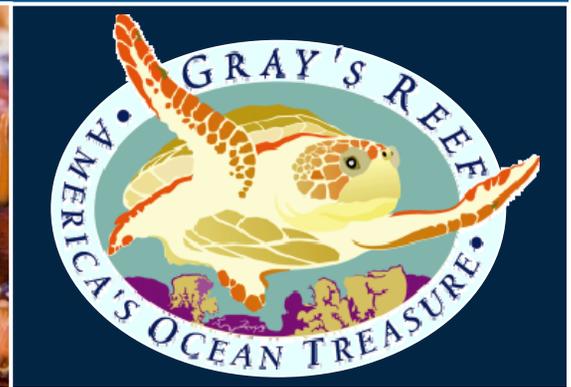




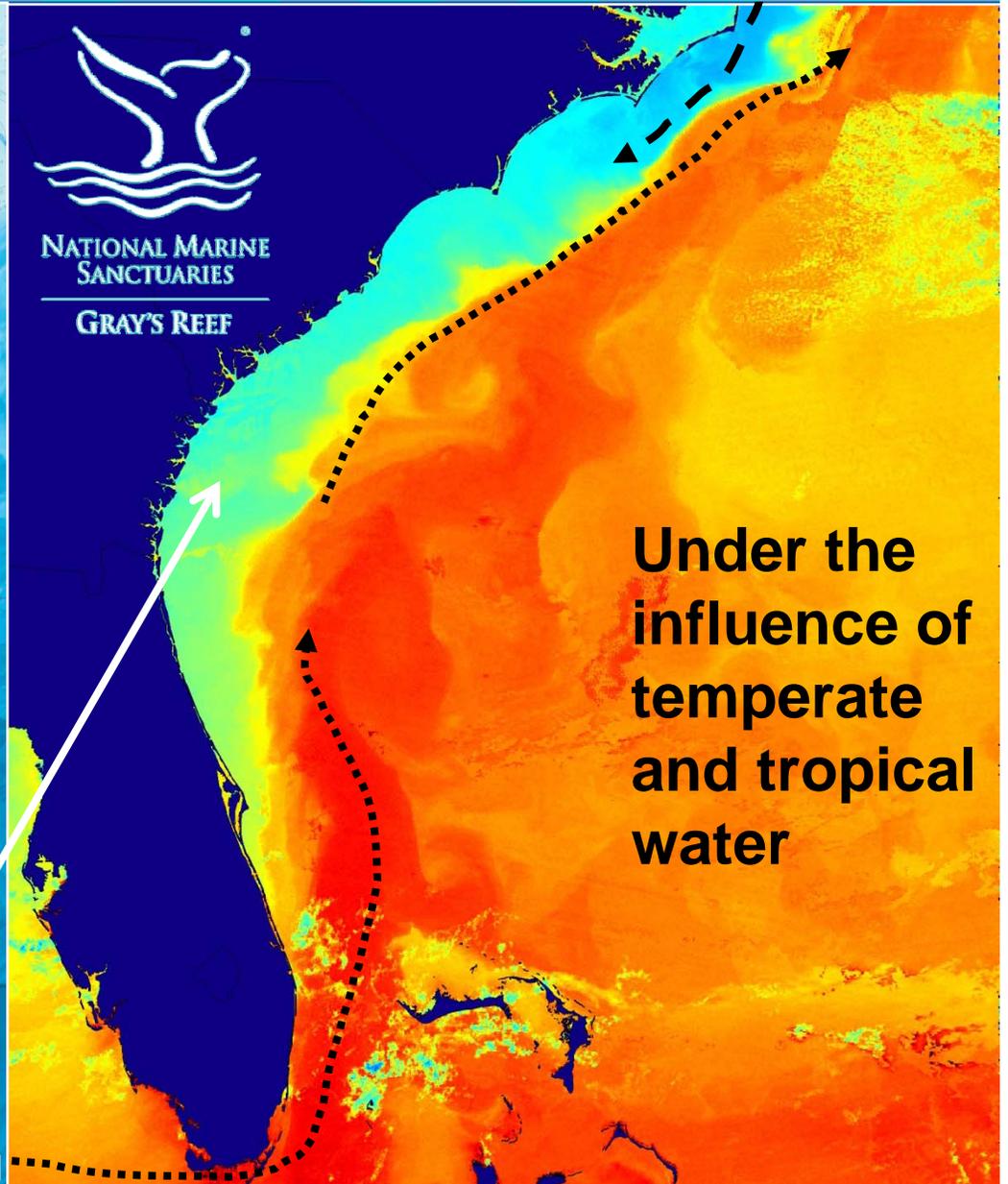
Research Update for Gray's Reef National Marine Sanctuary

Coastal Georgia Research Colloquium
30 October 2013

George Sedberry (george.sedberry@noaa.gov)

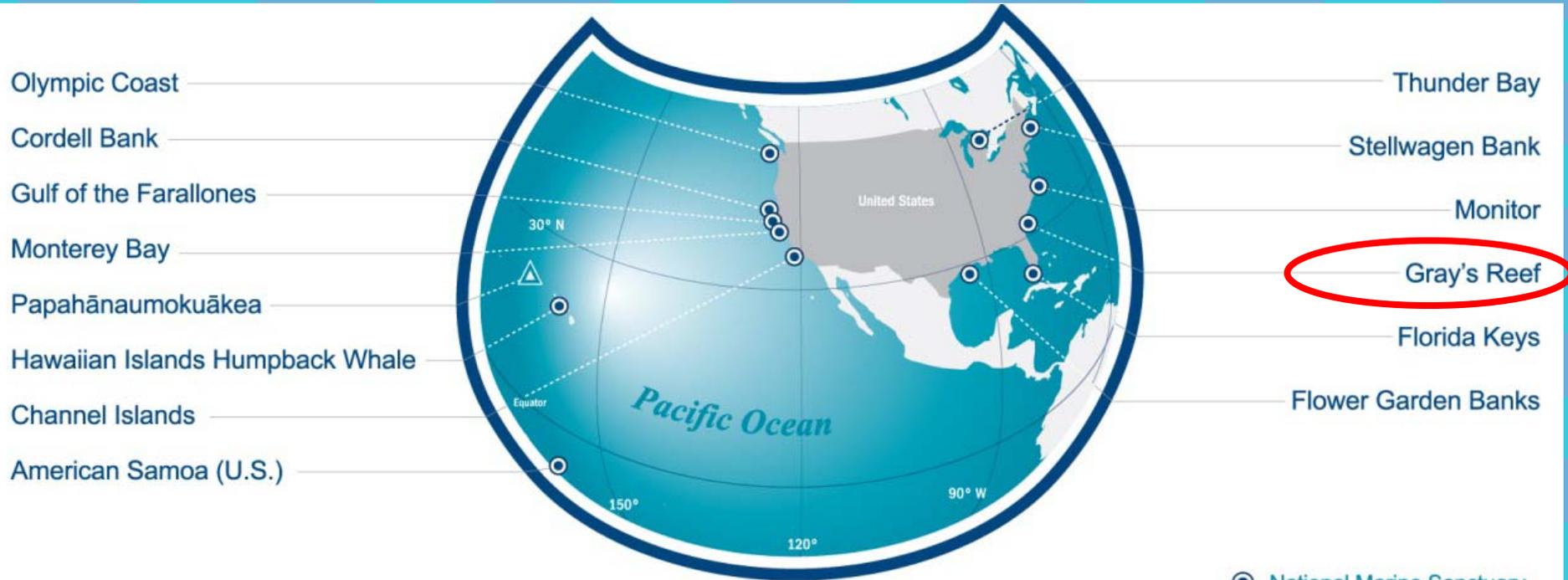


Gray's Reef National Marine Sanctuary



The National Marine Sanctuary System

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



Scale varies in this perspective. Adapted from National Geographic Maps.





“Live-Bottom Habitat”

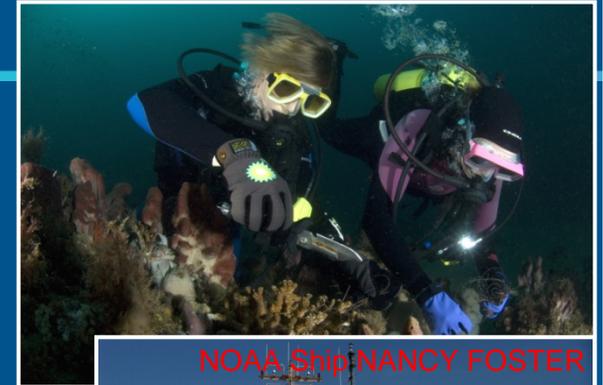


- **Rocky substrate with “carpet” of attached organisms**
- **Foundation for sessile benthic invertebrates**
- **Habitat and prey for mobile invertebrates and a variety (201 spp.) of fishes; also turtles and Atlantic right whales**



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



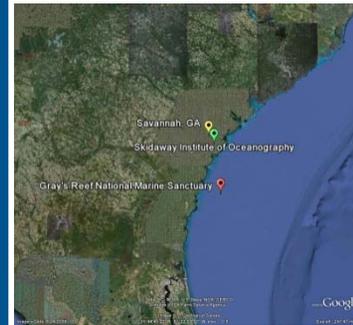
R/V Joe Ferguson



R/V Sam Gray



SRVx



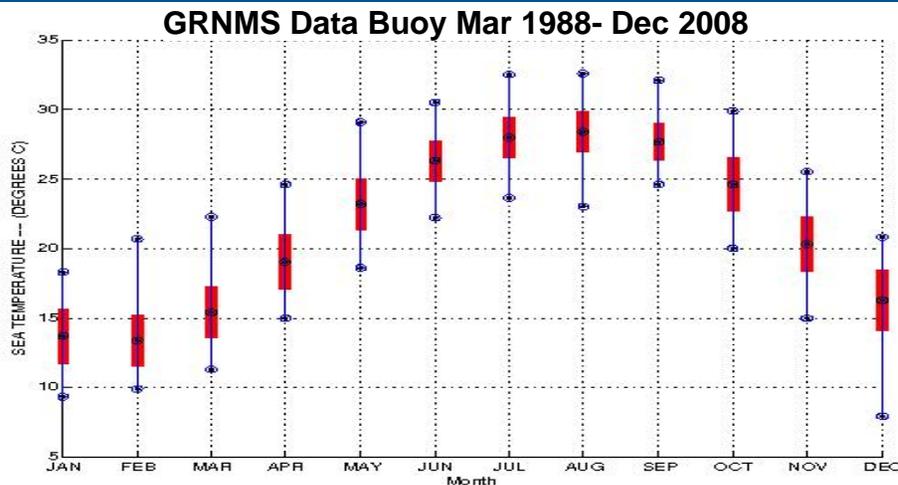
Campus of the Skidaway Institute of Oceanography

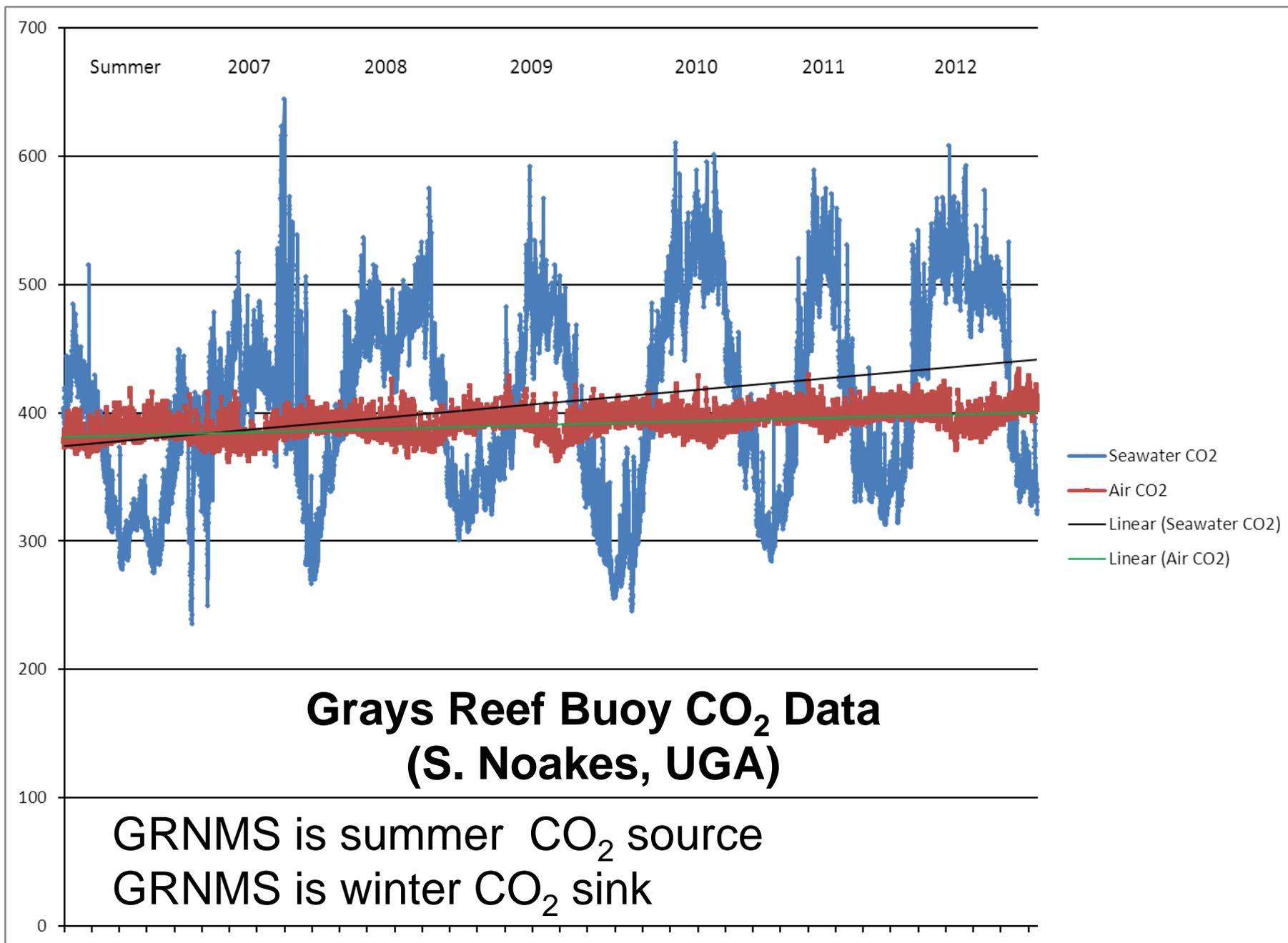


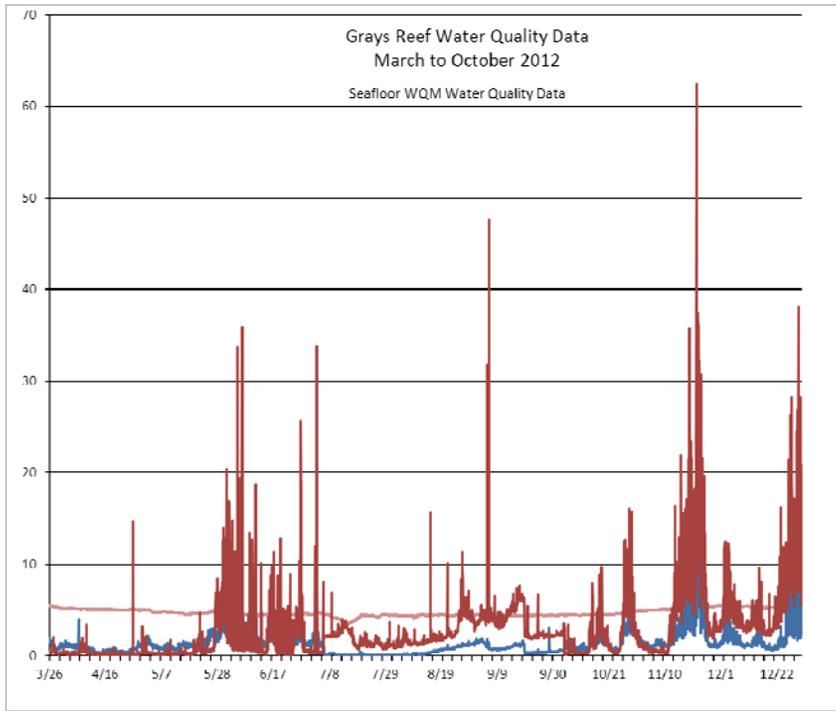
GRMS Offices

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



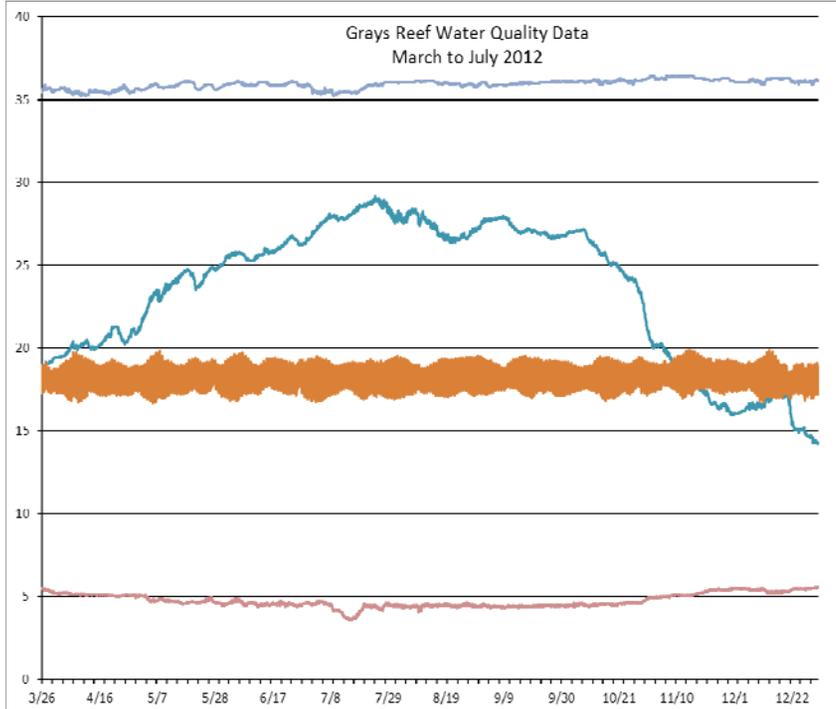




- DO(ml/l)
- Chlorophyll
- Turbidity

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

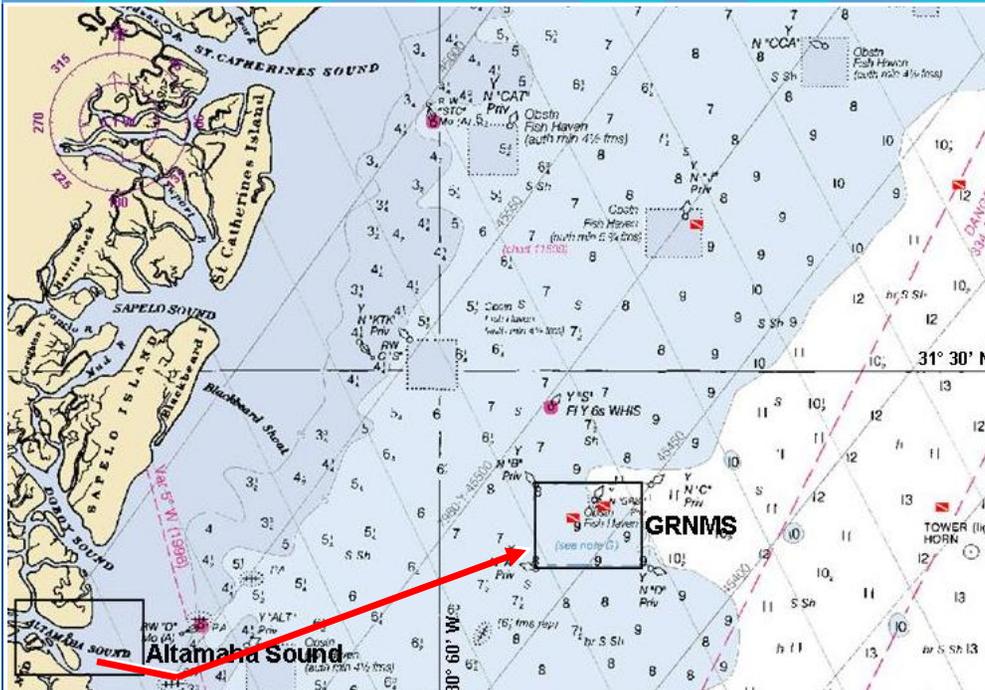
(plus standard weather parameters)



- Temp(C)
- Pres(dbar)
- Sal(PSU)
- DO(ml/l)

Transport of Waterborne Substances to Georgia Offshore Reefs

D.F. Gleason & R.A Cohen

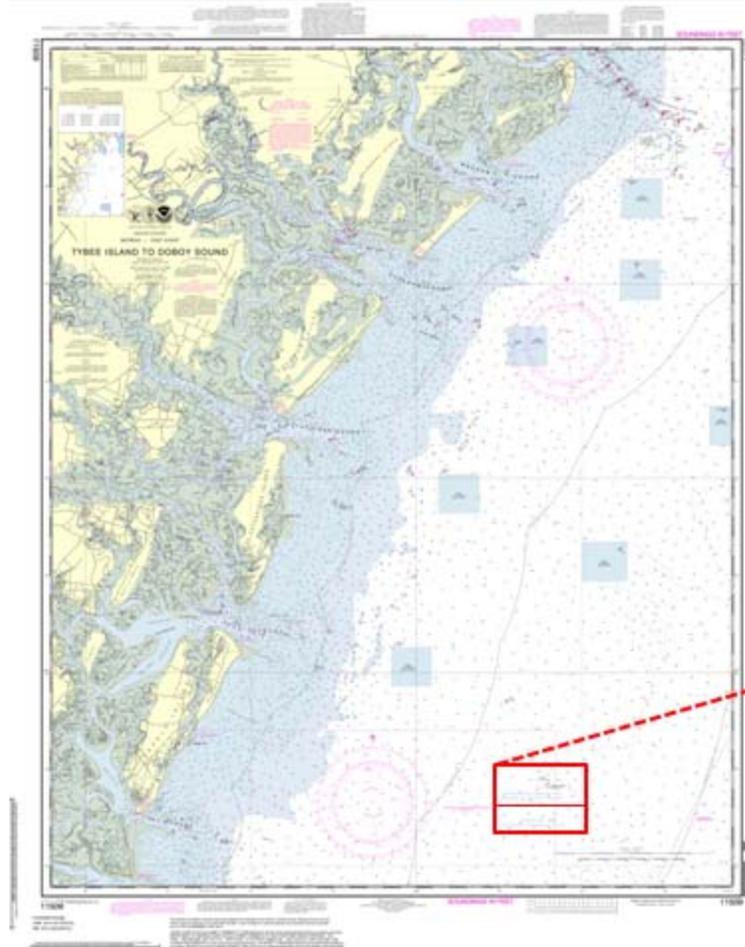


- Rhodamine dye appeared within GRNMS boundaries in 3 days
- Influence of river outflow on GRNMS resources significant both positively and negatively

Gray's Reef NMS Research Area

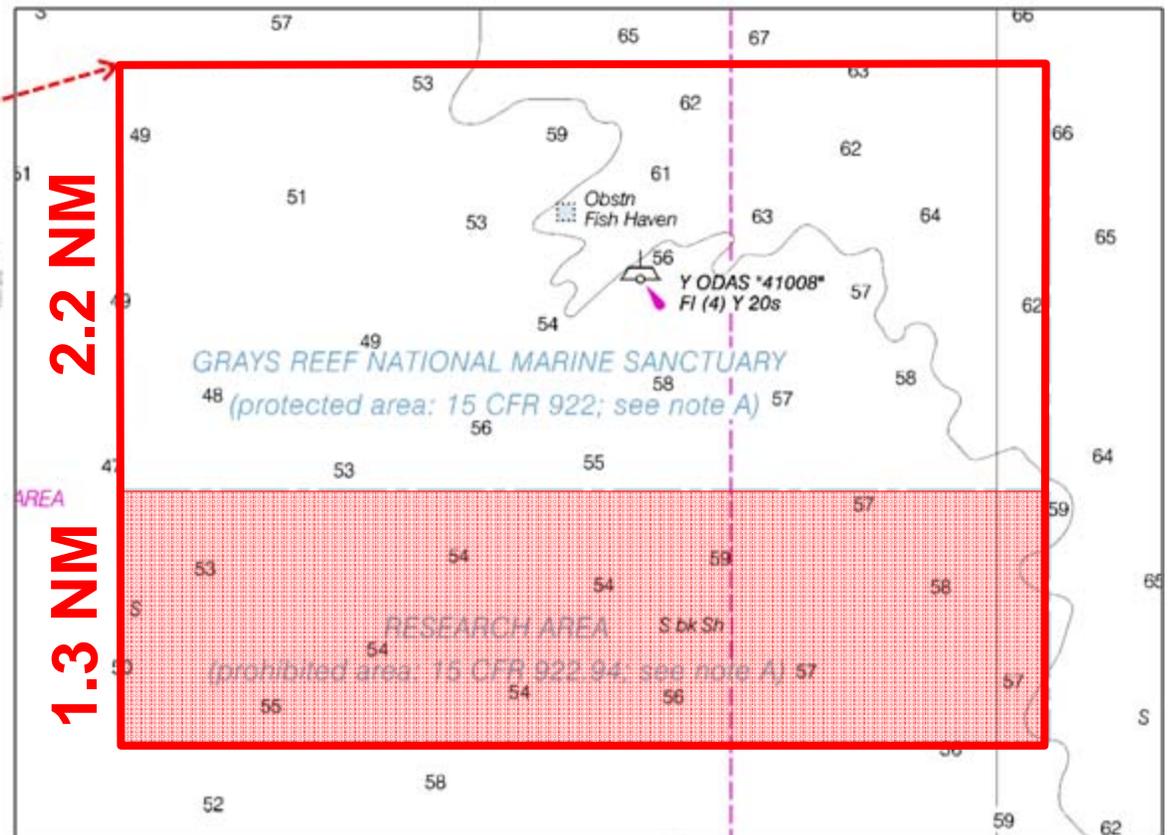
No fishing
No diving
No stopping

4.8 NM



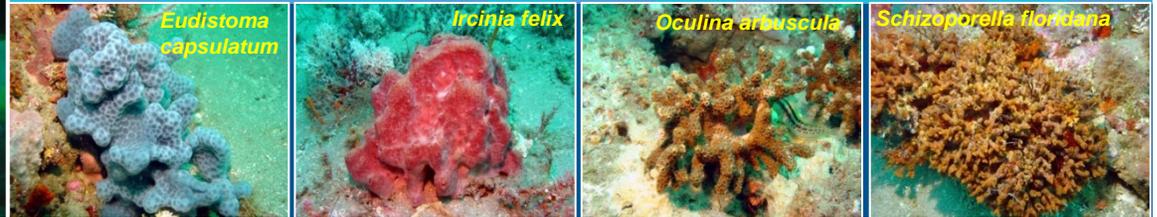
2.2 NM

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

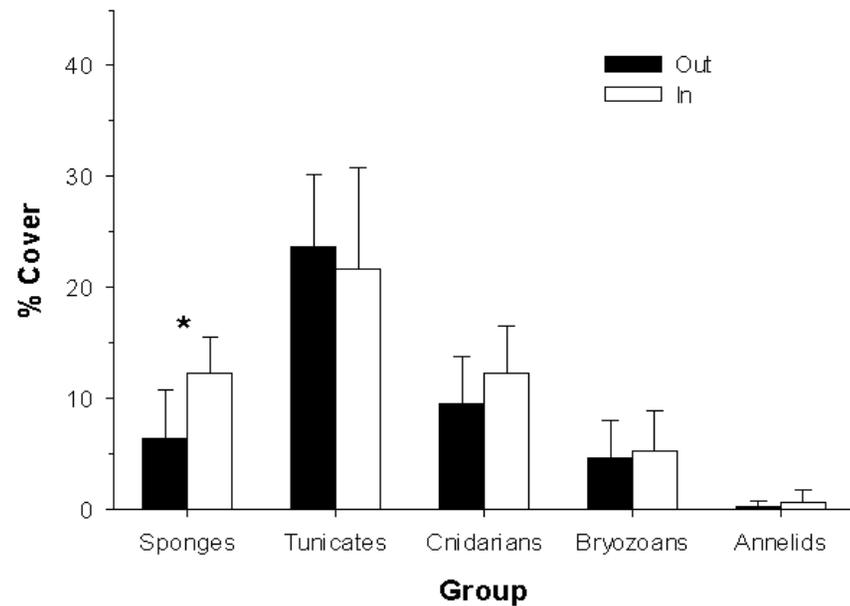
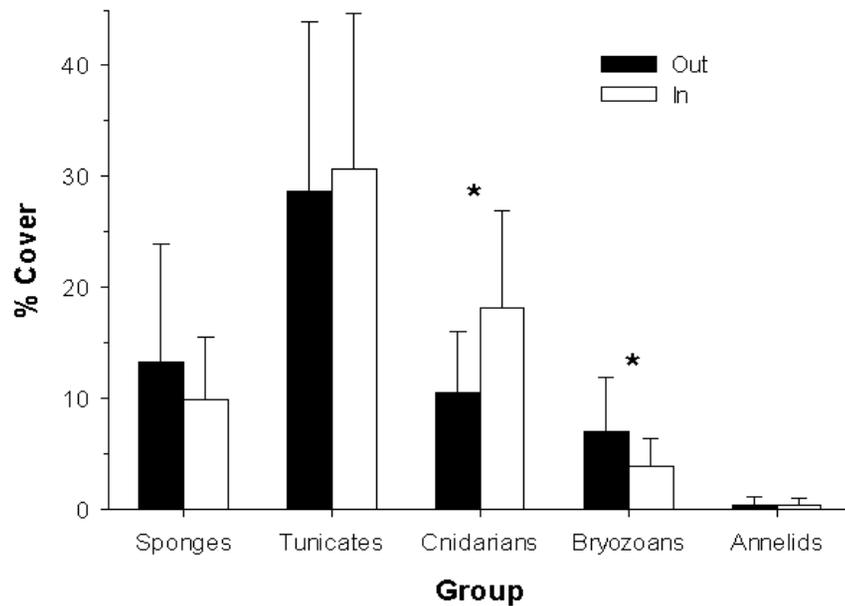


Figure 22. Percent cover of the dominant taxonomic groups quantified in 0.5 x 0.5 m quadrats outside and inside the research zone of GRNMS. An asterisk above the bars indicates a significant difference in percent cover outside versus inside the research zone for that taxonomic group. Sample sizes in 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

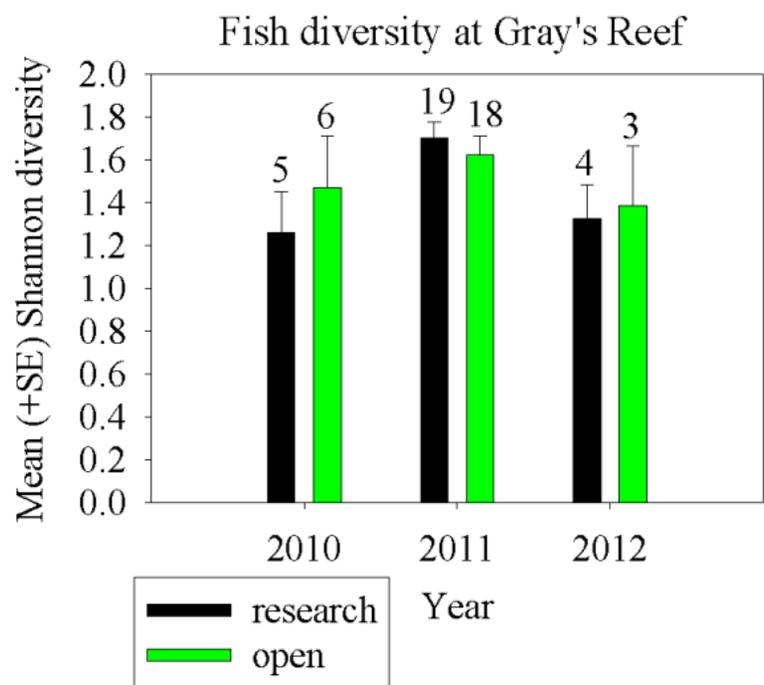


Figure 6. Fish Diversity at GRNMS

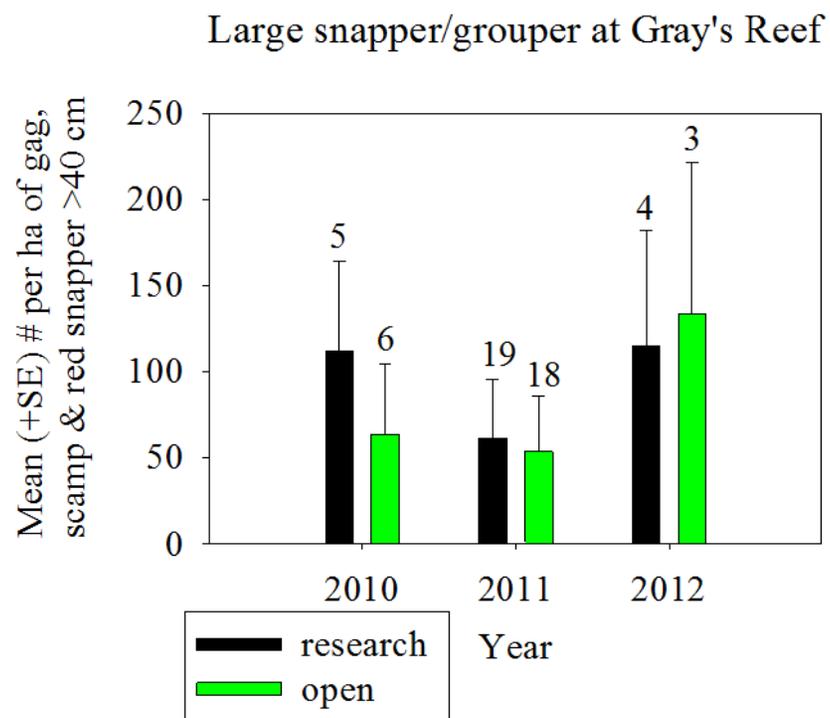
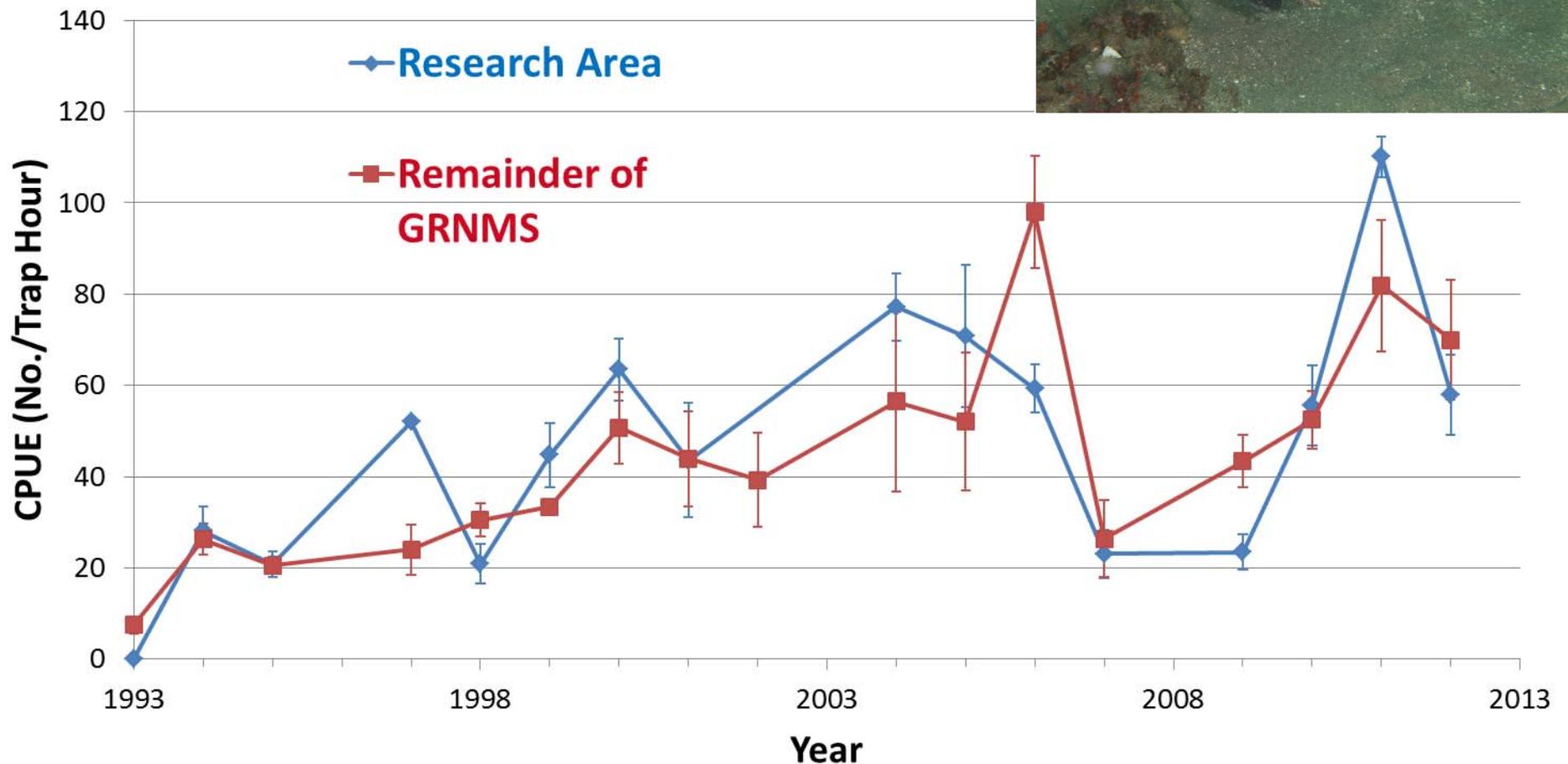


Figure 11. Densities of large (> 40 cm total length) snapper and grouper by year in the Research Area and open area.

Trap Surveys of Fish Abundance

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



Fisheries Acoustics

(L. Kracker, NOAA)

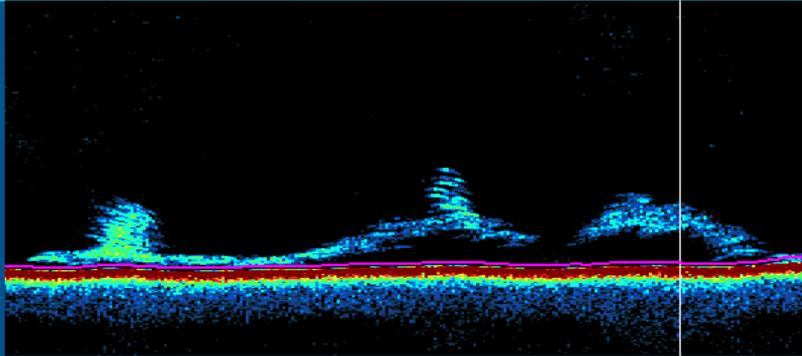


Photo credit: Eric Heupel UConn 2011

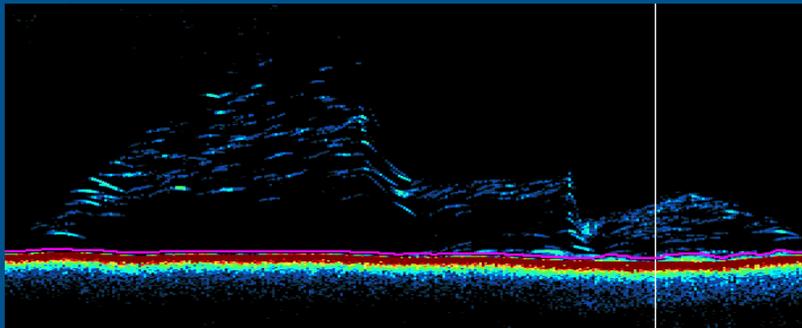


Photo credit: Peter Auster UConn 2011

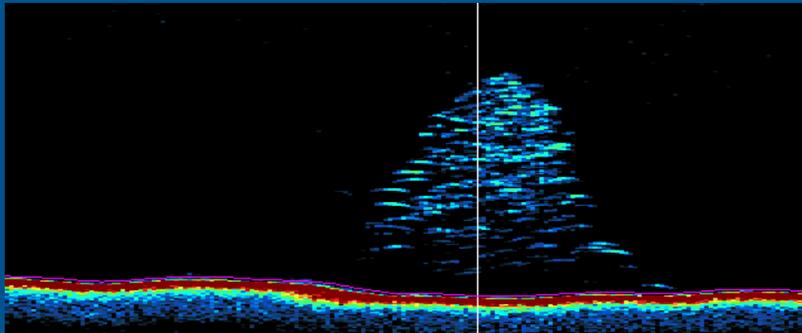
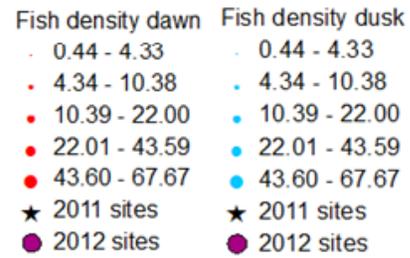


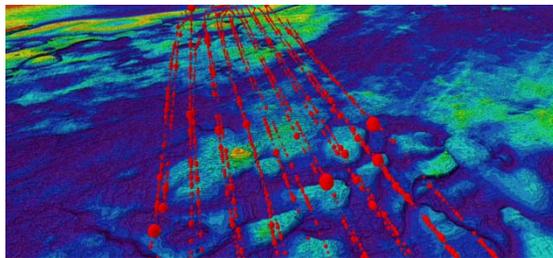
Photo credit: Eric Heupel UConn 2011



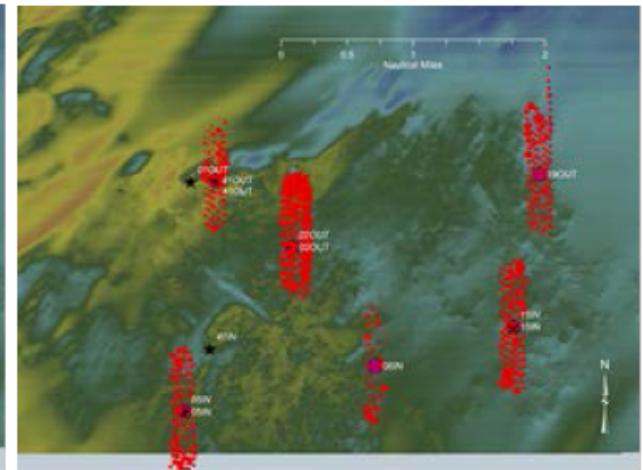
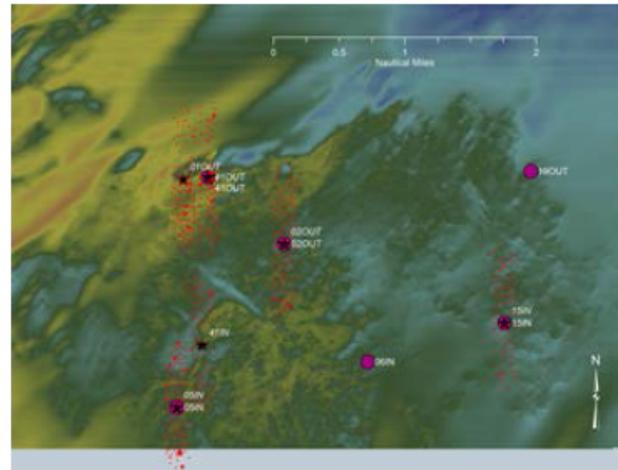
Fish/100 m²

2011

2012



Dawn



Dusk

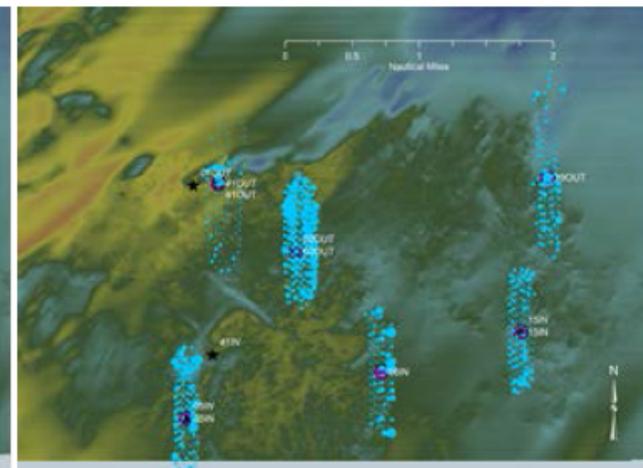
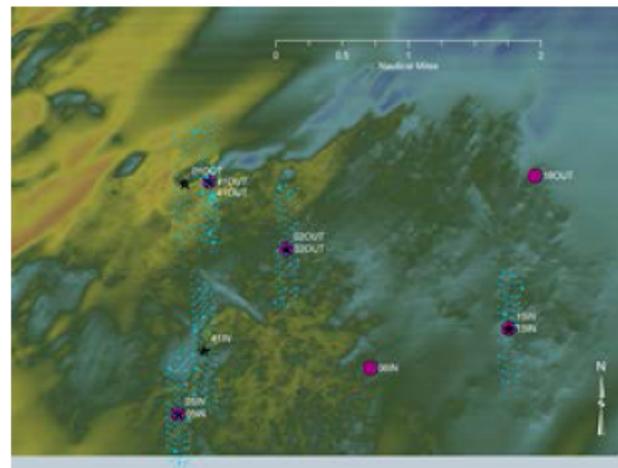


Figure 17. Maps of fish density (fish 100m⁻²) in 2011 (left) and 2012 (right) at dawn (0500-0730 - red) and dusk (1830-2100 - blue). Fish density was significantly higher in 2012 than in 2011.

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



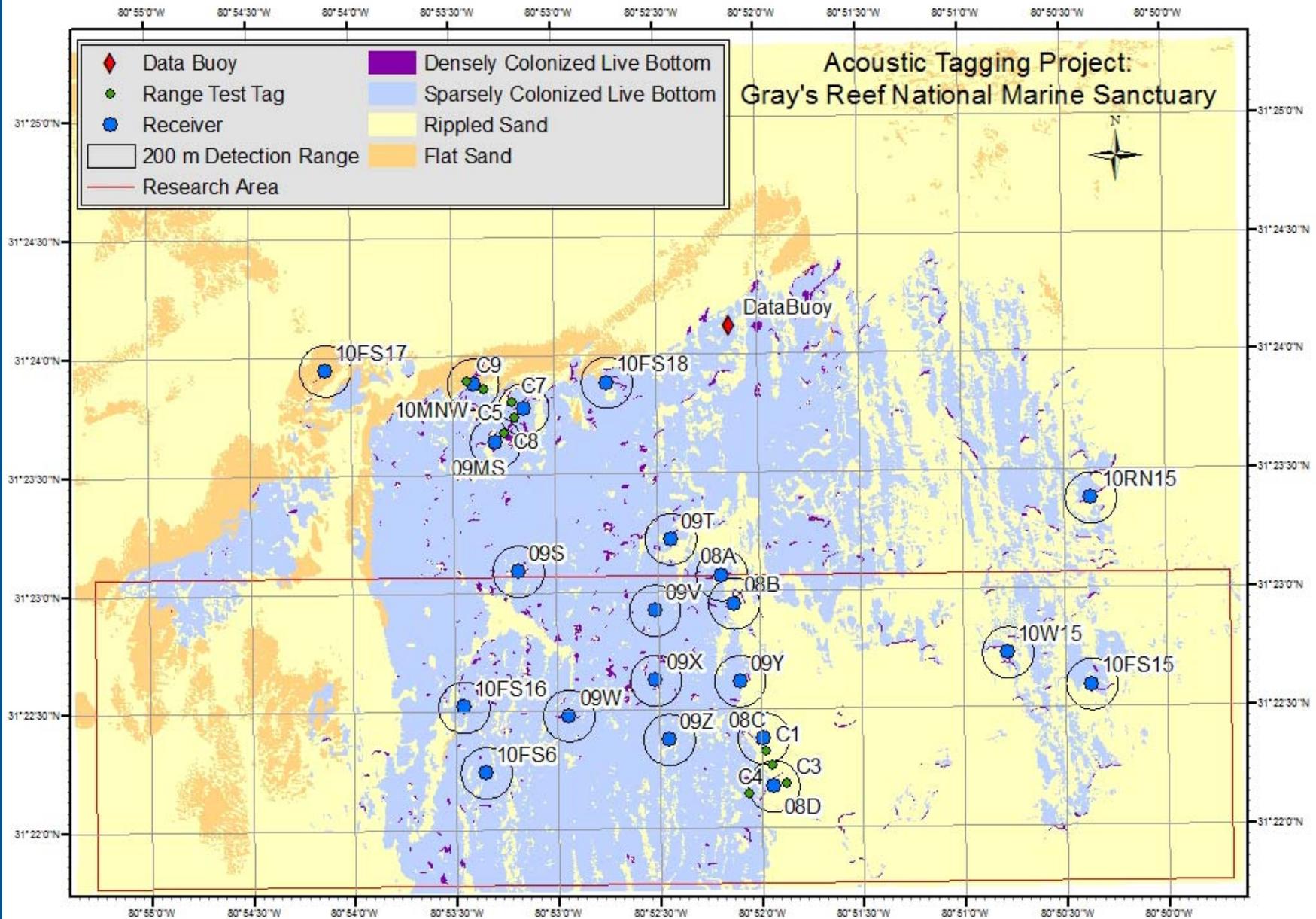
**Red
Snapper**



Black Sea Bass



Acoustic Array at GRNMS



Fish Tagged Elsewhere and Detected at Gray's Reef



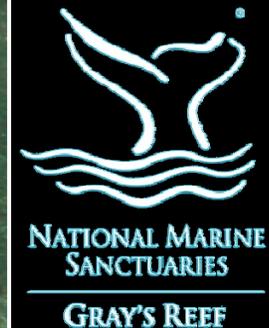
Behavior of prey links mid-water and demersal piscivorous reef fishes



(Auster *et al.* 2009, 2013)

Gray's Reef National Marine Sanctuary

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



<http://graysreef.noaa.gov>