



Habitat-linkages, spatial demographics and food web components of the northeastern Gulf fisheries ecosystem - Year 1 progress



Doug DeVries¹, Chris Gardner¹, Gary Fitzhugh¹, Mark Monaco², Robert Allman¹, and Linda Lombardi-Carlson¹

¹NOAA Fisheries Service, Panama City Laboratory

²NOAA Ocean Service, Biogeography Program, Silver Spring, MD

Introduction

- The relationship of fishery production to hard bottom habitats from nearshore to shelf edge and the connectivity among them is poorly understood.
- An estimated 17-20% of the shelf in the eastern Gulf is hard bottom, but little (estimated 9% as of 1992) has been surveyed in a way allowing calculation of habitat area.
- Ecosystem management requires knowledge of interactions between fishes and their habitats and the ability to predict fisheries productivity.
- Knowledge of trophic dynamics is key to understanding the fish-habitat linkages.



Lions Paw Reef – nearshore (23 m) depth stratum. One of the highest profile sites (1-1.5 m in places).

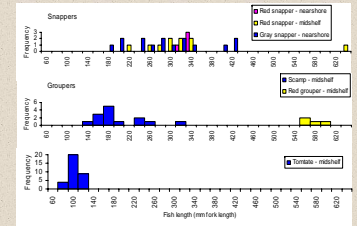


Another view of Lions Paw showing blue angelfish, gag, scamp, and both red and gray snapper. Most fish shown are 25-35 cm in length.

First Year Results

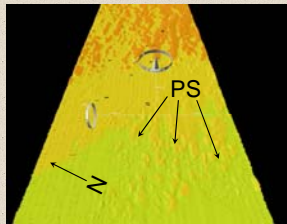
- Located and surveyed potential ROV sites and matching suite of nearby sites for collecting biological specimens (14 sea days).
- Collected high-resolution bathymetry and back scatter data with multibeam sonar in cross-shelf transect (~2.5x30 nm) off NW Florida.
- Began ROV and hook-and-line sampling:
 - 1) Hard bottom habitat much lower profile in mid- and deepest strata.
 - 2) Nearshore less speciose. Gray snapper only found nearshore, where very common. Red snapper and scamp common in all strata. Very few gag observed anywhere.

Length frequencies of red and gray snappers, scamp, red grouper, and tomate obtained from laser-scaled ROV video.

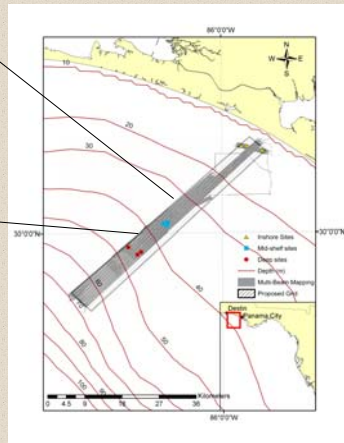


Methods

- 9 fixed, hard bottom sites, 3 each in 3 depth strata (23, 37, & 49 m) sampled Feb, Jun, and Oct.
- Species composition, abundance, and size data from 2-4, 25-40m strip transects using ROV with parallel lasers.
- Cryptic species and additional size data during 20-30 min random search with ROV.
- Age, food habits, and stable isotope samples from standardized hook-and-line sampling at nearby sites.
- High-resolution bathymetry and backscatter data from multibeam sonar in 3x30nm transect, nearshore to ~70m, to delineate and quantify hard bottom habitat.



Multibeam bathymetry (oblique view) of mid-depth stratum with evidence of Pleistocene shoreline (PS).



Feb '07 multibeam survey transect and fixed biological sampling sites.



Red grouper and speckled hind at mid-depth site showing typical low-profile rocky habitat and sponge fauna.

Scamp illuminated with scaling lasers (=50 mm).



Seabotix ROV and tether



R/V Harold B

Species observed with ROV at mid-shelf sites during March 2007 and size ranges obtained by laser scaling.

Common Name	Species	Min FL (mm)	Max FL (mm)	Number of Measurements
Tomate	<i>Haemulon aurolineatum</i>	80	125	33
Red Snapper	<i>Lutjanus campechanus</i>	220	633	10
Red Porgy	<i>Paragus pagrus</i>	139	232	6
Spotfin Butterflyfish	<i>Cheilotodon ocellatus</i>	123	147	6
Scamp	<i>Myxotroperca phenax</i>	138	319	5
Short Bigeye	<i>Prisacanthus arenatus</i>	221	261	5
Red Grouper	<i>Epinephelus morio</i>	562	594	4
Gray Triggerfish	<i>Balistes capricornis</i>	235	352	4
Blue Angelfish	<i>Holocentrus bermudensis</i>	83	165	4
Yellowtail reeffish	<i>Chromis enchrysurus</i>	68	87	2
Bank Sea Bass	<i>Centropristis occurrentis</i>	149	149	1
Reef Butterflyfish	<i>Chaetodon sedentarius</i>	123	121	1
Bank Butterflyfish	<i>Prognathodes aya</i>	96	96	1
Spotfin Hoopfish	<i>Bodianus pulchellus</i>	183	183	1
High-hat	<i>Equetus acuminatus</i>	102	102	1
Gulf Surgeonfish	<i>Acanthurus randalli</i>	91	91	1
Belted Sandfish	<i>Serranus subligarius</i>			
Blenny	<i>Chasmodes</i> spp.			
Cardinalfish	<i>Apogon</i> spp.			
Cocoa Damselfish	<i>Stegastes variabilis</i>			
Crocodile Fish	<i>Paranthurus furcifer</i>			
Greenhead wrasse	<i>Halichoeres bathyphilus</i>			
Jackknife-fish	<i>Equetus lanceolatus</i>			
Wrasse	<i>Halichoeres</i> spp.			
Goby	<i>Coryphopterus</i> spp.			
Purple Reeffish	<i>Chromis scotti</i>			
Rock Beauty	<i>Holocentrus tricolor</i>			
Sharpnose Puffer	<i>Canthigaster rostrata</i>			
Speckled Hind	<i>Epinephelus drummondhayi</i>			
Tattler	<i>Serranus phoebe</i>			
Wrasse Bass	<i>Liopropoma eukirines</i>			