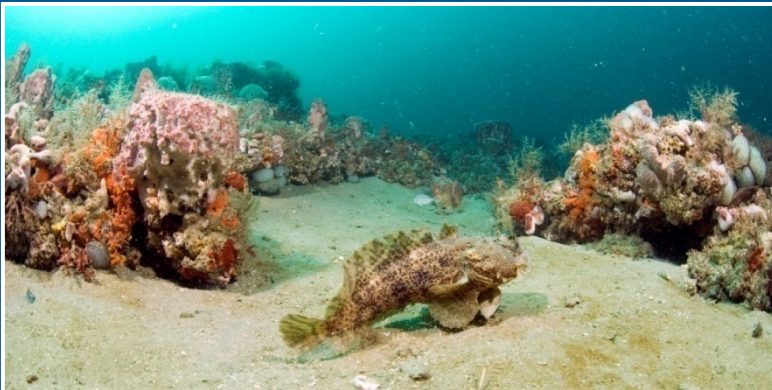


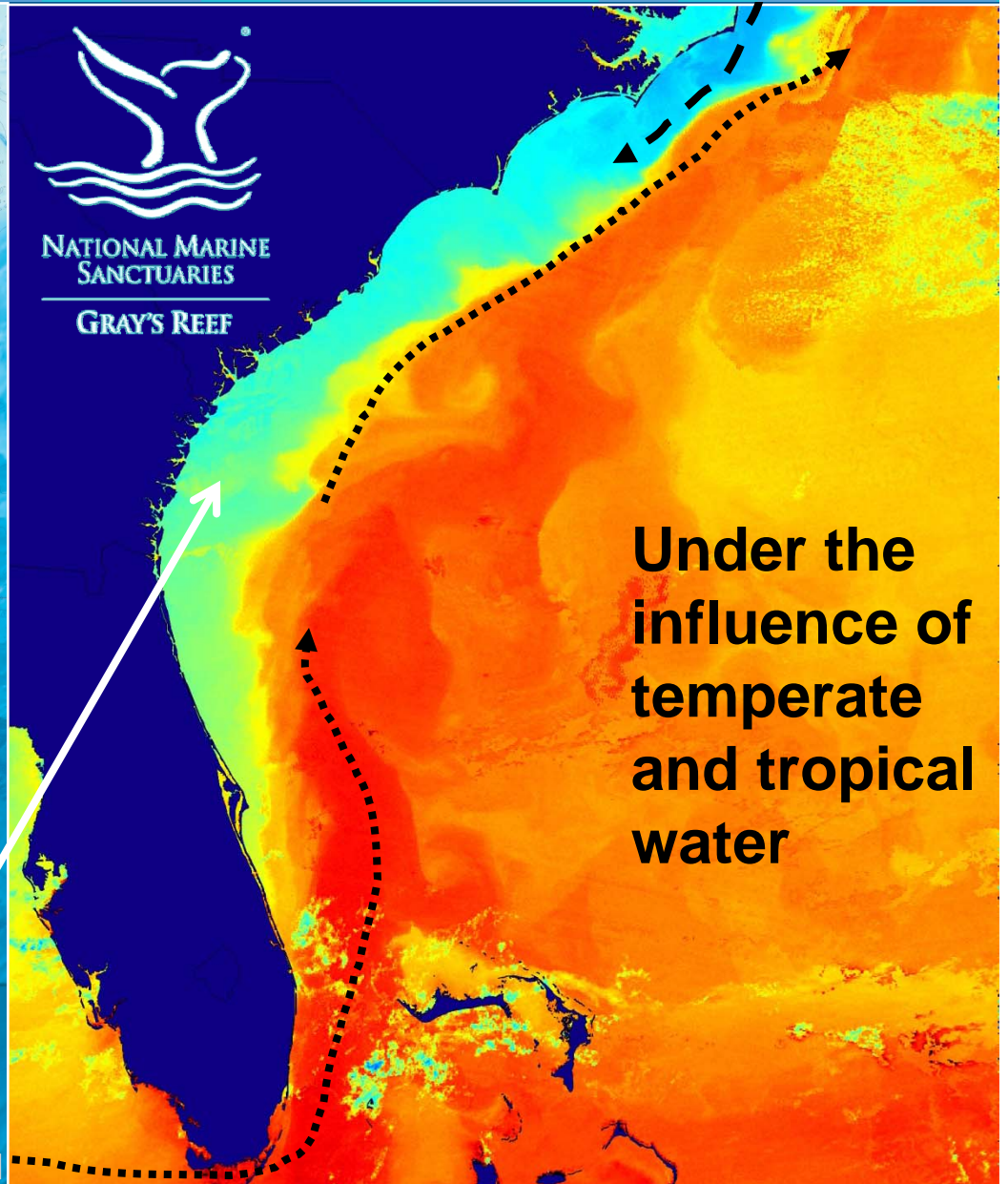
Research Update for Gray's Reef National Marine Sanctuary

Coastal Georgia Research Colloquium
30 October 2013

George Sedberry (george.sedberry@noaa.gov)



Gray's Reef National Marine Sanctuary



Ocean and Great Lakes Protected Areas and Environments that are of Special National Significance

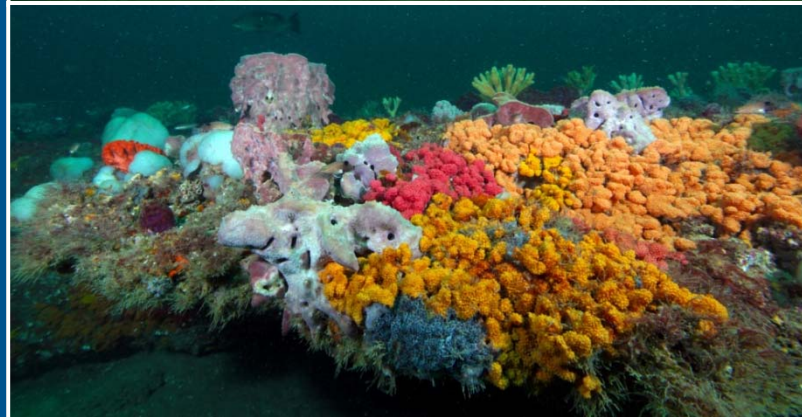




“Live-Bottom Habitat”



- **Rocky substrate with “carpet” of attached organisms**
- **Foundation for sessile benthic invertebrates**
- **Habitat and prey for mobile invertebrates and a variety (201 spp.) of fishes; also turtles and Atlantic right whales**



Gray's Reef Depends on Research and Education Partnerships

- Federal, local, and state agencies
- Not-for-profit organizations
- Private businesses and institutions
- Aquaria, museums, and nature centers
- Universities and labs
- Local schools



NOAA Ship NANCY FOSTER



GRNMS Assets: Facilities and Vessels



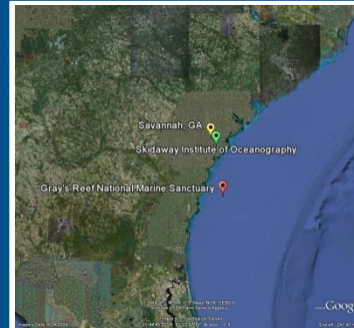
R/V Joe Ferguson



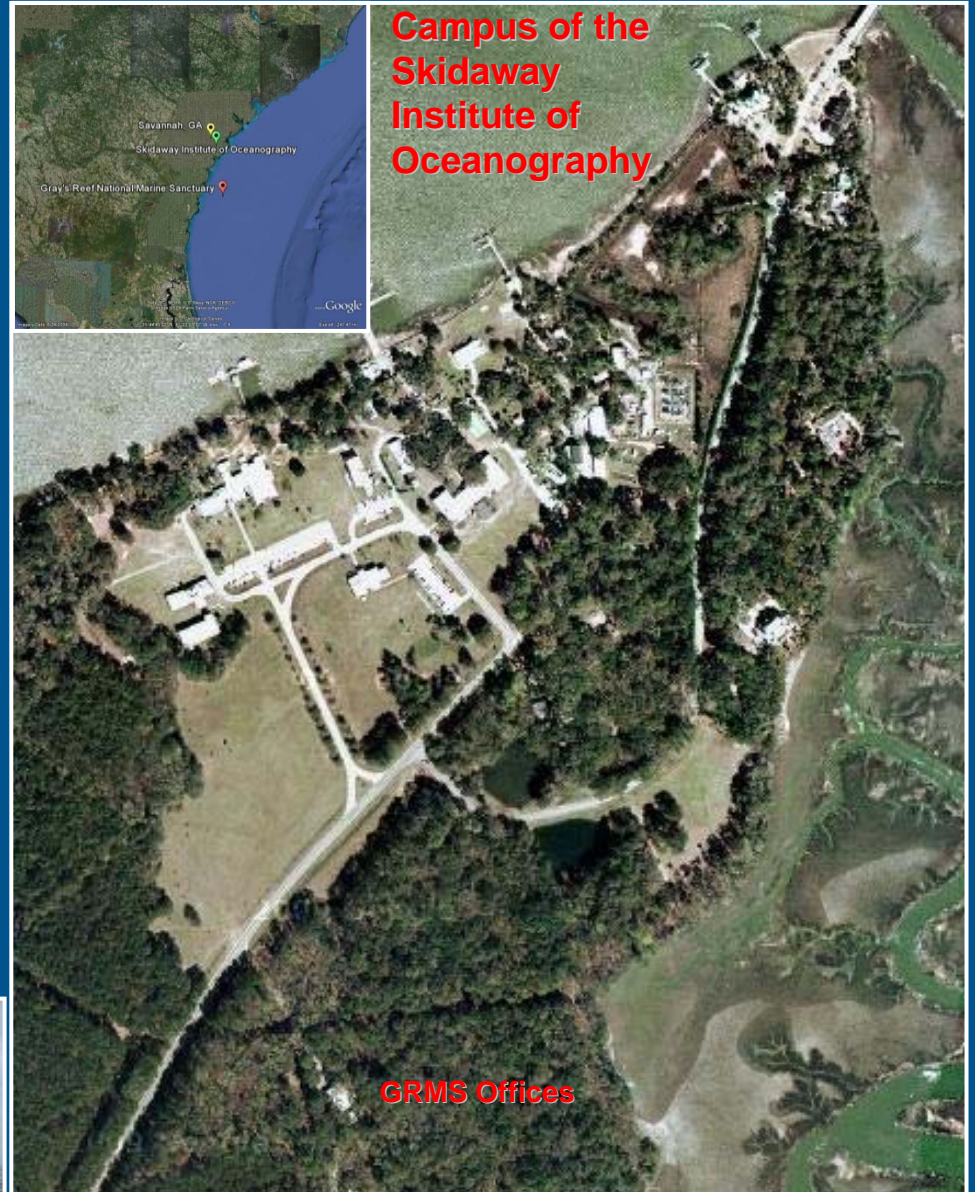
R/V Sam Gray



SRVx



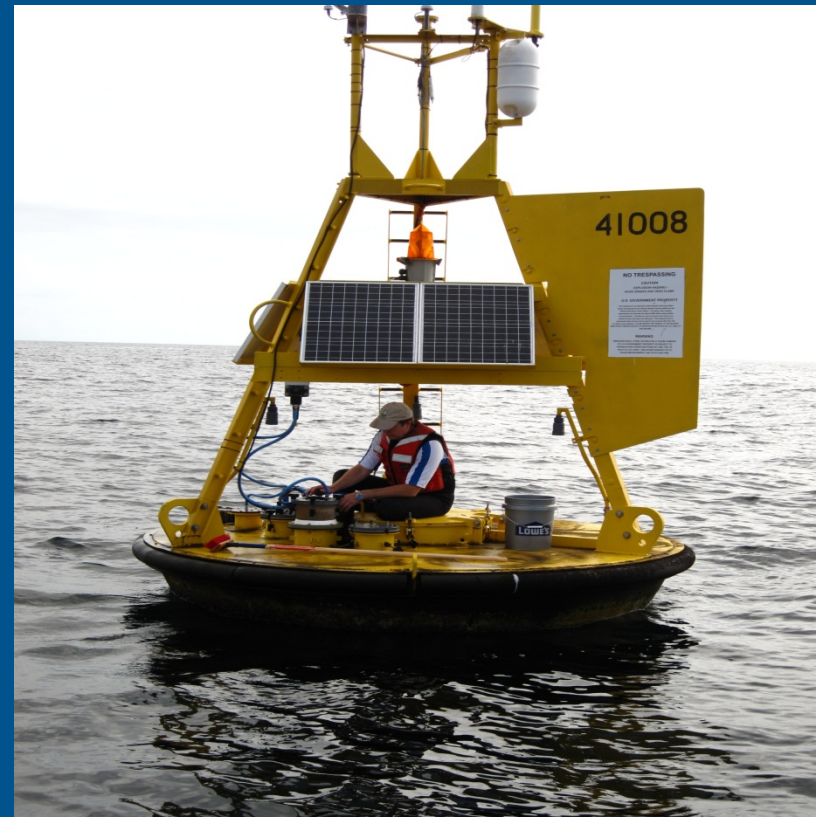
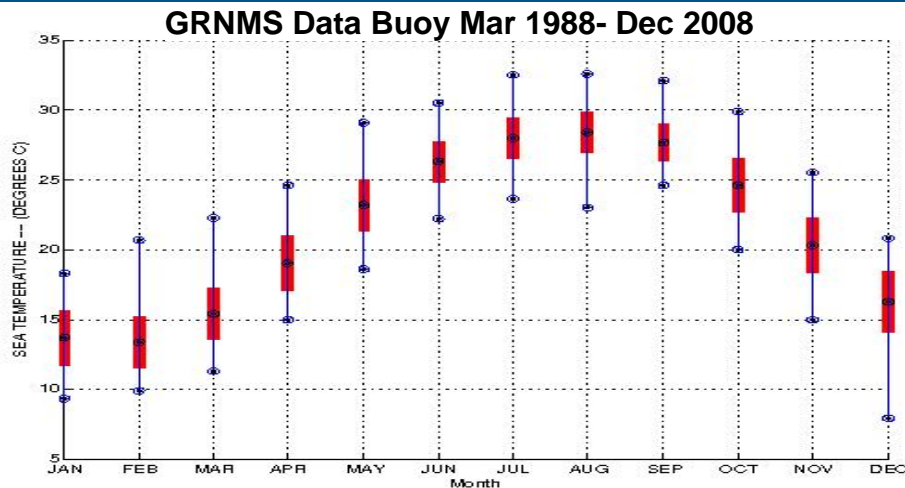
**Campus of the
Skidaway
Institute of
Oceanography**

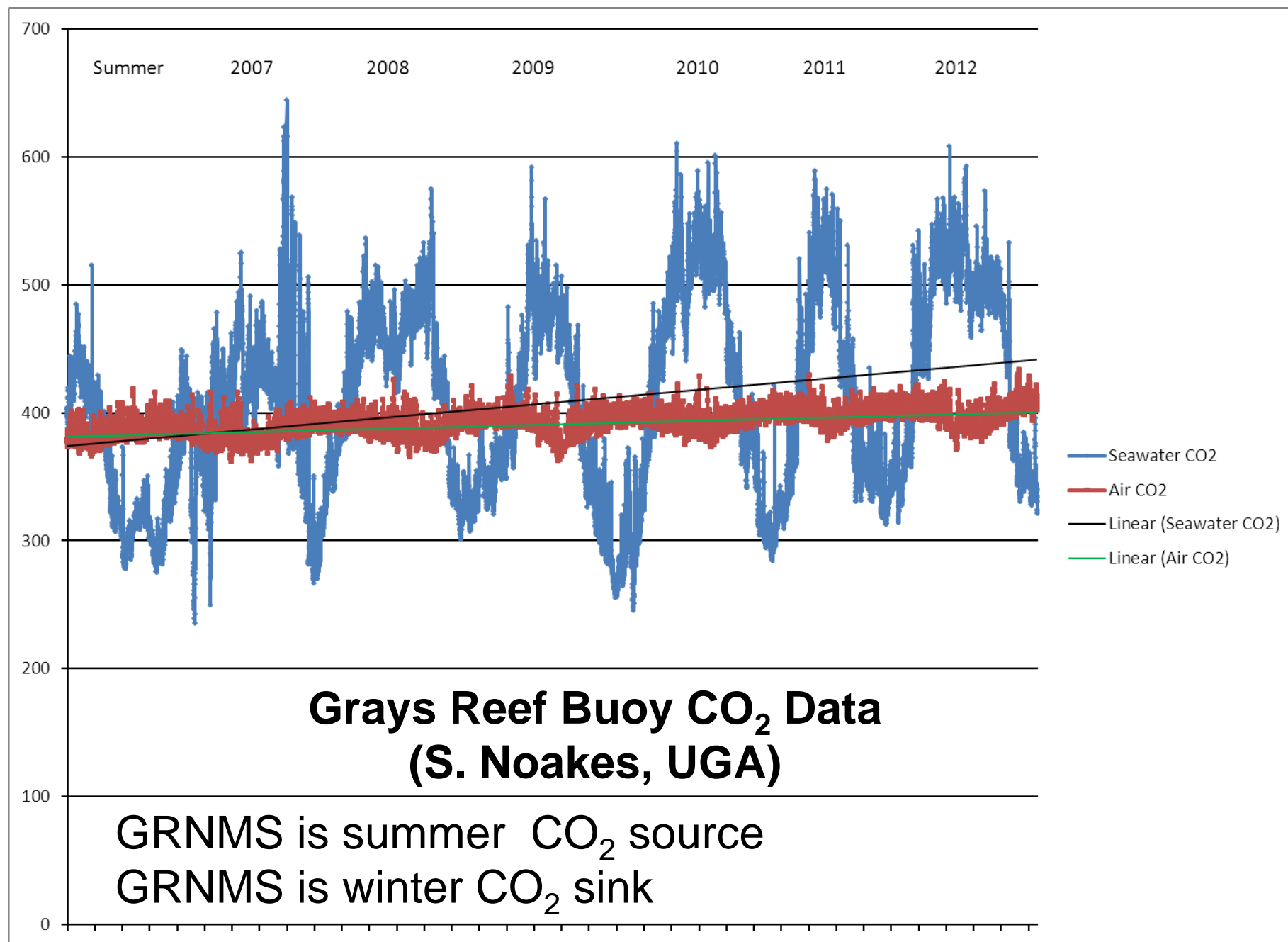


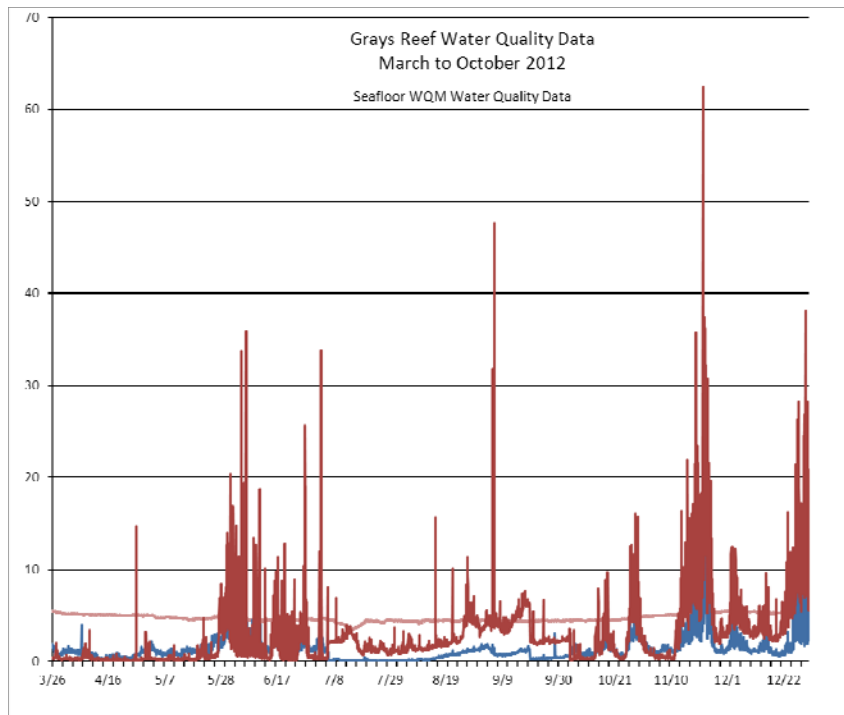
GRMS Offices

Climate Change and GRNMS

- GRNMS data buoy provides long-term temperature data: A sentinel site for climate change, ocean acidification, etc.
- Other long-term monitoring data available
- GRNMS geographic location is especially valuable







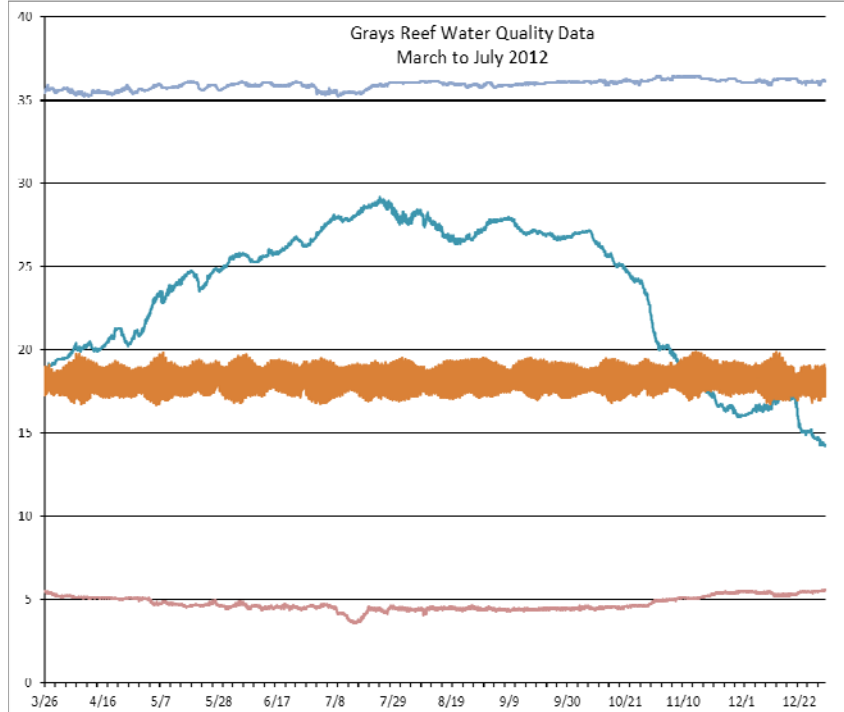
DO(ml/l)

Chlorophyll

Turbidity

Grays Reef Data Buoy Monitoring (S. Noakes, UGA)

(plus standard
weather
parameters)



Temp(C)

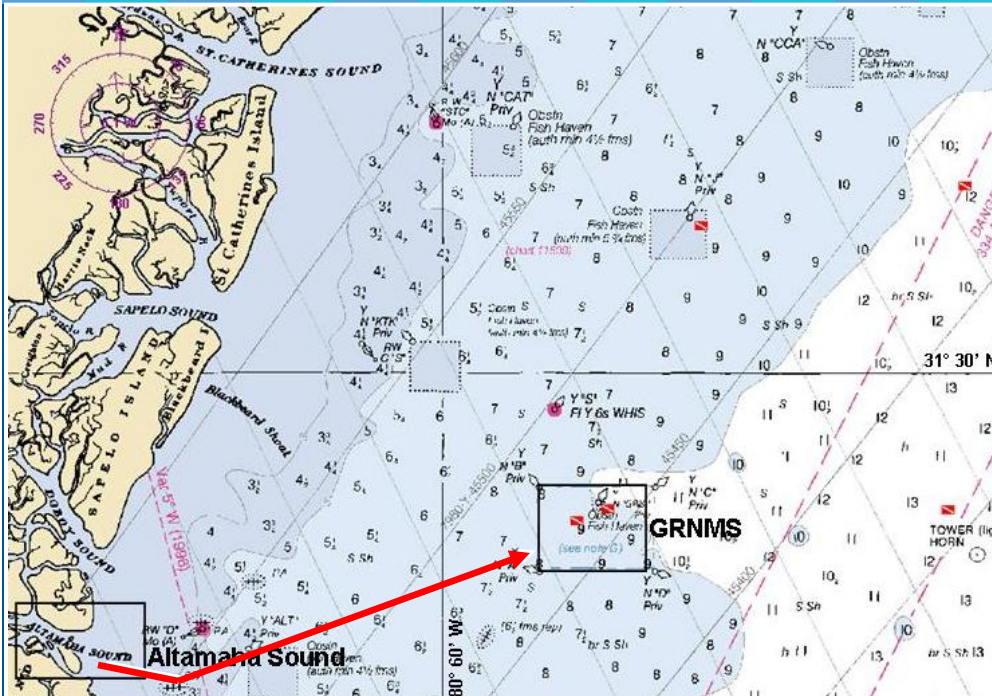
Pres(dbar)

Sal(PSU)

DO(ml/l)

Transport of Waterborne Substances to Georgia Offshore Reefs

D.F. Gleason & R.A Cohen



- Rhodamine dye appeared within GRNMS boundaries in 3 days
- Influence of river outflow on GRNMS resources significant both positively and negatively

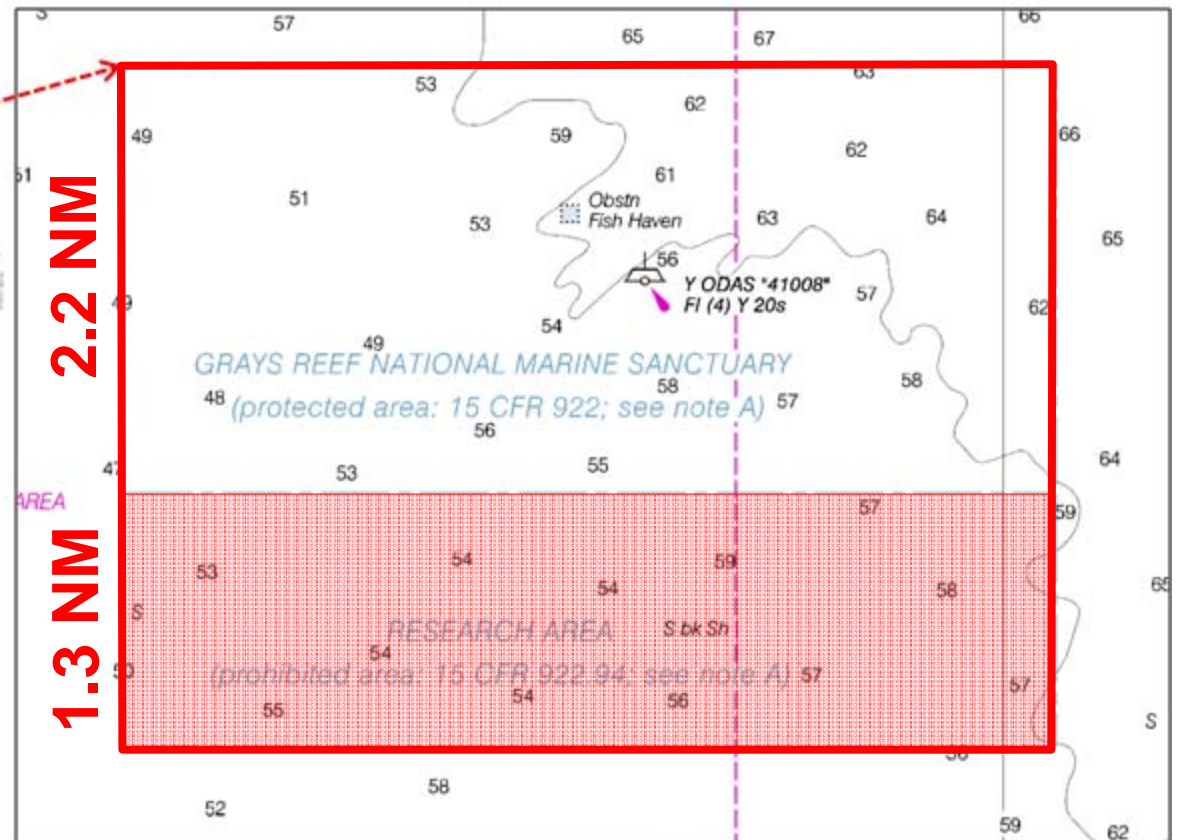
Gray's Reef NMS Research Area

No fishing
No diving
No stopping

4.8 NM

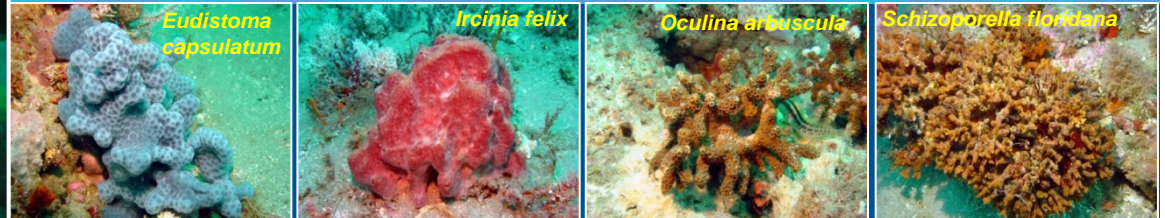
2.2 NM

1.3 NM

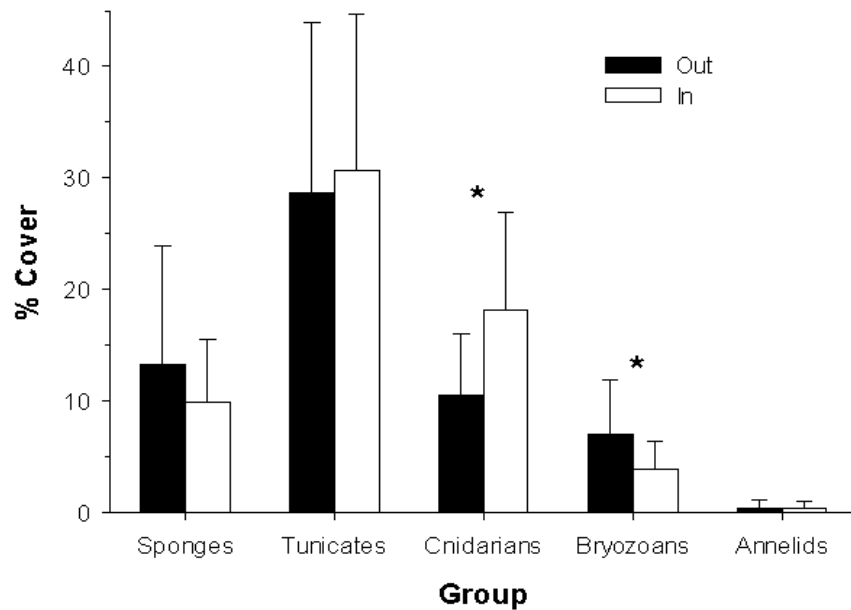


What are the effects
of fishing on habitats
and assemblages of
algae, invertebrates
and fishes?

Research Area: Invertebrate Populations in GRNMS (D. Gleason, GSU)



2011



2012

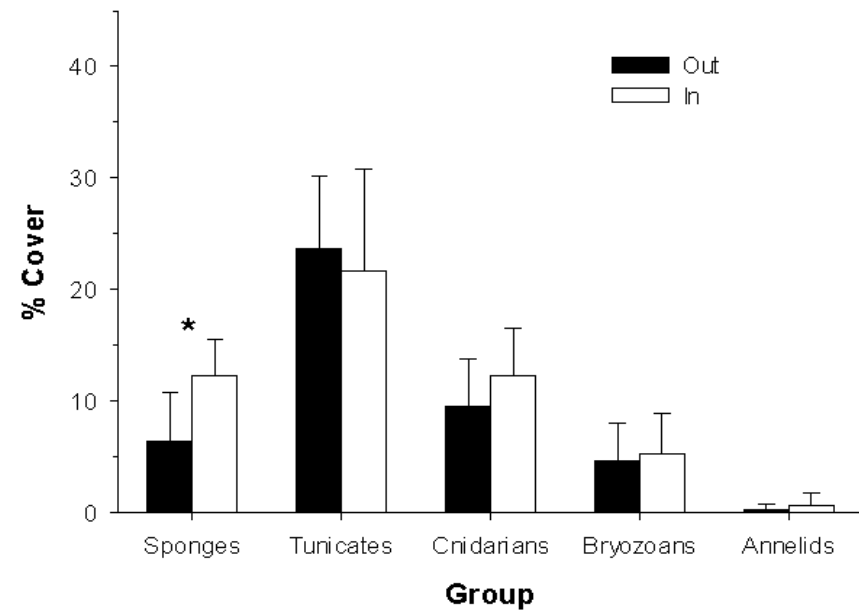


Figure 22. Percent cover of the dominant taxonomic groups quantified in 0.5 x 0.5 m quadrats outside and inside the research zone of GRNMS. An asterisk above the bars indicates a significant difference in percent cover outside versus inside the research zone for that taxonomic group. Sample sizes in 2011 were 19 sites inside and 18 outside the research area, whereas in 2012 they were 6 inside and 6 outside.

Visual Fish Counts at GRNMS

R. Muñoz et al., NOAA Fisheries

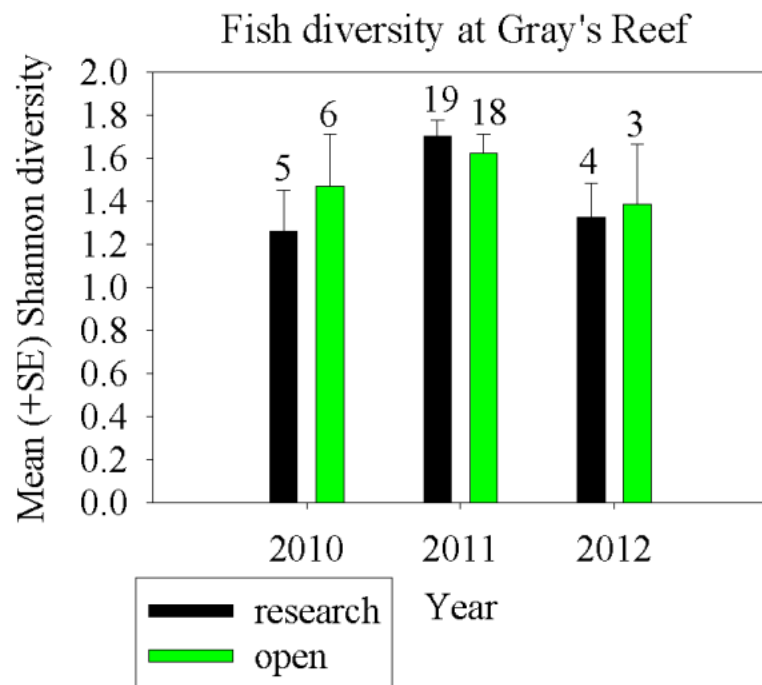


Figure 6. Fish Diversity at GRNMS

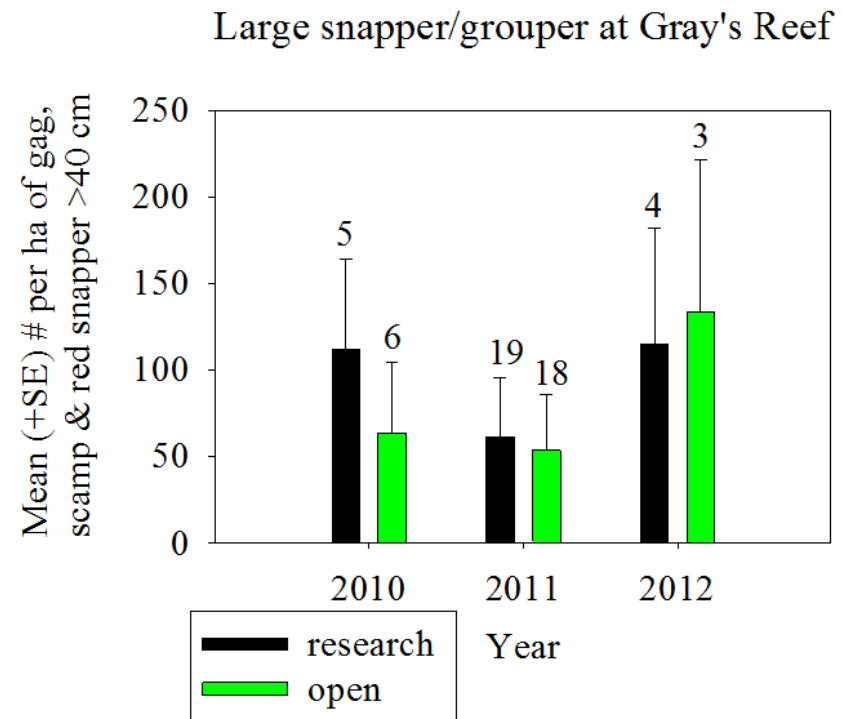
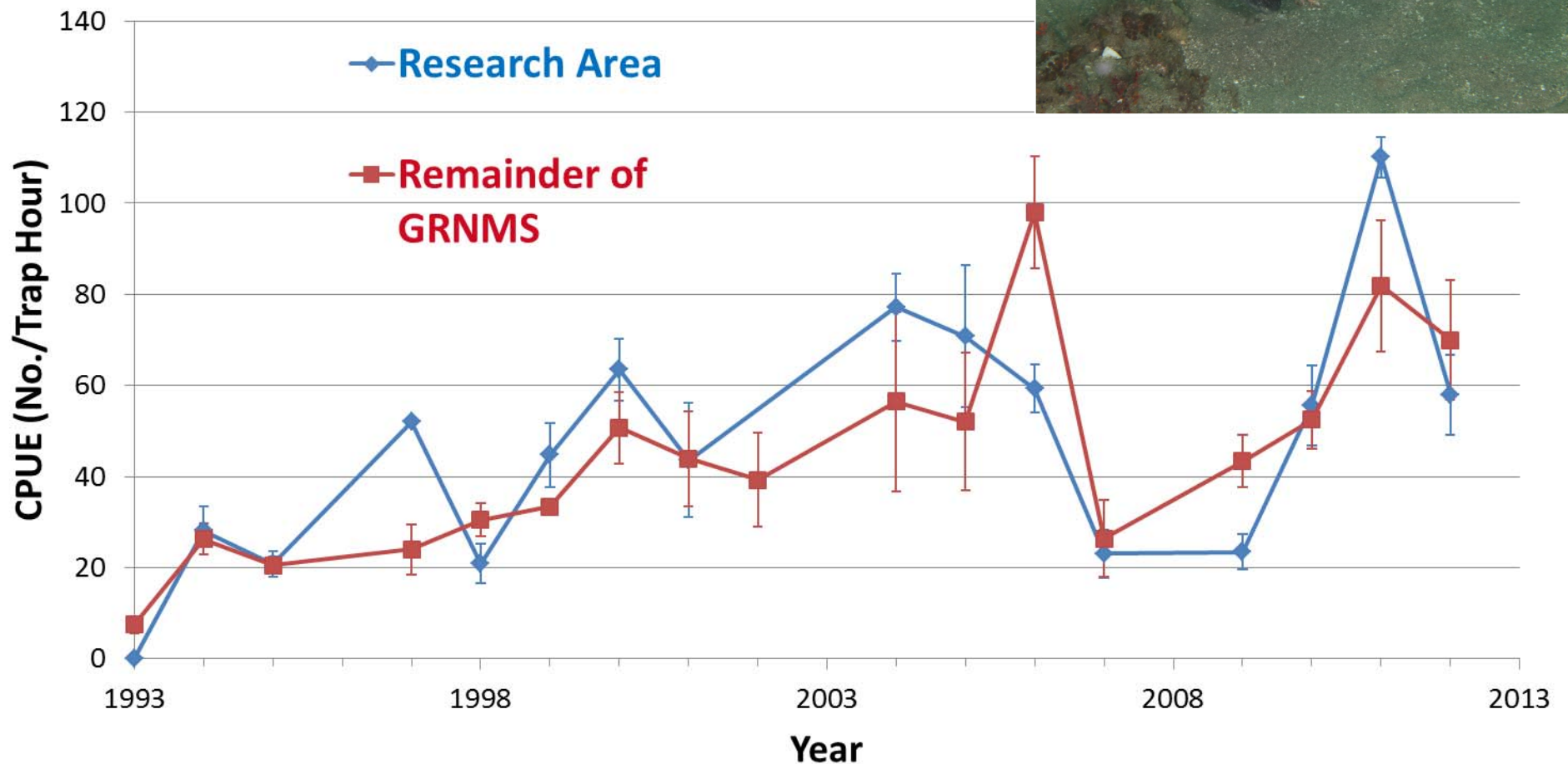


Figure 11. Densities of large (> 40 cm total length) snapper and grouper by year in the Research Area and open area.

Trap Surveys of Fish Abundance

**Black Sea Bass Catch per Unit Effort
(± 1 SE)
M. Reichert, MARMAP**



Fisheries Acoustics

(L. Kracker, NOAA)

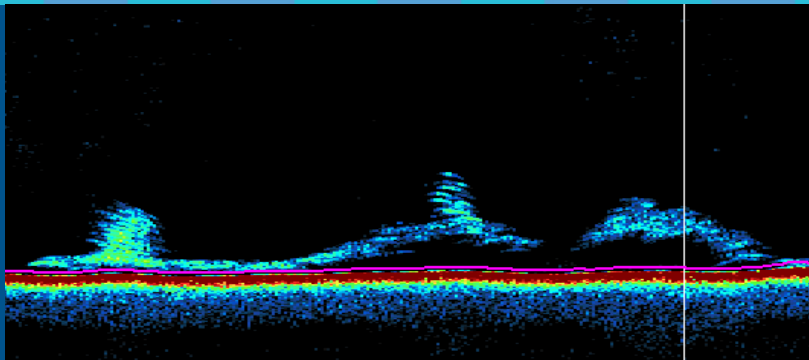


Photo credit: Eric Heupel UConn 2011

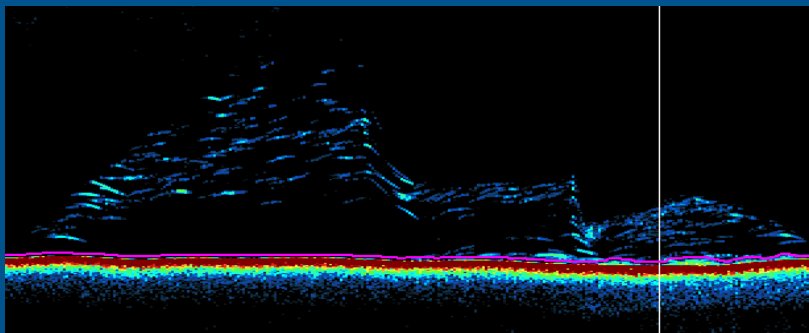


Photo credit: Peter Auster UConn 2011

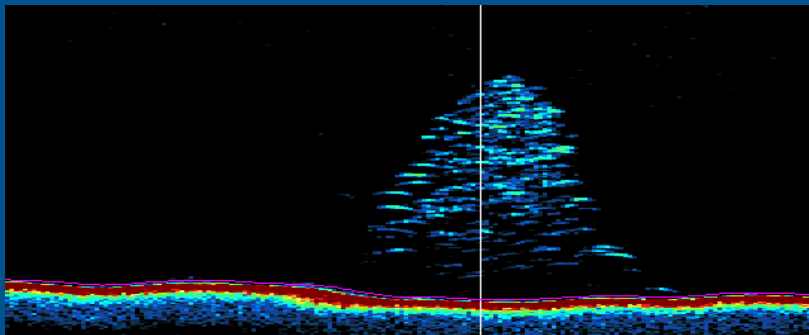
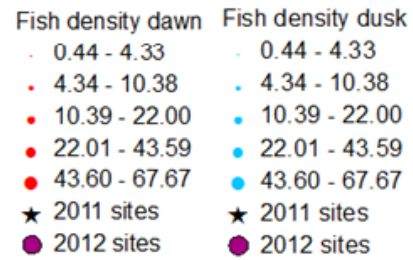
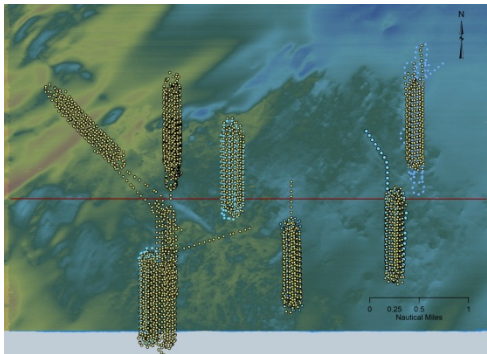


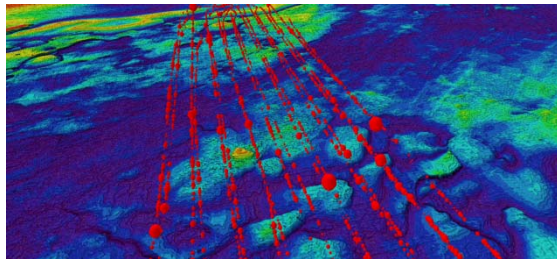
Photo credit: Eric Heupel UConn 2011



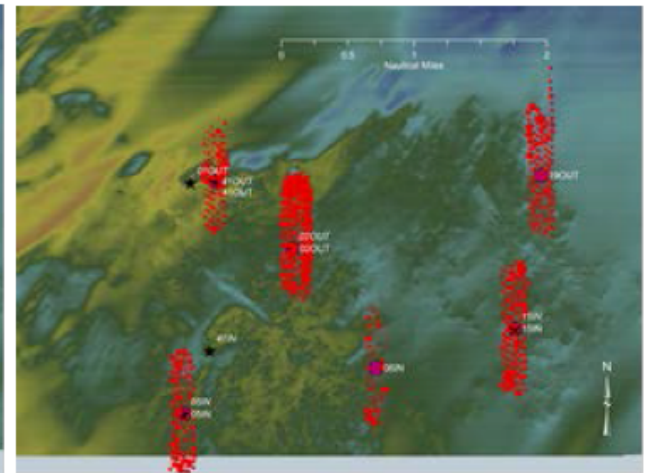
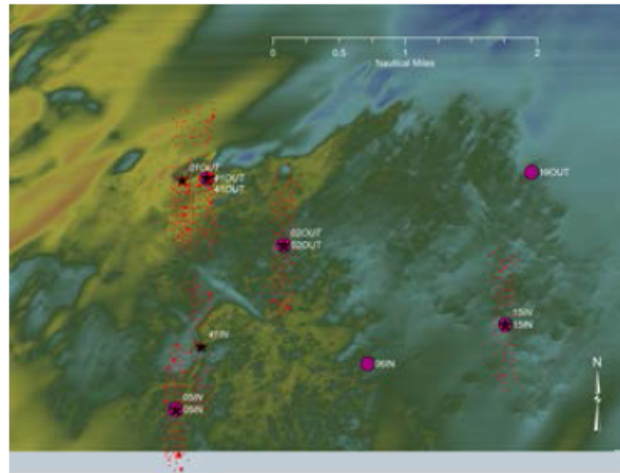
2011

Fish/100 m²

2012



Dawn



Dusk

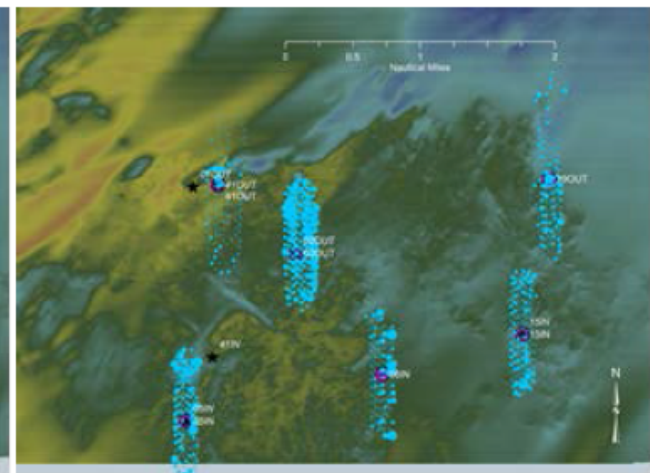


Figure 17. Maps of fish density (fish 100m²) in 2011 (left) and 2012 (right) at dawn (0500-0730 - red) and dusk (1830-2100 - blue). Fish density was significantly higher in 2012 than in 2011.

Acoustic Tagging of Fishes at GRNMS 2008 – 2013, Continuing

(S. Fangman, ONMS)

- **63 fish tagged 2008 - 2013:**

- **13 Scamp (grouper)**

- (58-89 cm)

- **1 Red Grouper**

- (72 cm)

- **14 Black Sea Bass**

- (34-46 cm)

- **6 Red Snapper**

- (49-80 cm)

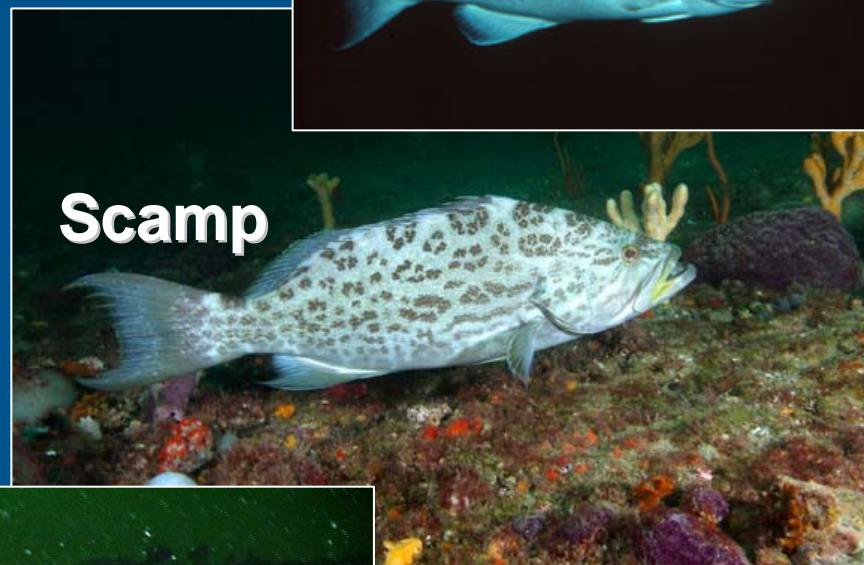
- **29 Gag (grouper)**

- (38-85 cm)

Gag



Scamp



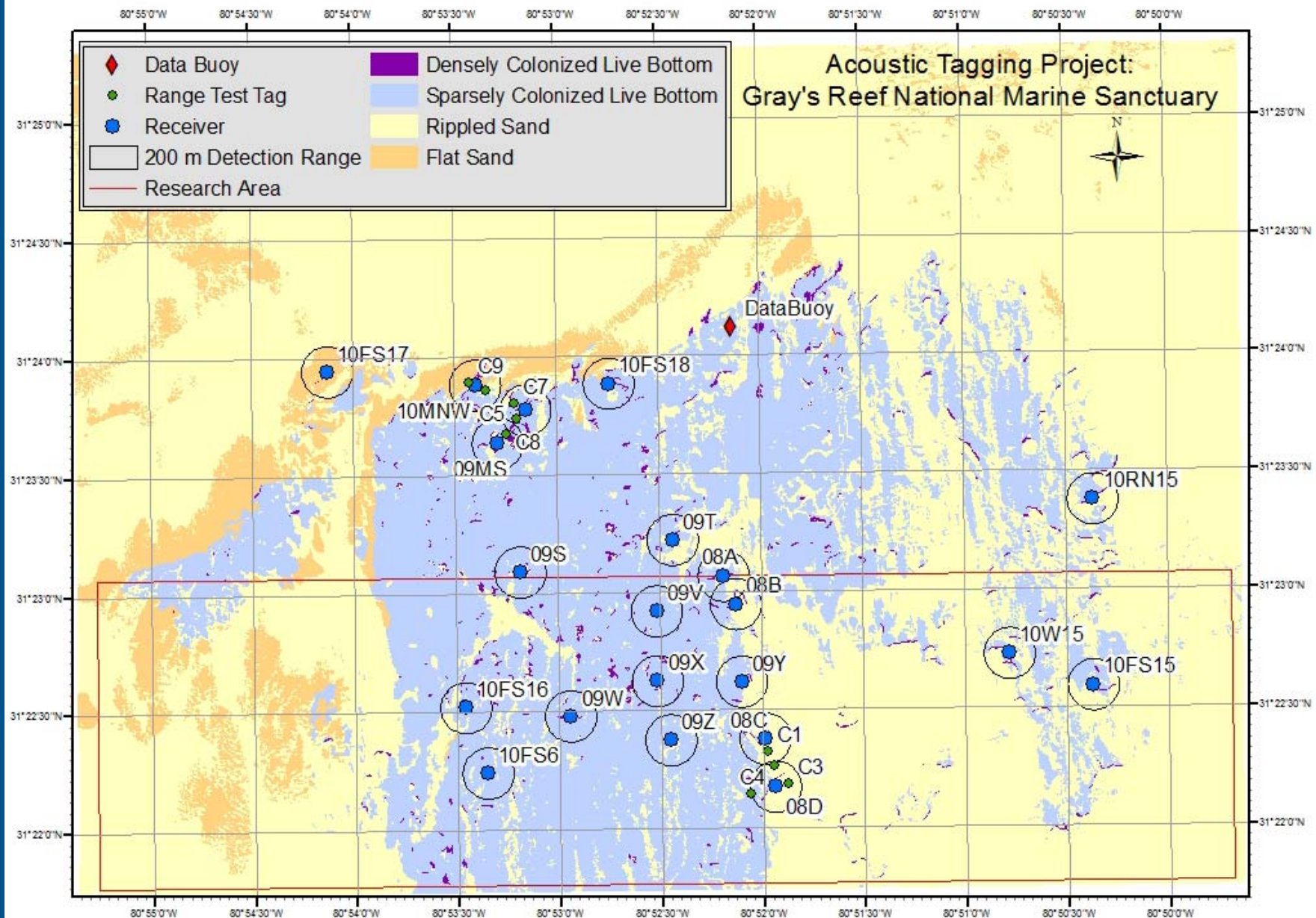
**Red
Snapper**



Black Sea Bass



Acoustic Array at GRNMS



Fish Tagged Elsewhere and Detected at Gray's Reef



9 Atlantic Sturgeon

NY Bight, Delaware Bay, Edisto River, SC and
Altamaha River, GA



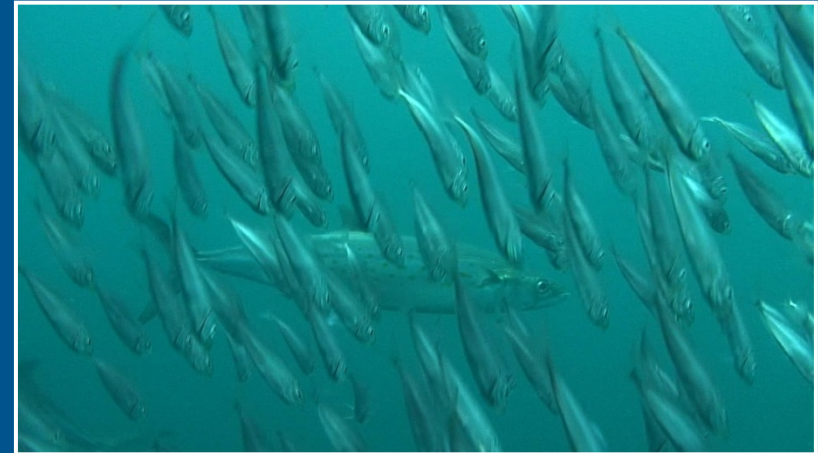
9 Bull Sharks **Jupiter, FL**



1 White Shark **Cape Cod, MA**



Behavior of prey links mid-water and demersal piscivorous reef fishes



(Auster *et al.* 2009, 2013)

Monitoring Infauna at Gray's Reef

(J. Hyland, NOAA)



- Sediment and animals are relatively uncontaminated (2000, 2005)
- 588 taxa (371 to spp.) found since 2000
- Third cycle of sampling at 20 stations in 2012-2013; samples being analyzed for community and contaminants

Gray's Reef National Marine Sanctuary

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



<http://graysreef.noaa.gov>