

# Investigators

John Reed and  
Stephanie Farrington

NOAA

The Cooperative Institute for  
Ocean Exploration,  
Research, and Technology

Harbor Branch  
Oceanographic Institute at  
Florida Atlantic University

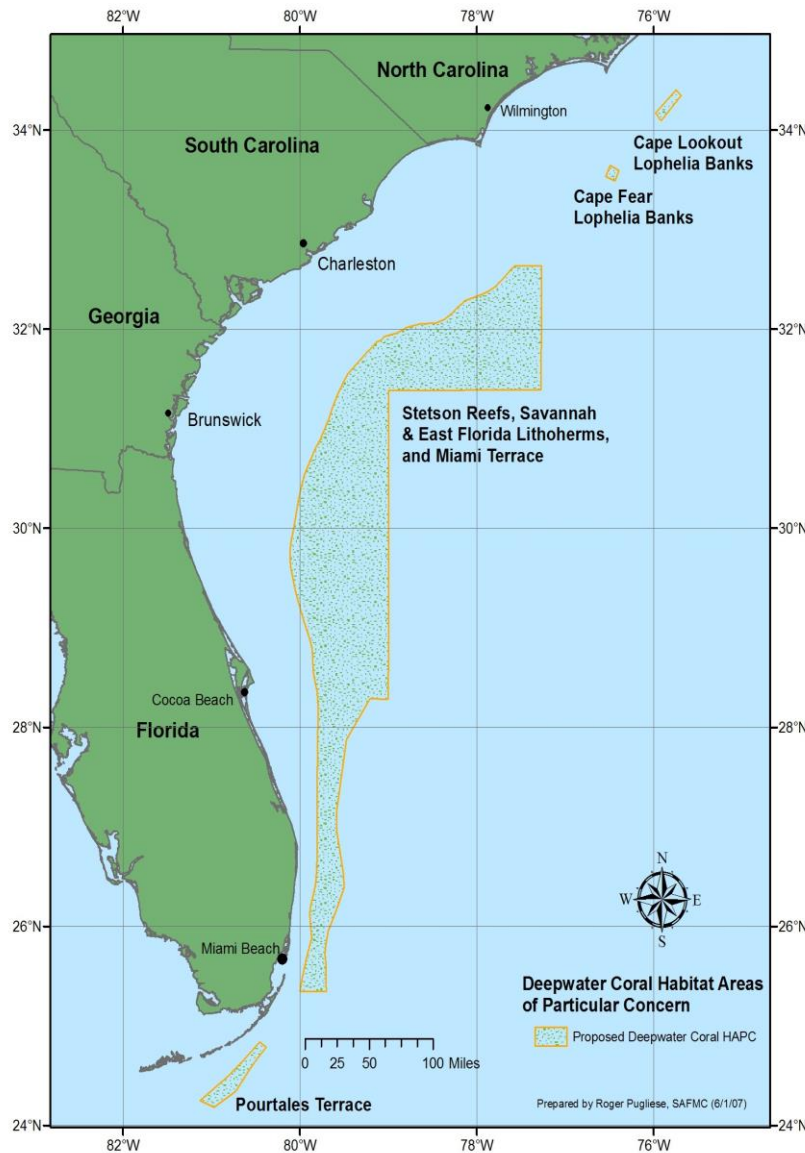


**HARBOR  
BRANCH**

FLORIDA ATLANTIC UNIVERSITY®



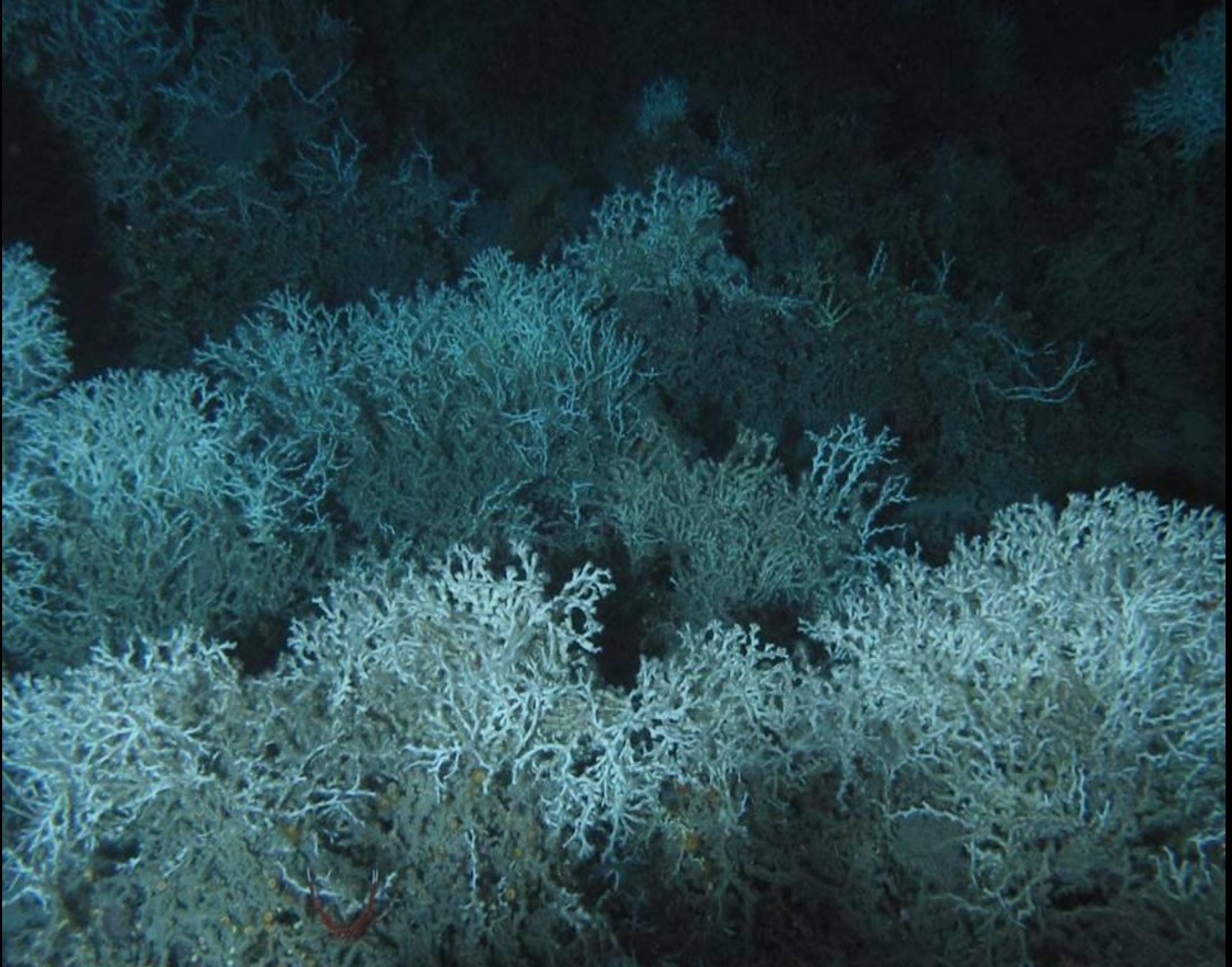
**2018 SAFMC Meeting- St. Petersburg, FL, Nov. 6-8**



# Deep-water Coral Habitat Areas of Particular Concern (CHAPC)

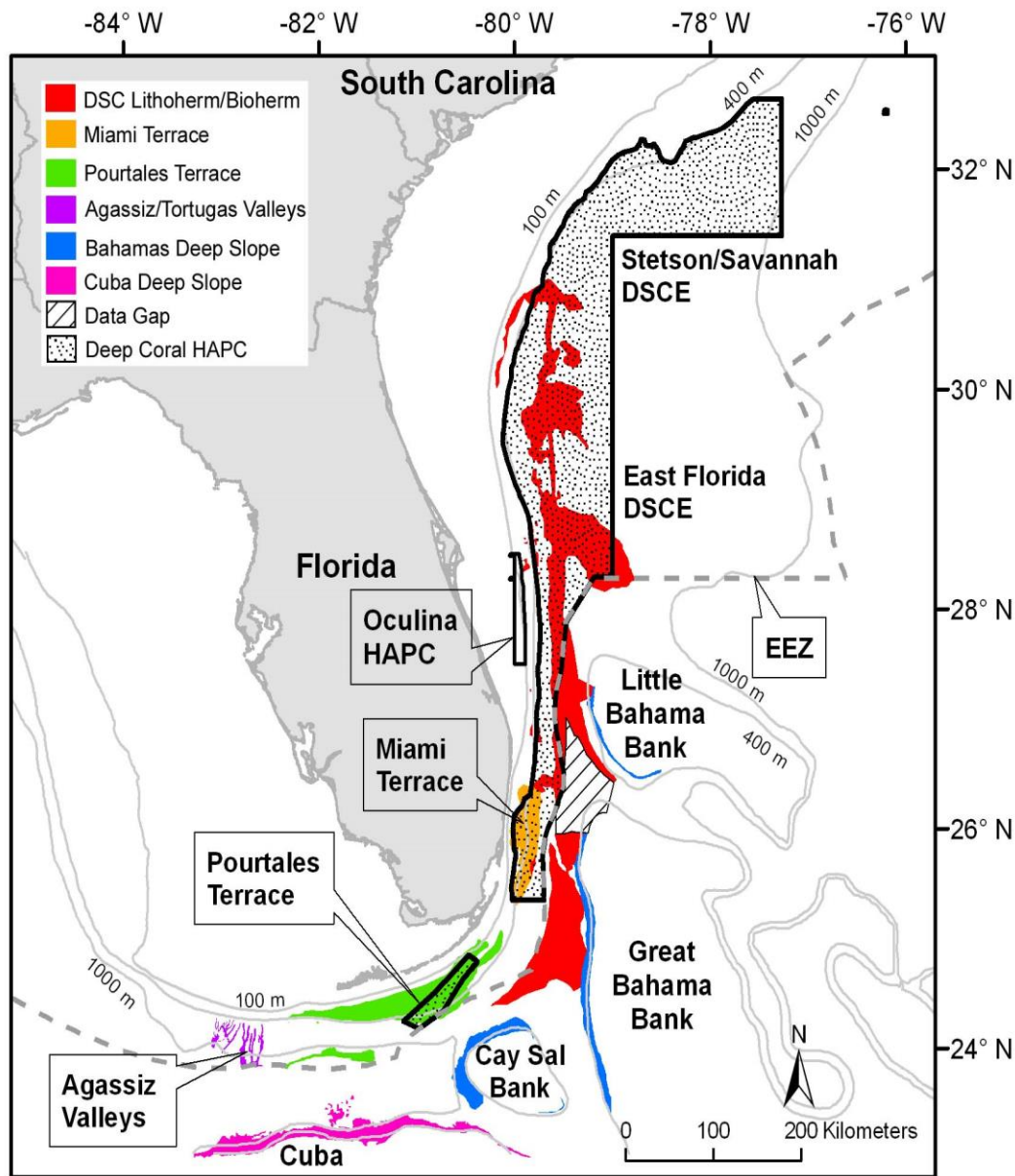
(24,000 sq.mi.;  
43,393 km<sup>2</sup>)

2010  
Department of Commerce,  
Magnuson-Stevens Fishery  
Conservation and Management Act



Deep-water coral thickets of *Lophelia pertusa*





Model of Probable Deep-sea Coral and Sponge Habitat off SE USA  
(Reed et al., 2013)



Lithistid sponge- potent anticancer compounds

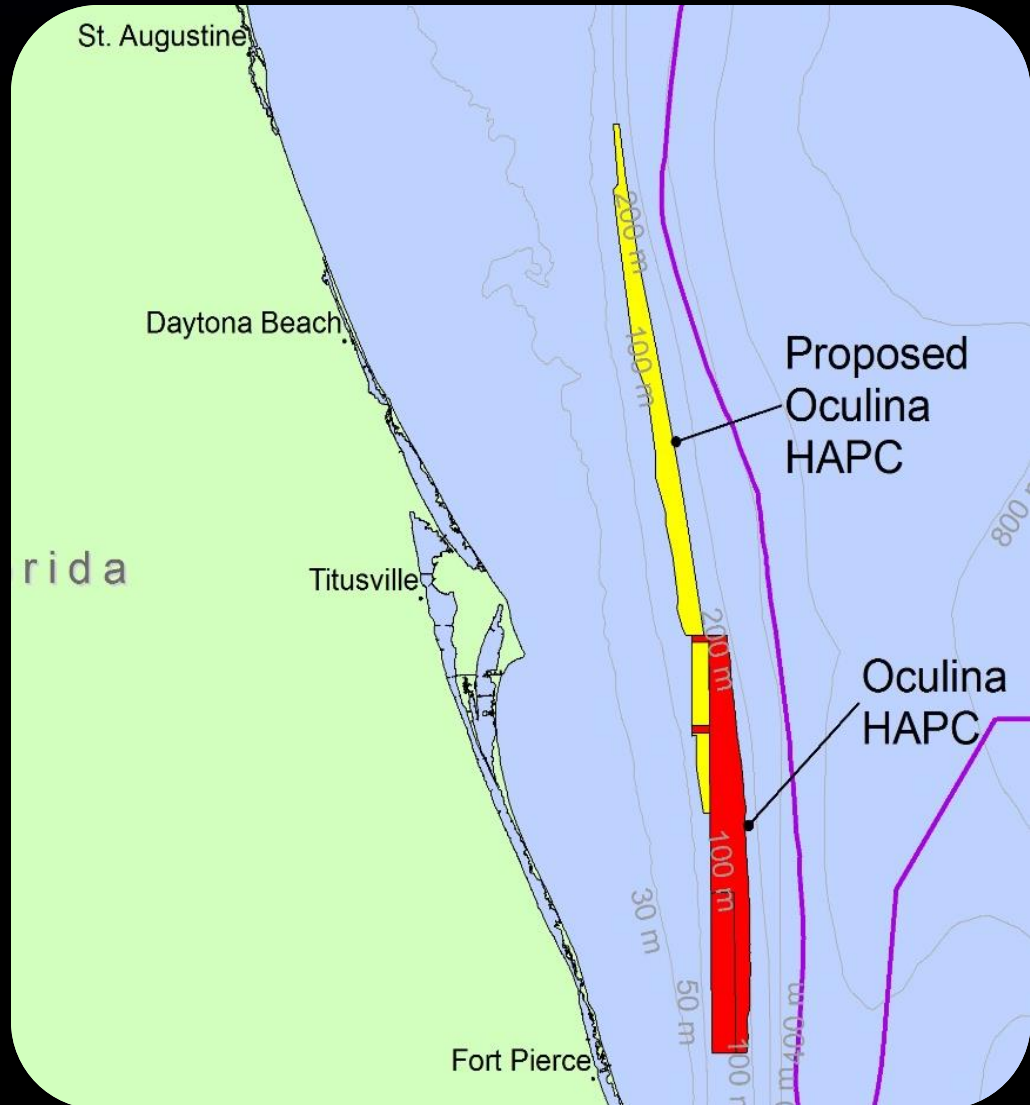
Habitat Type	U.S. Florida	Western Bahamas	Northern Cuba	Total
Coral Mounds km <sup>2</sup> (% of total)	13,440 (58.0%)	9,482 (41.0%)	227 (1.0%)	23,149 (100%)
Island Slope km <sup>2</sup> (% of total)	-	4,226 (53.2%)	3,723 (46.8%)	7,949 (100%)
Miami Terrace and Escarpment km <sup>2</sup> (% of total)	2,329 (100%)	-	-	2,329 (100%)
Pourtales Terrace and Escarpment km <sup>2</sup> (% of total)	5,660 (97.2%)	154 (2.6%)	9 (0.2%)	5,823 (100%)
Agassiz/Tortugas Valleys km <sup>2</sup> (% of total)	628 (95.2%)	-	32 (4.8%)	660 (100%)
<b>Total DSCE Habitat km<sup>2</sup> (% of total)</b>	<b>22,057 (55.3%)</b>	<b>13,862 (34.7%)</b>	<b>3,991 (10.0%)</b>	<b>39,910 (100%)</b>
DSCE Habitat within CHAPC (U.S. only)	15,503 (70.3%)	-	-	-
<b>DSCE Habitat outside CHAPC (U.S. only)</b>	<b>6,554 (29.7%)</b>	-	-	-

Table 1 [from Reed et al. 2013]. Planar areal extent (km<sup>2</sup>) of regions of deep-sea coral ecosystem habitat in the southeastern U.S. from northeastern Florida (31°N) through the Straits of Florida between Florida, Bahamas and Cuba.



# 2015 Oculina HAPC Extension

- 265 mi<sup>2</sup> North & 60 mi<sup>2</sup> West
- 2015-  
Amendment 8  
of Coral  
Fishery  
Management  
Plan



# Fish Associated with Deep-water *Oculina* Coral Habitat (Grant Gilmore)

## 70 Species

- **Grouper (Serranids)-** gag, scamp, snowy, red, warsaw, speckled hind, goliath grouper, black sea bass
- **Snapper-** red snapper, grey, lane, vermilion
- **Migrating-** greater amberjack, king mackerel, spanish mackerel, wahoo, little tunny
- **Charismatic-** giant ocean sunfish (*Mola mola*), manta ray, tiger shark, hammerhead shark
- **Reef fish-** anthiids, angelfish, damselfish, wrasse, gobies, squirrelfish, bigeye, cardinalfish





Scamp grouper use deep Oculina reefs for spawning sites.  
Dominant male scamp grouper on Oculina reef- 280 ft

# **Mollusks Associated with *Oculina* Coral Habitat**

- **230 Species**
- **111 Genera**
- **74 Families**
- **153 Gastropoda**
- **68 Bivalvia**
- **5 Polyplacophora**
- **1 Scaphopoda**
- **1 Cephalopoda**

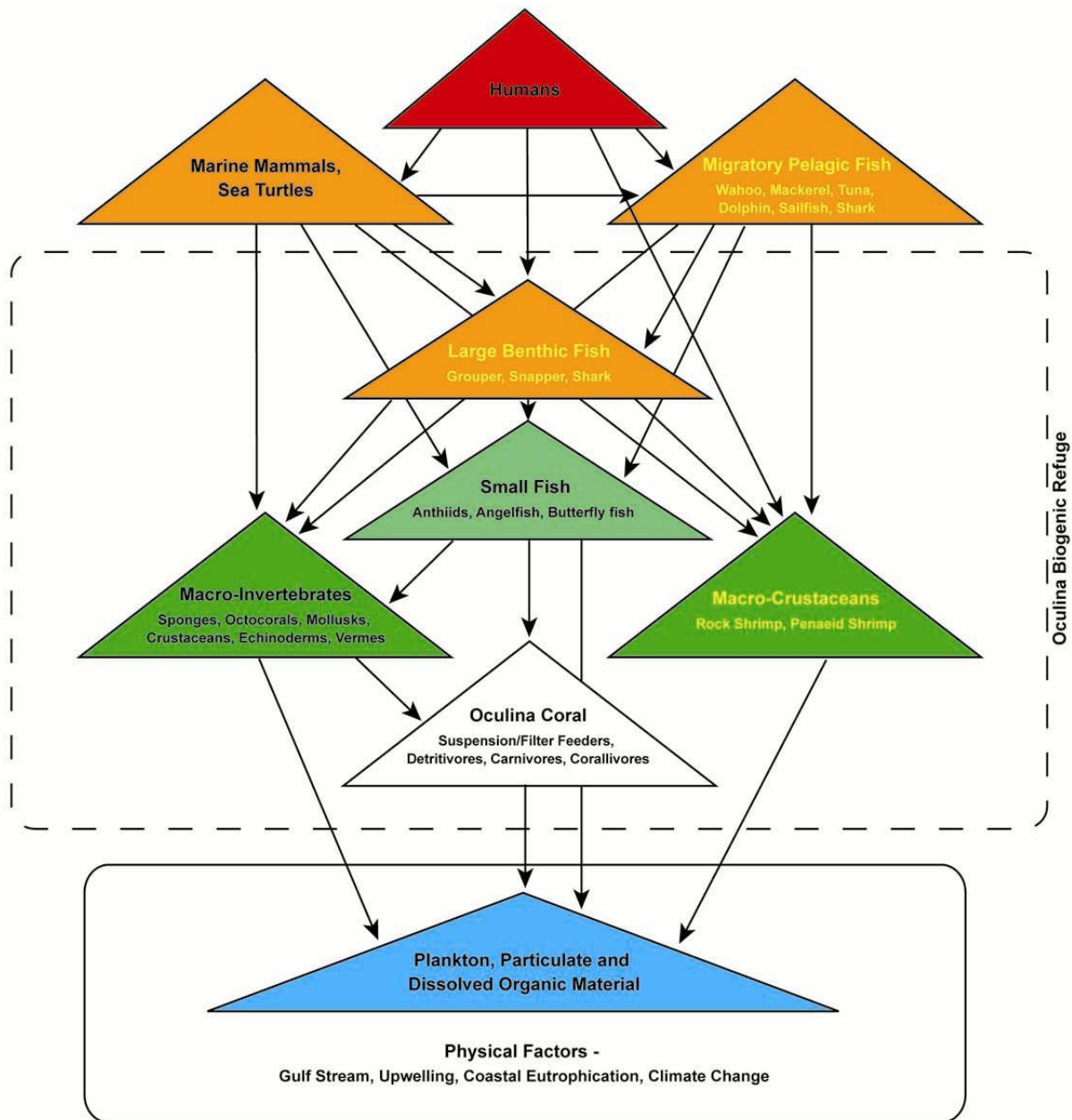


Fig. 5. Trophic model of deep-water *Oculina* coral ecosystem. *Oculina* Coral Marine Protected Area off the southeastern United States which includes essential fish habitat for the Grouper/Snapper complex (fisheries species in yellow). (John Reed, 2004)



# Potential Human Impacts

- Offshore energy projects- gas, oil, renewable energy
- Bottom fisheries such as shrimp trawling, bottom longlines & crab traps
- Global warming- ocean acidification
- Invasive species



06/04  
DEPTH  
2690FT

TEMP  
06.0C

10:22:57  
SALIN  
34.9



Deepwater shrimp- target of bottom trawling

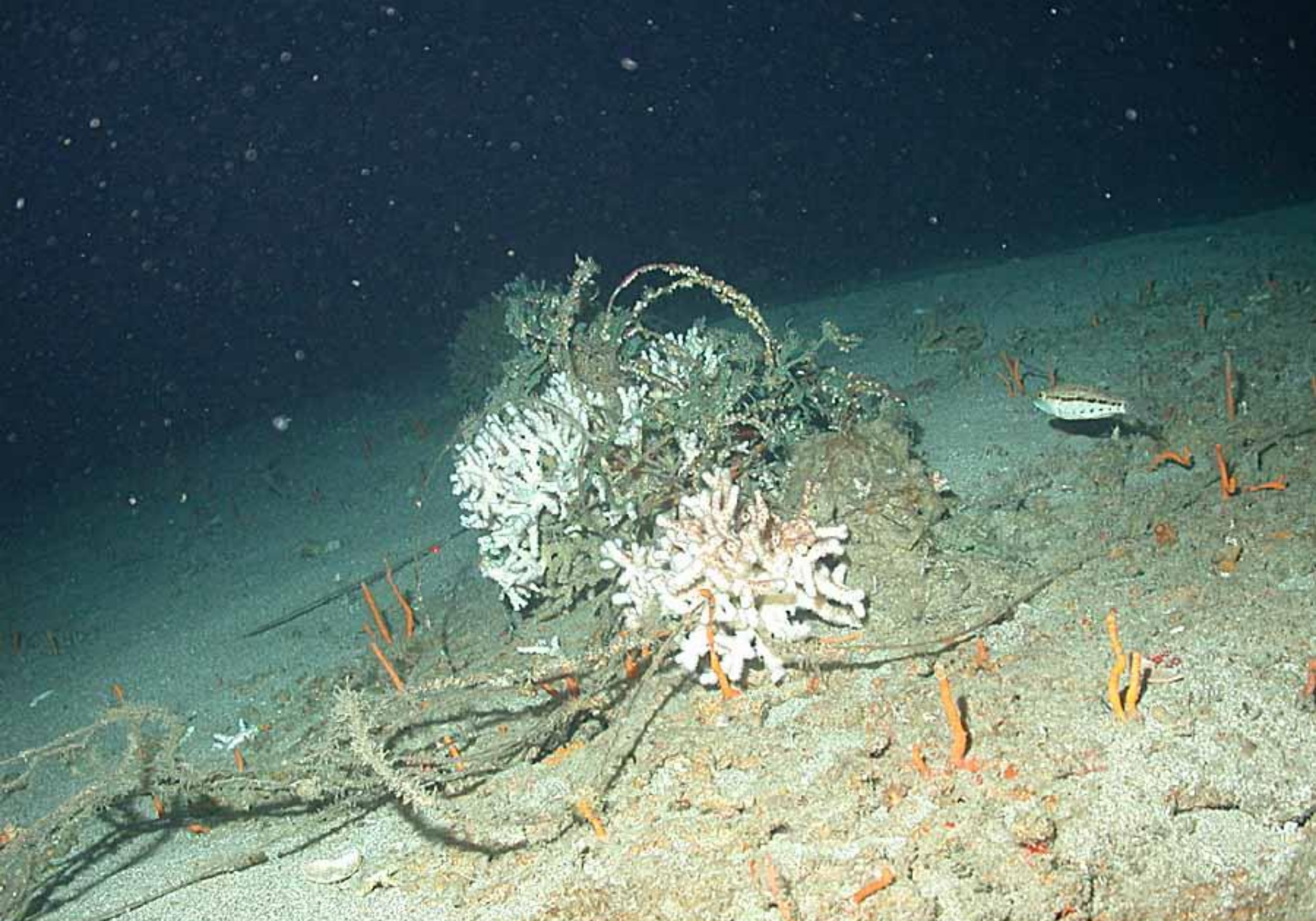


17:50:10 08/10/09  
DEPTH TEMP SALIN  
1390FT 07.5C 35.0



Golden crab- target of deepwater longline traps



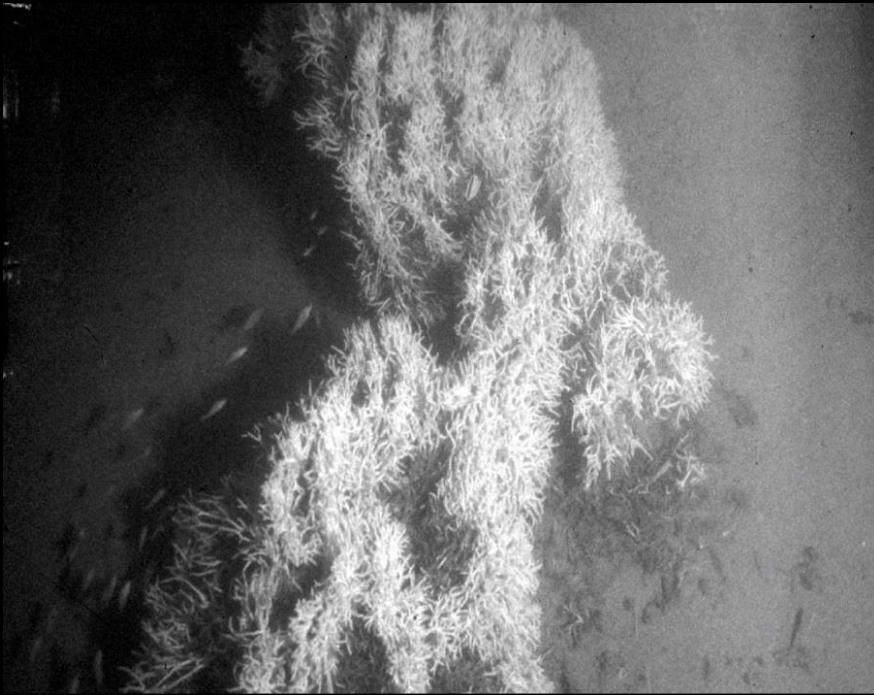


Longline wrapped on deepwater Oculina coral





Bottom trawling for rock shrimp has devastated a vast amount of the Oculina reef habitat



## Oculina HAPC

- Healthy Oculina coral reef off Cape Canaveral-1978.
- Same as previous reef in 2001, after years of bottom trawling by rock shrimp fishery.

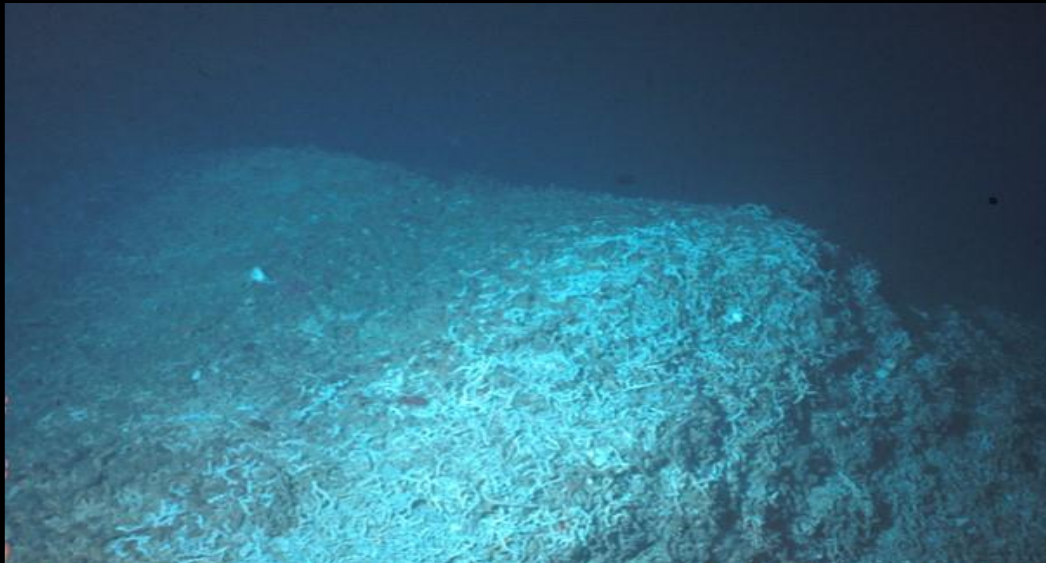
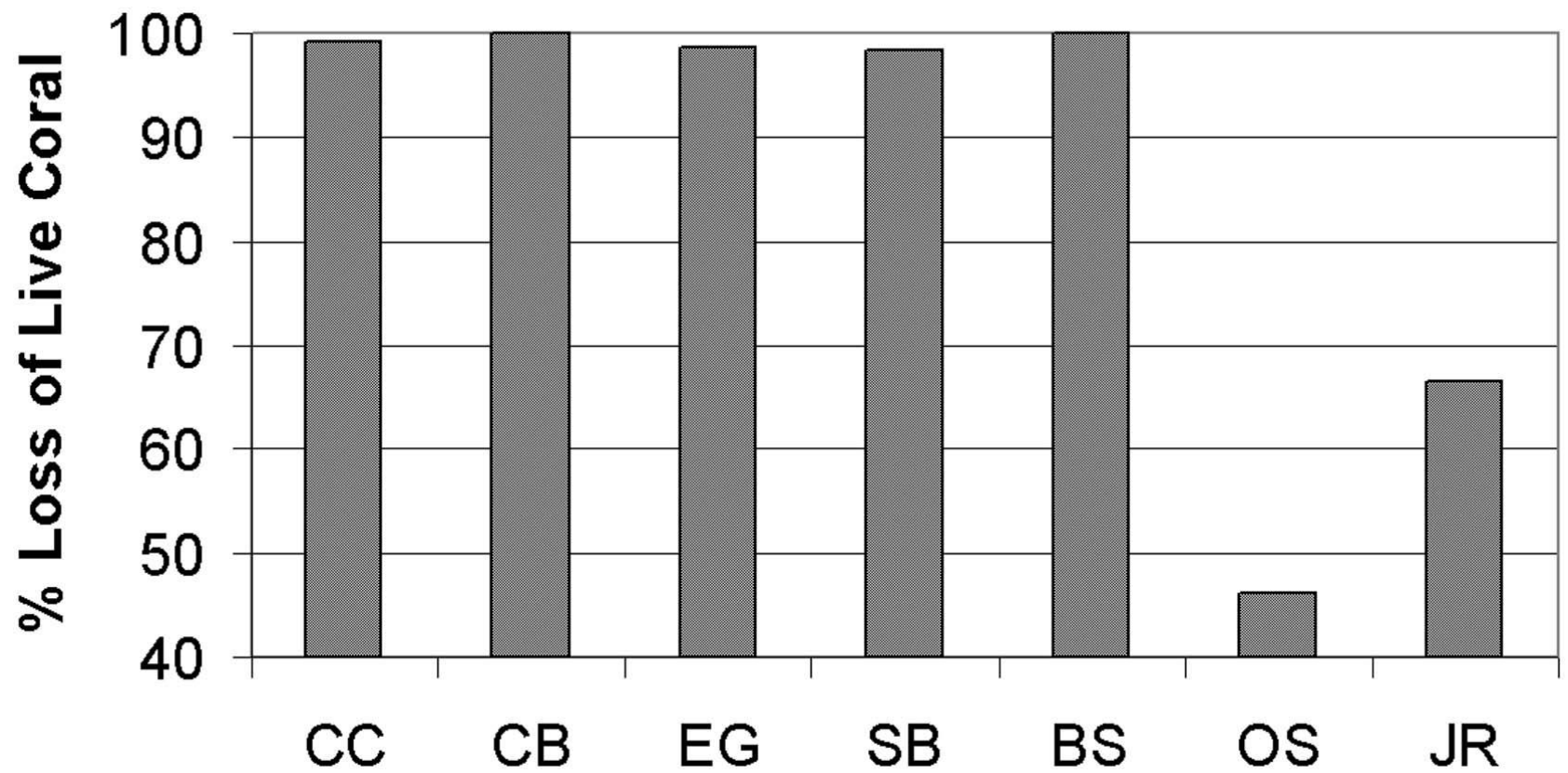
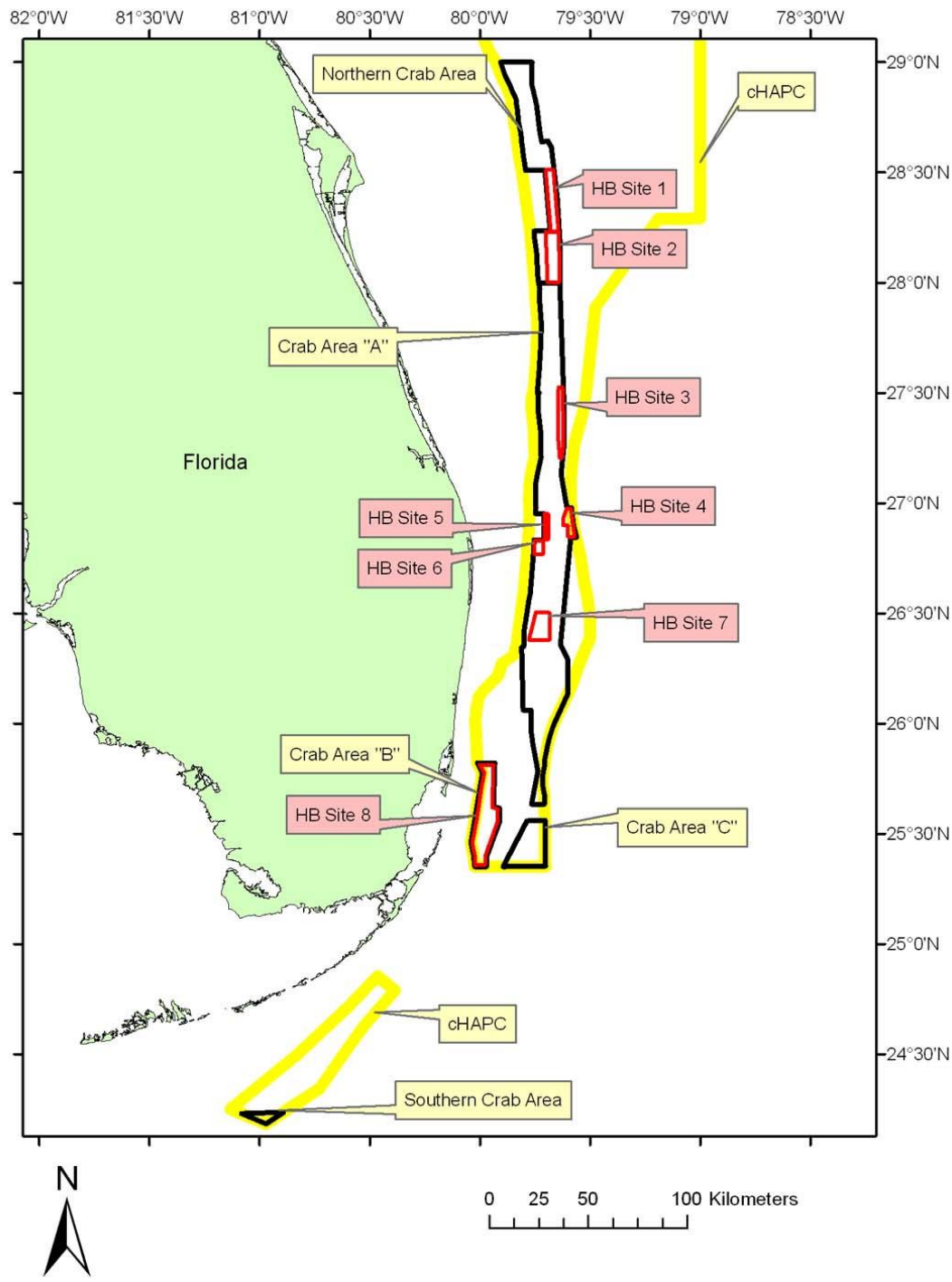


photo by John Reed, JSL submersible





from Reed et al., 2007

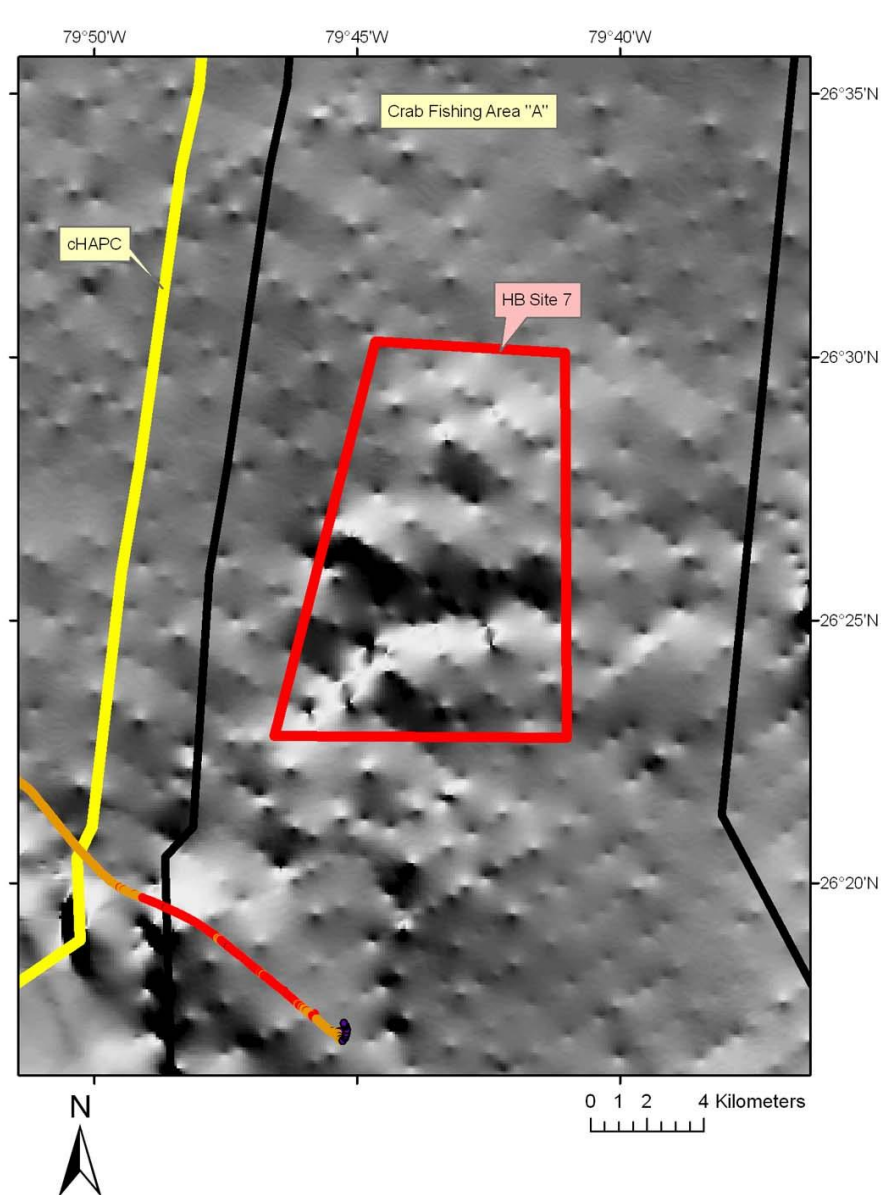
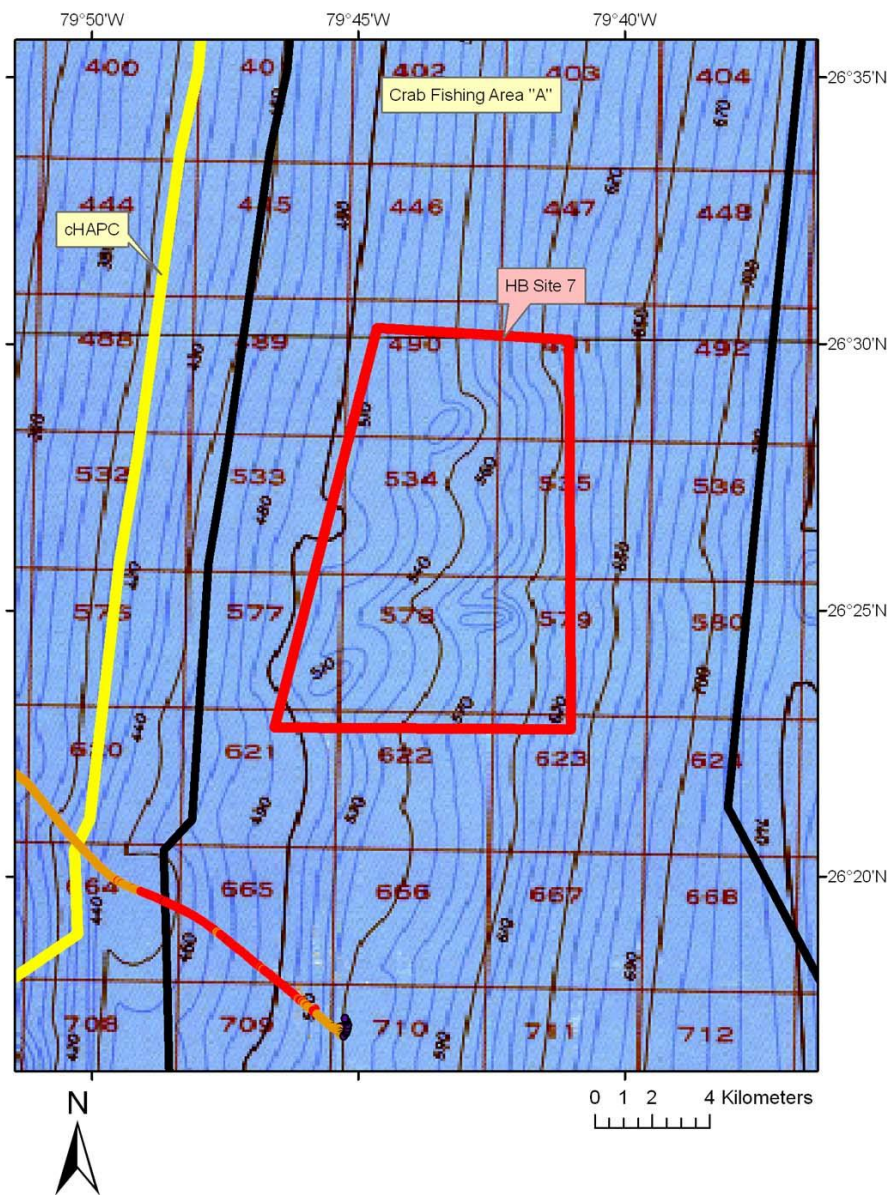


Boundaries of Deep-water Coral HAPC (yellow polygons).

Allowable Crab Fishing Areas (black polygons)

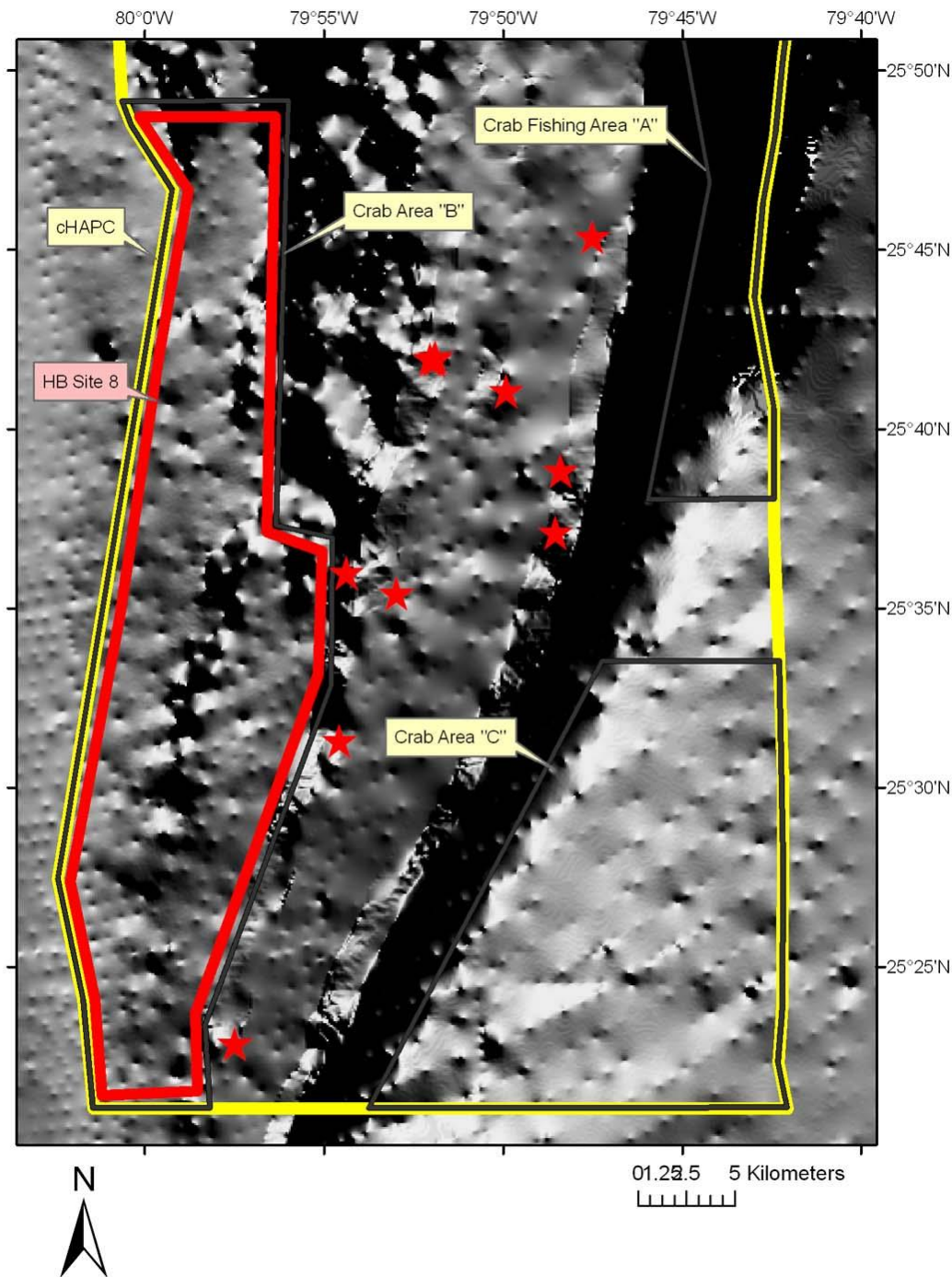
Probable hard-bottom (HB), coral/sponge habitat sites (red polygons) that are within the Crab Fishing Areas.

Reed and Farrington, 2010.



Allowable Crab Fishing Area "A" (black polygon) within CHAPC (yellow). HB Site 7 (red polygon) within the Allowable Fishing Area clearly appears as potential high-relief bathymetry. Bathymetry from NOAA Bahamas NG 17-6 chart and NOAA DEM.





Allowable Crab Fishing Area "B" (black polygon) within CHAPC (yellow).

NOAA 3-d bathymetry showing **high-relief bathymetry** (red polygon) within the Allowable Crab Fishing Area.

Red stars- hard-bottom habitat ground-truthed by submersible dives.

Reed and Farrington, 2010

# CORAL GROWTH and AGE

- *Oculina* 16 mm/yr  
Site A- 1526 yr (25m high mound)  
max.15,000 yr
- *Lophelia* 6-15 mm/yr  
Site E- 860-940 yr  
Site F- 28,170 yr  
Norway- 526-2500 years (10m mound)  
GOM- >40,000 years

