 1520.4-1526.3 (m/s), Oxygen Saturation: 5.1-5.3 (ml/l), Density: 1026-1026.7 (Kg/m^3), Nitrogen Saturation: 9.3-9.7 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, 82 m; UNCW ROV Dive 162

Dive Imagery:

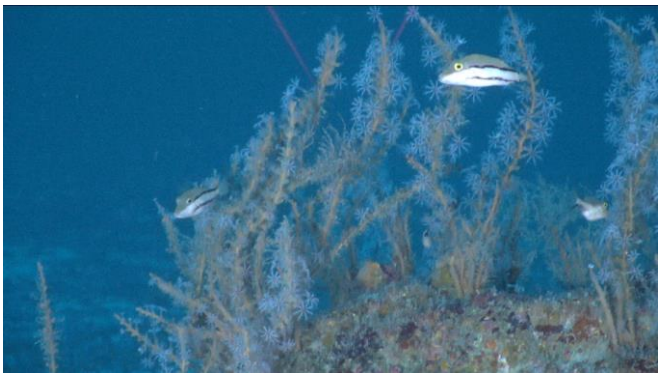


Figure 1: -84.6 m
Telesto sp. and puffer fish

Figure 2: -84.5 m
Outcrop with fish

Figure 3: -84.5 m
Corallimorphs

Figure 4: -84.6 m
Lionfish

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, 82 m; UNCW ROV Dive 162

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

17- V-15-1, ROV 15-18, UNCW 162, Pulley Ridge West, north end, new AUV dive site 9 side-scan sonar. Ground truth AUV SSS map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2” diameter suction hose.

Site Description/Habitat:

Depth range: 82.2- 84.5 m.

SSS WP- Near west edge of West Ridge top. 10 m diameter rock on top of ridge. Appeared to be linear rock ridge oriented E-W, 5 m x 2 m and 1 m tall. Formed reef oasis for fish. Biota: Davidaster, zoanthids on dead octocorals, thin encrusting sponges, Crinometra, flat 20 cm hydroids. Fish- lots of lionfish >25, reef butterfly, red barbier, yellow tail reeffish, spotfin hogfish, deepwater squirrelfish, tattler, scamp, spotted moray eel, squirrelfish, sargassum triggerfish, reef butterfly, rough tongue bass, sharpnose puffer, golden face puffer, almaco jack, yellow encrusting sponges, Poecilosclerida, spotted toadfish.

Off boulder: 84.5 m, flat, no ledges, soft bottom with 50% cover 5-20 cm cobble, CCA on cobble, Stichopathes lutkeni, Ellisellidae, sand tilefish with pile 5 cm rubble, or algal nodules. Sampled one.

SSS-WP- 83.9 m, large shallow pit with 5-20 cm cobble. 20 cm white Octocoral, 2 scamp. 50 cm Muricea?

SSS WP- rock outcrop, 84.2 m base, 82.5 m top, 15 m long oriented NW-SE. 100+ lionfish, 5 scamp, sunshine fish, xxx cheek soldierfish, juvenile queen angel, porgy, creole. Top of rock flat, covered with 20 cm Telesto, CCA, Corallimorpharia, Cinachyrella, Halimeda. Base of rock is flat, coarse sand, 5 cm rubble.

SSS WP- 84.5 m, two 1 m rock boulders. Lionfish, same reef fish.

Head E from west edge about 50 m, to top middle of main ridge.

82.5 m- top middle of ridge. 80% 5-20 cm cobble, hydroids, Tanacetipathes, Halymenia sheets.

SSS WP- 3 m pit. Lionfish, same reef fish, blue angelfish, graysby?

Head NE along ridge. 10-20 cm cobble, and sediment. Swiftia?, Verdigellas, 10 cm Primnoidae, Ircinia campana, Andyomene sparse, Halymenia.

Pit- same fish, threadnose, green band bass.

Head NNE along top. 80% cover cobble, flat, no ledges.

Head east down east slope of ridge. Start 82.5 m. Various sponges. Petrosiid.

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, 82 m; UNCW ROV Dive 162

Base of east slope, 84 m. 80% 10-20 cm cobble. Sponges.
Head NW upslope. Aplysina, 10 cm Primnoidae, various sponges.
Top of ridge again, 82 m. Change habitat to 80% cobble, with denser biota, Anadyomene, Stichopathes, 4-6 spp Octocorallia, 3 scamp.
SSS WP- large pit, 20 m diameter, 6 scamp, 20 cm ledge. Cobble/rubble. Lionfish, 40 cm red grouper, 40 cm scamp, brotula.
SSS WP- 17 m diameter outcrop. Top 82.5 m, 1 ½ m tall, flat topped rock, with some ledges on side. Scamp, lionfish, spotfin butterfly, creole, soldier, rock beauty. Halimeda, Spirastrellidae, Tethya, Petrosidae, Ircinia.
Transect between two boulders, west edge of ridge, 84 m. 19 m diameter boulders or outcrops, appear attached at bottom. 100% sediment and sparse rubble between. Second boulder 15 m long, flat top, 82.5 m on top, smooth rock. 100+ creole, lionfish.

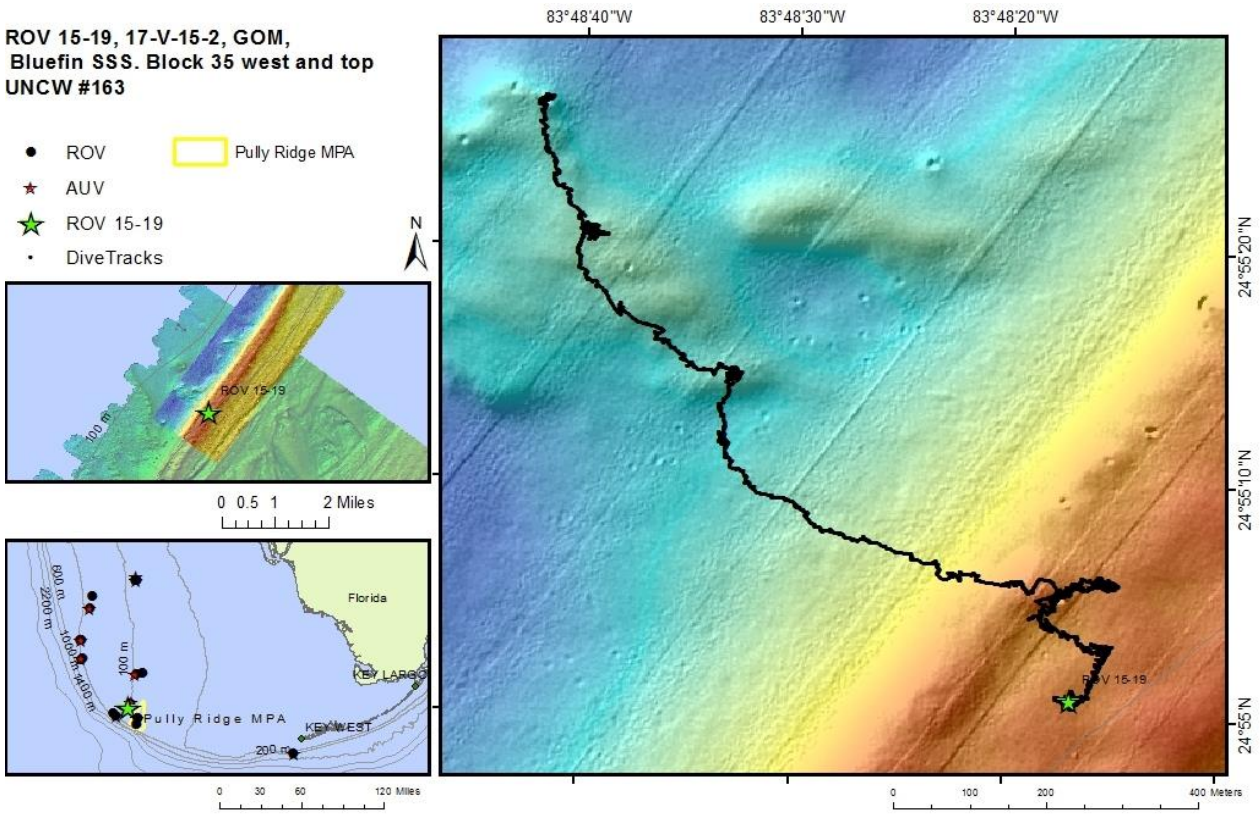
Collected 15 samples: 10 Porifera- Cinacyrella, Aplysina?; 2 Octocoral- Muricea or Hypnogorgia with basketstar, Telesto; Algae- Halymenia, cobble algal nodule?

Common Species

Algae- Chlorophyta; *Anadyomene menziesii*, Chlorophyta; *Halimeda* sp., Chlorophyta; *Verdigellas peltata*, Rhodophyta; crustose coralline algae, Rhodophyta; *Halymenia* sp.
Cnidaria- Antipatharia; *Elatopathes abietina*, Antipatharia; *Stichopathes lutkeni*, Octocorallia;, Octocorallia; *Telesto* sp.
Echinodermata- Crinoidea; Comatulida
Fish- Anthiinae, Bank butterflyfish - *Chaetodon* (*Prognathodes*) *aya*, Creole fish - *Paranthias furcifer*, Deepwater squirrelfish - *Sargocentron bullisi*, Goldface puffer - *Canthigaster jamestyleri*, Greenband wrasse - *Halichoeres bathyphilus*, lionfish - *Pterois volitans*, Purple reeffish - *Chromis scotti*, Red barbier - *Hemanthias vivanus*, Reef butterflyfish - *Chaetodon sedentarius*, Roughtongue bass - *Pronotogrammus martinicensis*, Scamp - *Mycteroperca phenax*, sharpnose puffer - *Canthigaster rostrata*, Spinycheek soldierfish - *Corniger spinosus*, spotfin hogfish - *Bodianus pulchellus*, Squirrelfish - *Holocentrus adscensionis*, sunshine fish - *Chromis insolata*, Threadnose bass - *Anthias tenuis*, Wrasse bass - *Liopropoma eukrines*, Yellowtail reeffish - *Chromis enchrysura*,

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, Block 35, 80-92 m; UNCW ROV Dive 163

General Location and Dive Track:



Site Overview:

Project:	CIOERT GOM Cruise
Principal Investator:	John Reed
PI Contact Info:	5600 U.S. 1, North, Fort Pierce, FL 34946
Website:	www.fau.edu/hboi/cioert/index.php
Scientific Observers:	Don Liberatore, Jason White, John Reed, Lance Horne, Melissa Price, Shirley Pomponi, Stephanie Farrington
Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	Nancy_Pulley_NW_2m_UTM 17N
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	Temperature (°C), Dissolved Oxygen (ml/l), Dissolved Oxygen (% sat), Conductivity, Depth (m)
Date of Dive:	5/17/2015
Specimens:	16
Digital Photos:	200
DVD:	4
Hard Drive:	1

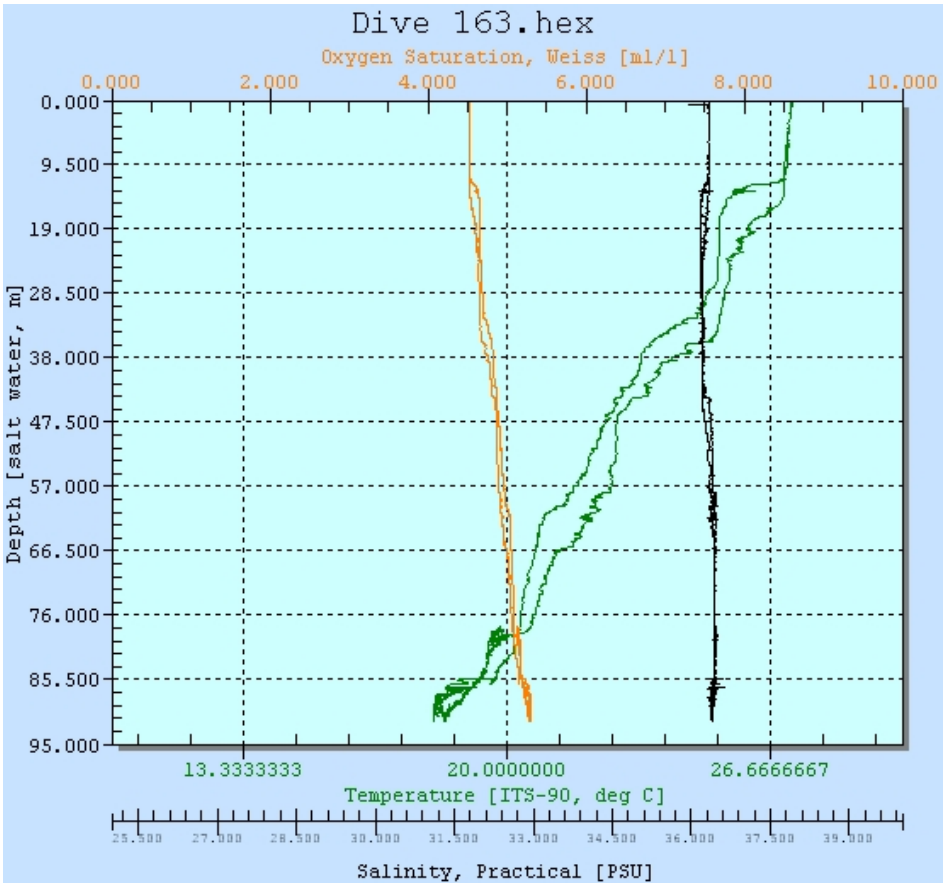
Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, Block 35, 80-92 m; UNCW ROV Dive 163

Dive Data:

Minimum Bottom Depth (m):	72.6	**Total Transect Length (km):**	1.881
Maximum Bottom Depth (m):	91.8	**Surface Current (kn):**	0.4
On Bottom (Time- GMT):	13:16	**On Bottom (Lat/Long):**	24.92°N; -83.8°W
Off Bottom (Time- GMT):	16:40	**Off Bottom (Lat/Long):**	24.92°N; -83.81°W

Physical (bottom); Temp (°C): **Salinity:** **Visibility (ft):** **Current (kn):** 0.1

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-19 are as follows: Depth: 72.6-91.8 m, Temperature: 18.2-20.9 °C , Conductivity: 47700-50700 (µS/cm), Pressure: 105.8-133.9 (PSI), Salinity: 36.3-36.5 (PSU), Sound Velocity: 1519.3-1526.8 (m/s), Oxygen Saturation: 5-5.3 (ml/l), Density: 1025.9-1026.7 (Kg/m^3), Nitrogen Saturation: 9.3-9.7 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, Block 35, 80-92 m; UNCW ROV Dive 163

Dive Imagery:

Figure 1: -80.3 m
Orange tube sponge

Figure 2: -80 m
Madracis sp.

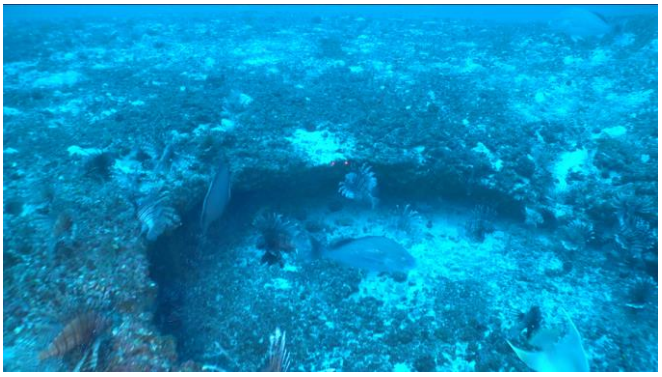


Figure 3: -81.2 m
Large outcrop and grouper pit

Figure 4: -80.2 m
Yellow sponge

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, Block 35, 80-92 m; UNCW ROV Dive 163

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

17- V-15-2, ROV 15-19, UNCW 163, Pulley Ridge West, Random Block 35, 2011 Nancy Foster multibeam sonar. Ground truth multibeam sonar map. Collected samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Events, habitat and fauna were recorded directly into Access database by the CIOERT team. Fish data were recorded by Melissa Price (CNTS- USGS) in separate Access database which was added to the Access habitat database. Dive Notes' depth were recorded as total depth (ROV altitude + ROV depth in meters). COG is ROV heading. Digital photos were taken with a fixed digital camera (Kongsberg OE14-408, resolution of 3648x2736 pixels), set to fixed 1/125, TV mode, Auto F-Stop, ISO-Auto, Auto Focus. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom; each transect was ~100-m long, with ~30 images/xs. The high definition video camera (Insite Pacific Mini Zeus high definition CMOS color zoom camera with 2,000,000 effective pixels) was angled ~20-30° down to see near and far to the horizon for fish counts and transects. Both cameras had a pair of parallel 10-cm lasers for scale. A Fastcat 49 CTD was attached to the ROV (temp, salinity, dissolved oxygen). Date/time of video and digital still camera, ROV CTD and ROV Nav were set to ESDT. A new collection sled and manipulator were used for the first time on the Mohawk ROV. The sled has a collection bin that slides in and out for samples and has removable sections allowing 4 to 8 bins; also a suction hose deposits samples into five 2-l buckets. The five function manipulator has a flat bladed jaw and 2” diameter suction hose.

Site Description/Habitat:

Depth range: 80.0- 92 m.

Start at south middle end of Block 35, following beginning of survey ROV track of 2014. Head north up shallow valley to west of main ridge and small ridge just west. Highest diversity and density of sponges of all Pulley Ridge sites. Ground truthed several grouper pits. Then transected west, down west slope to deep mound about 500 m west.

81 m- Valley just west of main ridge. 90% hard bottom, 5-20 cm cobble, flat, no ledges. Biota: Anadyomene abundant, rubble with CCA, Peysonnelia, Verdigellas, lots of sponges and diverse. Antipathes furcate, Aplysina tubes, various orange sponges, Axinellidae, Axinella, encrusting orange sponges, Agelas PR 3. Shirley estimates close to 100 species of sponges.

80.0 m- same area on top, thick fingered Madracis formosa, brown, 10 cm.; Ellisellidae, Antipathes atlantica?, Stylaster. Lionfish, sunshine reef fish, yellowtail reef fish, green band wrasse, threadnose bass, orange back bass, goldface puffer.

Head west down west slope to deep mounds. Top edge, 80.7 m; 3 m grouper pit with 30 cm ledge: 3 large margate, red grouper, lionfish, Spanish hogfish, 2 spot cardinal, trumpetfish, spotfin butterfly. Corallimorph. Xestospongia muta, Aiolochoria crassa.

80.0 m- two 5 cm Agaricia fragilis, white edge, some white linear patches.

86 m- Still Anadyomene, Stichopathes lutkeni.

90 m- ½ way from main ridge to deep mound. 50-80% soft bottom, patchy, cobble; still Anadyomene.

92.5 m- 1 ½ m diameter pit with ledge. Stripped grunt, cardinal fish, red barbier, lionfish, yellow tail reeffish, spotfin butterfly, graysby?, soldier, school bass.

MB WP- first deep mound, 92.2 m base, 91.2 m top. Appears to be rock mound, with sediment and cobble. 90% soft bottom and cobble. Halimeda, Verdigellas, sponges, but not diverse or dense as main ridge.

Dive Site: Gulf of Mexico, Pulley Ridge West Ridge, Block 35, 80-92 m; UNCW ROV Dive 163

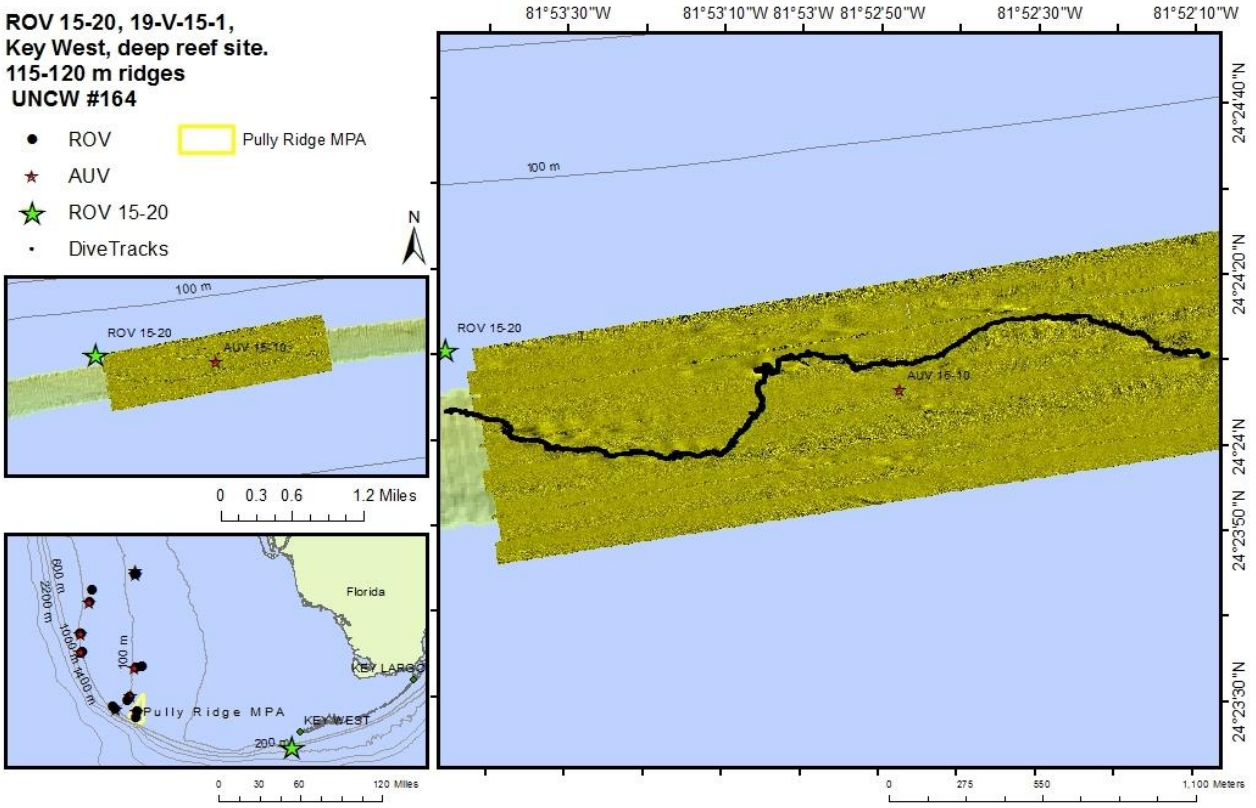
Tanacetipathes tanacetem.
Transect along north rim of deep mound. Cross valley with 100% sediment. 1 m pits common, no shaft. Halymenia, no Anadyomene.
92 m- 8 m diameter pit, 1 ½ m deep, ledge, vertical, undercut, and cobble. Threadnose, lionfish, red barbier, rough tongue bass, soldier, blue angel, 50-60 cm scamp, two 50-60 cm speckled hind. No octocorals, no black coral, few sponges, only encrusting. CCA or rock, Davidaster crinoid.
92 m- top of next mound, large pit, with 20 cm cobble, ½ m ledge. Lionfish, red grouper, several scamp, grasby. Red grouper in dark stripe phase.
16:42-abort dive. Rock jammed in vertical thruster.

Collected 16 samples: 13 Porifera- Axinella, Axinellid, encrusting orange, Agelas PR3, Amphimedon PR2; Algae- Anadyomene men.; Coral- Madracis formosa thick finger; Octocoral- White fan, very thin branches.

Common Species
Algae- Chlorophyta; *Anadyomene menziesii*,
Fish- blue angelfish - *Holacanthus bermudensis*, Chalk bass- - *Serranus tortugarum*, Deepwater squirrelfish - *Sargocentron bullisi*, Greenband wrasse - *Halichoeres bathyphilus*, lionfish - *Pterois volitans*, Reef butterflyfish - *Chaetodon sedentarius*, Roughtongue bass - *Pronotogrammus martinicensis*, Scamp - *Mycteroperca phenax*, spotfin butterflyfish - *Chaetodon ocellatus*, spotfin hogfish - *Bodianus pulchellus*, Yellowtail reeffish - *Chromis enchrysura*,

Dive Site: Florida, SW of Key West, NAAR MB Site, deep reef site, 115-120 m ridges; UNCW ROV Dive 164

General Location and Dive Track:



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Data Management:	Access Database
ROV Navigation Data:	Trackpoint II
Ship Position System:	DGPS
Report Analyst:	John Reed, Stephanie Farrington
Date Compiled:	9/23/2015

Dive Overview:

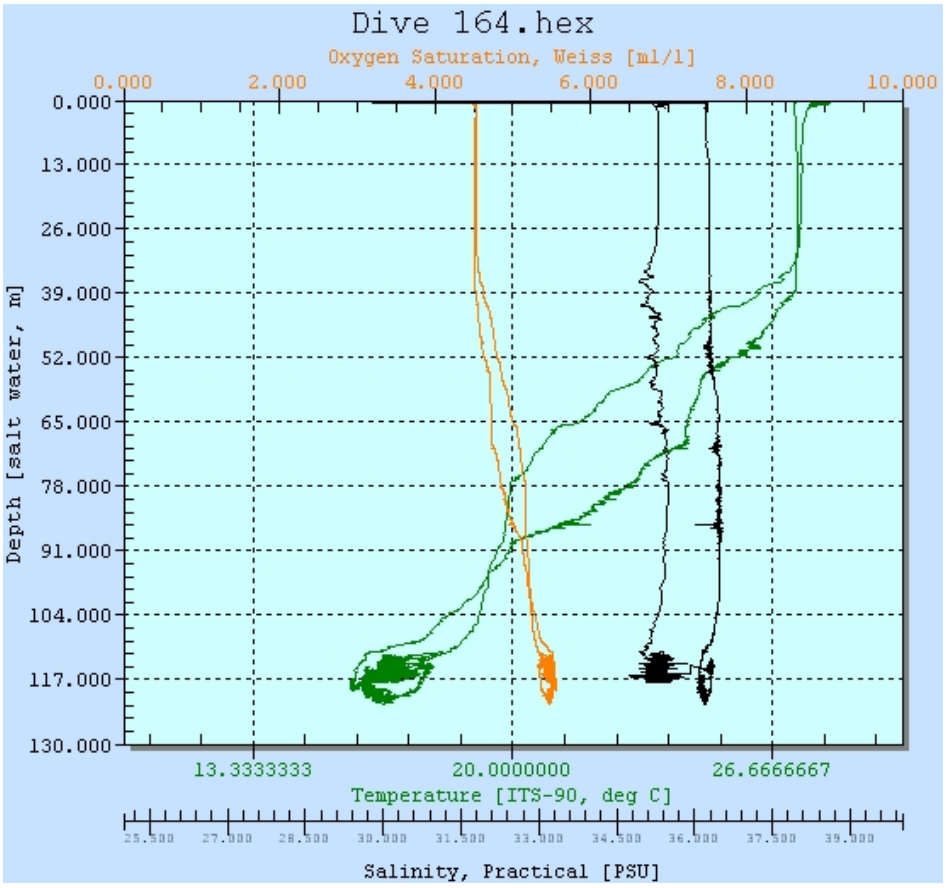
Vessel:	University of Miami R/V Walton Smith- Cruise No.: WS15125
Sonar Data:	15-10
Purpose:	Exploration and Collections
ROV:	Mohawk ROV
ROV Sensors:	
Date of Dive:	5/19/2015
Specimens:	9
Digital Photos:	197
DVD:	5
Hard Drive:	1

Dive Site: Florida, SW of Key West, NAAR MB Site, deep reef site, 115-120 m ridges; UNCW ROV Dive 164

Dive Data:

Minimum Bottom Depth (m):	111.4	**Total Transect Length (km):**	3.482
Maximum Bottom Depth (m):	121.9	**Surface Current (kn):**	0.1
On Bottom (Time- GMT):	8:19	**On Bottom (Lat/Long):**	°N; °W
Off Bottom (Time- GMT):	13:48	**Off Bottom (Lat/Long):**	24.4°N; -81.87°W
Physical (bottom); Temp (°C):	15.94	**Salinity:** 36.10 **Visibility (ft):** 20	**Current (kn):** 0.5

Physical Environment:



All CTD data were collected with a SeaBIRD CTD that was attached to the ROV (recording Descent, Bottom data and Ascent) the ranges of the bottom data ranges recorded during ROV 15-20 are as follows: Depth: 111.4-121.9 m, Temperature: 15.8-18.2 °C , Conductivity: 44600-47500 (µS/cm), Pressure: 162.5-177.9 (PSI), Salinity: 35-36.4 (PSU), Sound Velocity: 1512.4-1519.1 (m/s), Oxygen Saturation: 5.3-5.6 (ml/l), Density: 1025.9-1027.1 (Kg/m^3), Nitrogen Saturation: 9.8-10.1 (ml/l). These data were used to characterize hydrographic conditions at the dive sites.

Dive Site: Florida, SW of Key West, NAAR MB Site, deep reef site, 115-120 m ridges; UNCW ROV Dive 164

Dive Imagery:

Figure 1: -122.3 m
Scorpionfish

Figure 2: -121.2 m
Guyanacaris hirsutimana

Figure 3: -115.2 m
Small planar gorgonian

Figure 4: -115.8 m
Grouper near outcrop

Dive Site: Florida, SW of Key West, NAAR MB Site, deep reef site, 115-120 m ridges; UNCW ROV Dive 164

Dive Notes:

Objectives, Site Description, Habitat, Fauna:

Site/Objectives:

19- V-15-1, ROV 15-20, UNCW 164, Straits of Florida, Key West deep reef, 114-122 m, SW of Key West, south of Sand Key Lighthouse, and 1000 m south and outside of FKNMS boundary. Naar multibeam map, single 500 m wide swath that went from West Florida shelf Lophelia reef site to south of Pulley Ridge at 500 m depth, then from Tortugas to Key West along 125 m contour. This site is only portion of the 125 m swath that shows any hard bottom. AUV 10 conducted SSS of the same site. Ground truth the Naar MB map and the Bluefin AUV sonar. Collect samples for taxonomy, photo id album, and sponge cell culture (S. Pomponi). Video frame grabs of each sample. Conducted periodic quantitative photo/video transects for fish and biota analyses.

ROV Setup/Dive Events:

Digital still images shot in Tv Mode, fixed speed at 1/125, auto f-stop, auto focus, strobe on. Quantitative photo transects used the digital still camera pointing straight down, 1.3 m off bottom. Video for fish counts and transects used the video camera pointed forward and down to view the horizon to close up. Video frame grabs were made for documentation of each sample; no digital stills of samples. Both cameras had 10-cm parallel lasers for scale. Bottom visibility 7 m, and current variable but 0.25- ¾ knot from west.

Site Description/Habitat:

Depth range: 122.5- 114 m.

120.3 m- 225 m west of first reef tract. 100% soft bottom, very fine, silty clay mud. Sparse bioturbation, 10-20 cm depressions. ½ m diameter burrow with 5-10 cm vertical to oblique shaft in clay bottom. Very common throughout dive on non-reef areas of the dives. Later found out that it is made by a 10-15 cm long lobster. Shape of small Homarus but with hairy short claws (Axiidae; Guyanacaris hirsutimana). Most had two shafts, 1 m apart. Many had commensal small shrimp, shaped like Stenopus but brown colored.

119.2 m- MB WP- West end of West Ridge. 20-50% cover of ½ to 1 m diameter flat topped boulders, about 30-50 cm relief. Rock fairly barren except for hydroids, and thin encrusting sponges. 1 cm pits all over rock (boring sponge, Lithopaga, or boring barnacle), filamentous green algae, sparse purple octocorals. Sample of 10 cm finger, purple octocorals. Snowy grouper, school of mahogany snapper(?), Chaetodon aya, threadfins?, bigeye, blueline tilefish, anthiids, green band wrasse. Trap line? Snowy grouper.

121 m- Continue West Ridge. Series of patch reefs about 35 m linear diameter with the boulders zone. In between is either flat sediment or sediment with 10-15 cm cobble, 10-50% cover.

119 m- Another patch reef on West Ridge, snowy grouper, scorpionfish, red barbier, rough tongue bass, another snowy 30-40 cm.

119.5 m- 1/3 along West Ridge. 50% cover of boulders, same size, and cover of biota. Blueline tilefish, mahogany snapper?. Trap line. Snowy.

121 m- Patch reef. School of small fish, 2 snowy, pile of heavy fishing line, starfish. Sample of rock cobble, conglomerate of coarse sediment.

121.5 m- Another patch reef. Snowy, black bar drum, boarfish, anthiids.

122 m- Patch reef, 35 m diameter on MB. Snowy.

122.5 m- 35 m diameter patch reef, same size boulders and density, 50% cover. 1 snowy. Most snowy so far are small, 30 cm.

122.5 m- Last patch reef of West Ridge. 20-30 cm snowy grouper.

Head 30 dg. 330 m to Middle Ridge; first patch reef on it is 90 m long, oriented E-W, and 15 m wide. In between two ridges is 100% soft bottom, silty clay. Dense ½ m diameter burrows with vertical shafts- all Axiidae? Lobsters. Tethyaster grandis.

Dive Site: Florida, SW of Key West, NAAR MB Site, deep reef site, 115-120 m ridges; UNCW ROV Dive 164

118 m- On Middle Ridge. First patch reef, 90 m diameter in MB. ½ to 1 m flat topped boulders, 30-50 cm tall. Hydroids, encrusting sponges, but dense purple fingered, 10 cm octocorals (Diodogorgia?). Dense fish on all the boulder patch reefs. And some tilefish in the inbetween areas of mud. Mahogany snapper?, Chaetodon aya, French angelfish, anthiids, green band wrasse, rough tongue bass. Ophioderma devayni.
115 m- Top of ridge, west end of Middle Ridge. 118 m at base, 3 m relief overall. 30% cover of 10-15 cm cobble, some purple octocorals on rock. 25 cm white fan octocorals. Collected both species.
115m- Blueline tilefish, 40 cm; snowy grouper.
117 m- midway along Middle Ridge. Patch reef, ½ - 1 m boulders. Purple octocorals dense, Plumerella? Hydroids. Snowy grouper, scorpionfish, blueline tilefish, snowy grouper, mahogany snapper? Schools, bigeye, 5- snowy.
Series of patch reefs along the Middle Ridge; all with boulder zone and in between sediment with cobble zones. Collected sediment, trying to suck up the Axiidae lobster.
116.6 m- End Middle Ridge. Head NE to East Ridge. 50 cm tilefish on mud bottom, near burrow with small boulder, also snowy grouper. Lots of lobster burrows.
115.5 m- MB WP- West end of East Ridge. Ridge 114 m top of ridge, 115 m base. Boulder patch reef with 50 cm relief, 2 snowy, Lysmata banded shrimp, schools of Mahogany snapper?. Series of boulder patch reefs, with cobble zones between. Dense purple octocorals. Patch reefs with 60-70% boulders, and continuous cobble zones from 30-70% cover. Collect white Nidalia octocoral.
116 m- Transect over to second segment of East Ridge. 2 blue tilefish and bigeye in small boulder patch.
117 m- East part of East Ridge. French angelfish, rough tongue bass, juvenile black bar drum. Patch reefs with ½ to 1 m flat topped boulders, 30-50 cm relief. Snowy grouper, tilefish- 50 cm, yellow edge grouper.
118.5 m- Boulder with 2 snowy grouper, 1 yellow edge grouper.
Total photos- 132.

Total samples collected- 9. 1- Porifera; 3- Octocoral- purple finger, white fan, white Nidalia; rock cobble, sediment.

<u>Common Species</u>
Cnidaria- Octocorallia; *Diodogorgia* sp.
Fish- Anthiinae, Bank butterflyfish - *Chaetodon* (*Prognathodes*) *aya*, Bigeye - Priacanthidae, Bigeye - *Priacanthus arenatus*, Blackbar drum - *Pareques iwamotoi*, Blueline tilefish - *Caulolatilus microps*, Greenband wrasse - *Halichoeres bathyphilus*, Red barbier - *Hemanthias vivanus*, Roughtongue bass - *Pronotogrammus martinicensis*, Saddle bass - *Serranus notospilus*, Scorpionfish - Scorpaenidae, Snapper - Lutjanidae, Snowy Grouper - *Epinephelus niveatus*, Tattler - *Serranus phoebe*

End dive. End Cruise.