Biogeographic Characterization of Fish Communities & Associated Benthic Habitats within the FGBNMS

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NOAA / NOS
National Centers for Coastal Ocean Science

Historical Efforts

Citation	Technique	Period	Location	Sampling Frequency	Data
Bright & Cashman (1974)	hook and line; traps; divers; dipnets; trawls; towed camera; rotenone; submersible	1970 – 1972	WFGB	17 Cruises	size
Dennis & Bright (1988)	submersible transects from crest to depth; diving	1970 – 1972	EFGB & WFGB	unknown	abundance
Dennis (1985)	submersible transects; roving diver; hook and line; ichthyocides; spear; trawl	1970s – 1980s	EFGB & WFGB	unknown	size and abundance
Boland et al (1983)	hook and line; traps; divers; trawls; towed camera	1980 – 1982	EFGB & WFGB	8 cruises	size data
Gittings et al (1993)	video transects	1989 – 1991	EFGB & WFGB (plots)	6 cruises (2 transects/bank/cruise)	abundance of large bodied fish

Historical Efforts

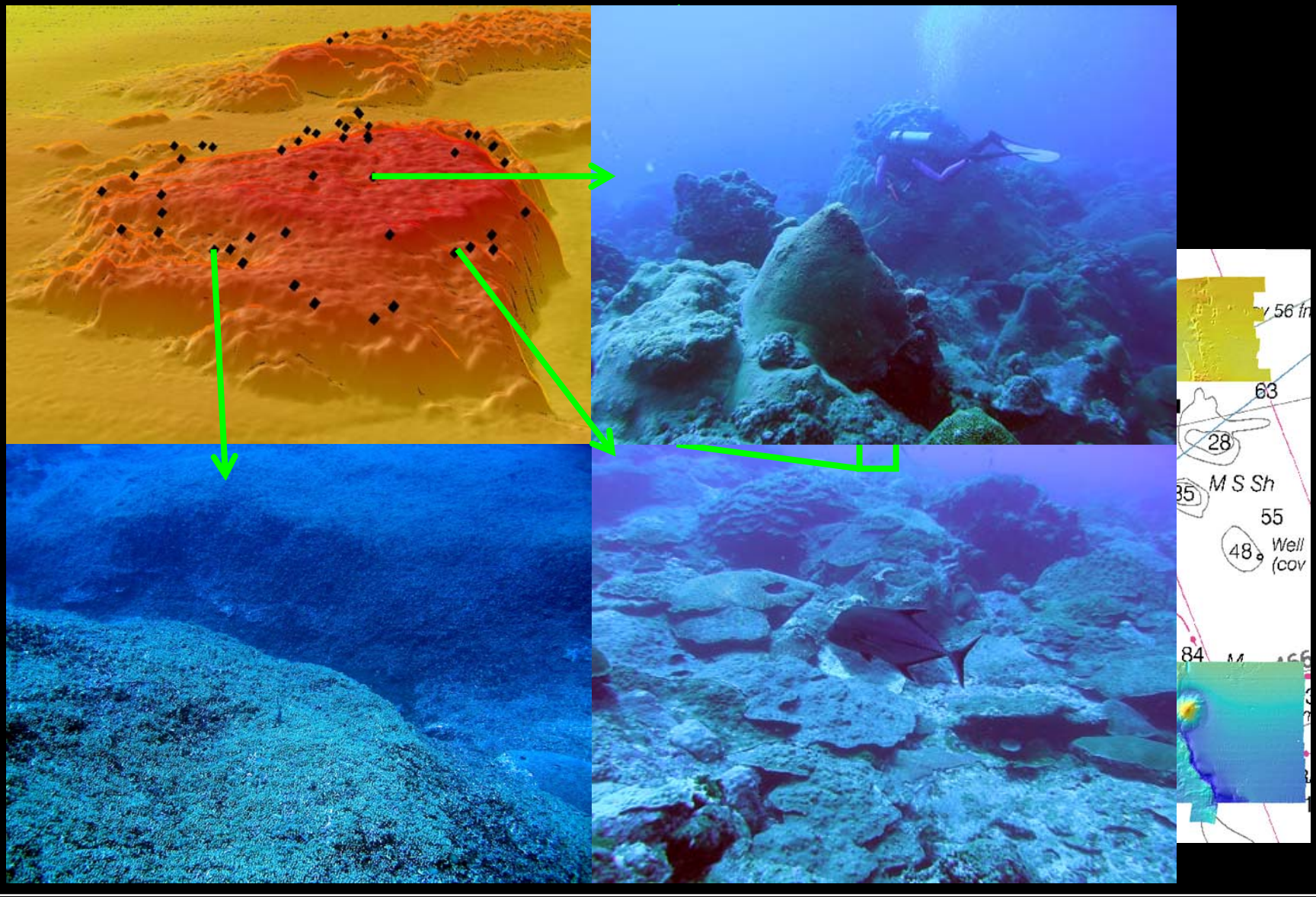
Citation	Technique	Period	Location	Sampling Frequency	Data
Pattengill (1986)	modified point count; roving diver	1994 – 1997	w/in 100m buoy 2 EFGB & buoy 5 WFGB	6 cruises (~24 surveys/bank/ trip)	point count: abundance; roving: log abundance
Dokken et al (1999)	video transects	1996 – 1997	EFGB & WFGB (plots)	2 cruises (2 transects/bank/ cruise)	abundance of large bodied fish
Pattengill-Semmens & Semmens (1998)	roving diver	1996 – present	EFGB & WFGB	Biannually to annually	log scale abundance
Pattengill Semmens et al (2000)	belt transects and roving diver	1999	EFGB & WFGB	1 cruise (12 transects/bank)	transect: size & abundance selected taxa; roving diver: log abundance
Precht et al (2006)	point counts	2003 – present	EFGB & WFGB (plots)	Annually (16 counts/bank)	size and abundance data

Objectives

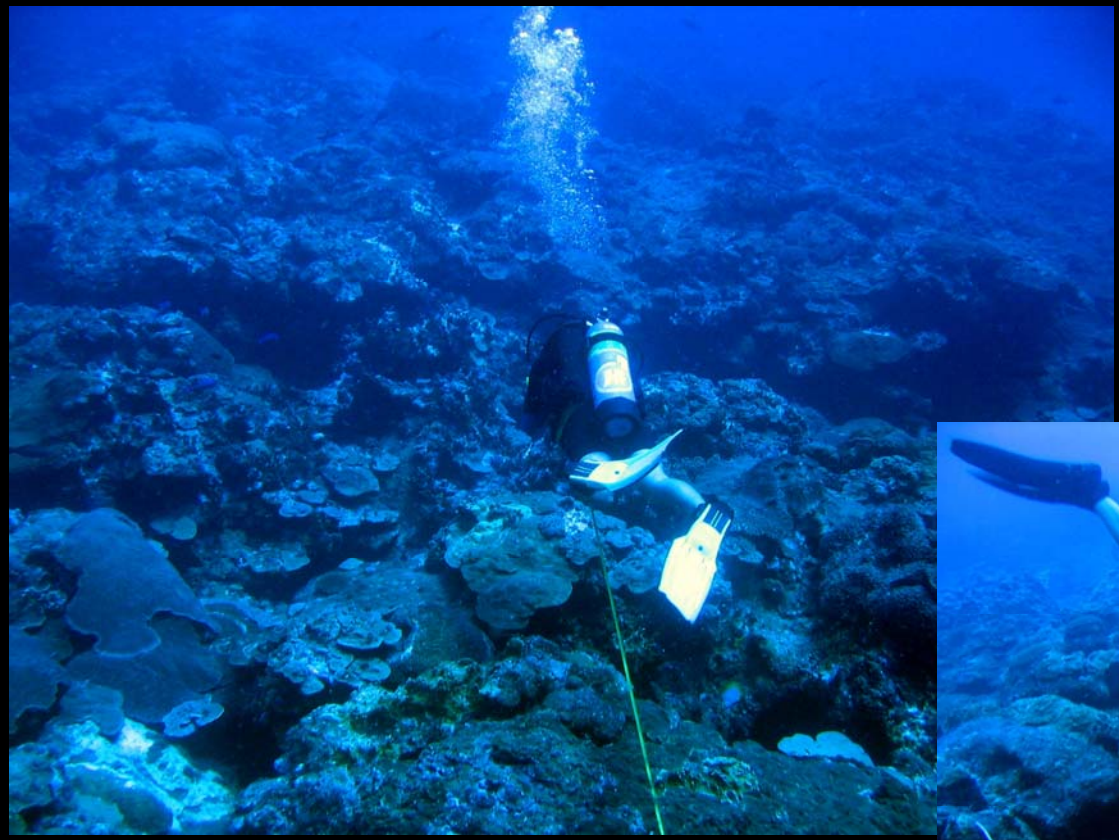
- To determine long-term changes in fish community structure using metrics of diversity, density, and trophic ratios
- To determine long-term changes in density and mean-size of selected economically important taxa
- To determine the relationship between physical measures such as habitat type, depth, slope, and geographic locations with the associated fish community using metrics of diversity, density, and biomass




Flower Garden Banks NMS



Field Methodology



Fish Transect (25 X 4 m)

- identification
- abundance
- size

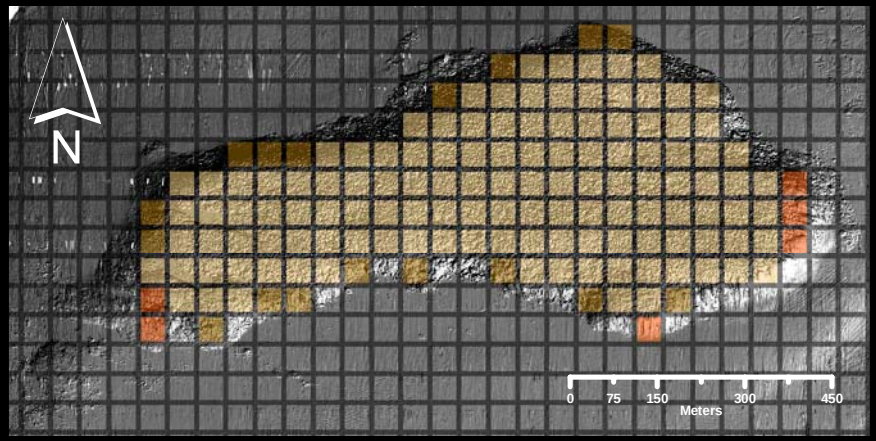
Benthic Composition (1m^2 quadrats)

- % cover of corals, algae, sponges
- auxiliary data – marine debris, macroinvertebrates

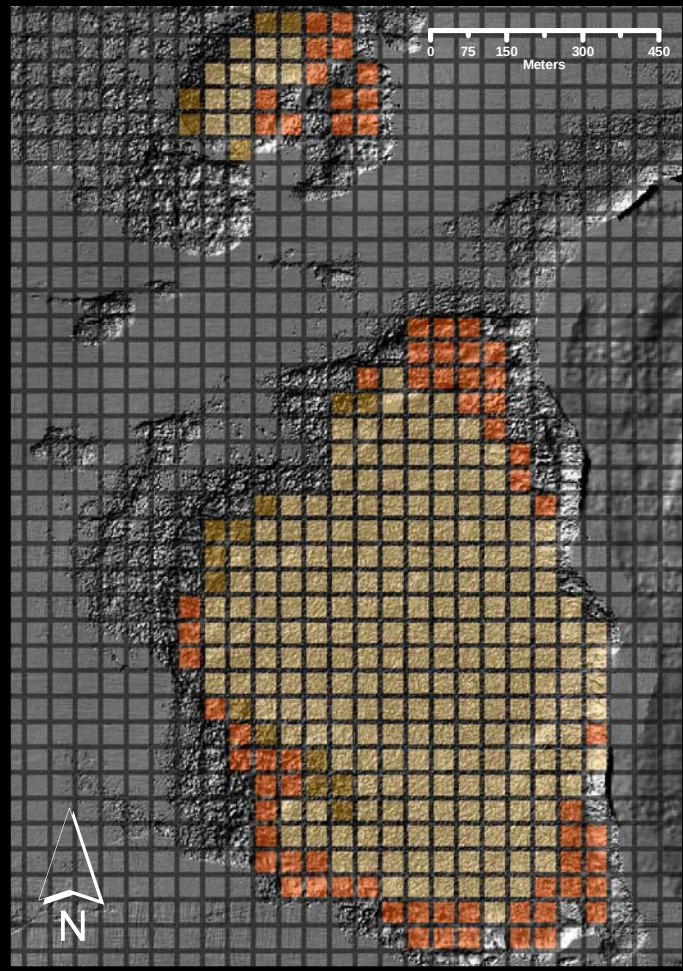
Sampling Design

Community Index	SRS	StRS 2006	StRS Bank	StRS Depth	StRS Habitat	StRS Comp
# Species	2	2	2	2	2	**2**
Density						
All Species	37	32	**30**	37	36	34
Groupers	74	76	74	72	76	**70**
H:P Ratio	121	123	119	**90**	127	109
Grey Snapper	730	710	764	727	825	**574**
Yellowmouth Grouper	158	167	157	167	155	**143**
Tiger Grouper	234	239	242	252	239	**216**
Marbled Grouper	676	741	704	861	**703**	731
Average Size						
All Groupers	36	36	**35**	54	48	45
Biomass						
All Species	186	456	146	130	446	**129**
Groupers	842	**145**	455	455	1465	425
H:P Ratio	817	550	588	**237**	913	530

Site Selection

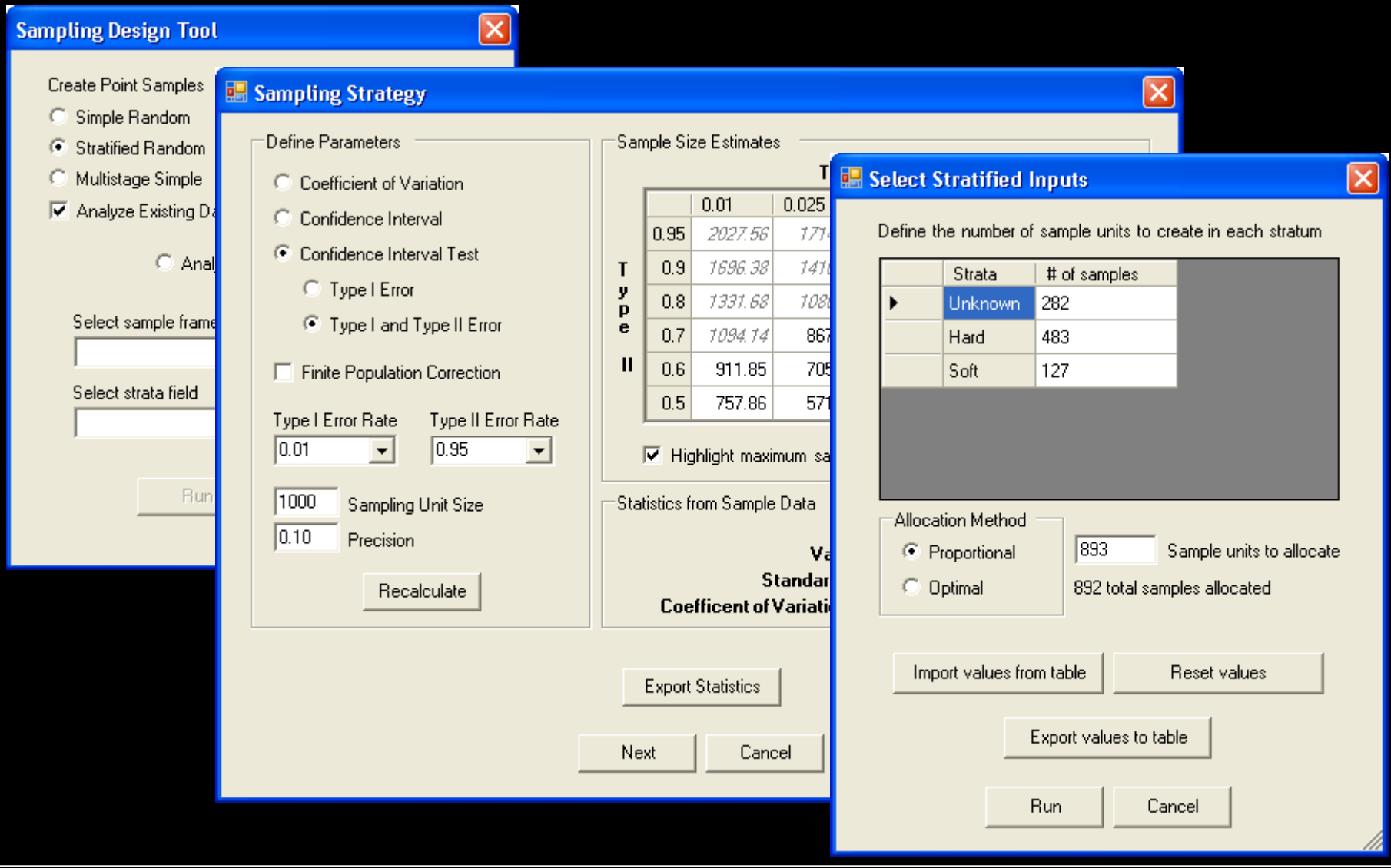


West Bank



East Bank

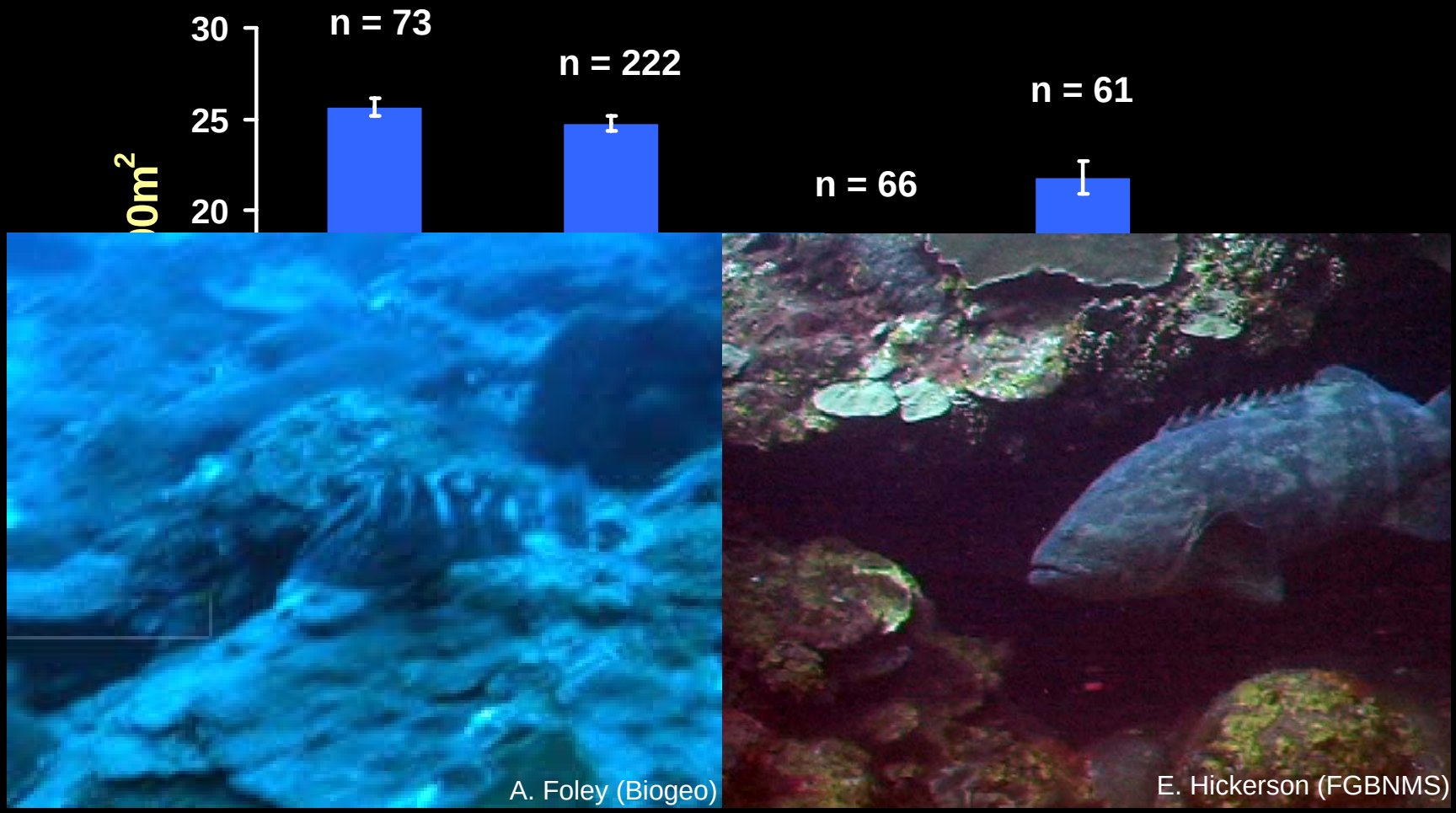
Sampling Design Tool



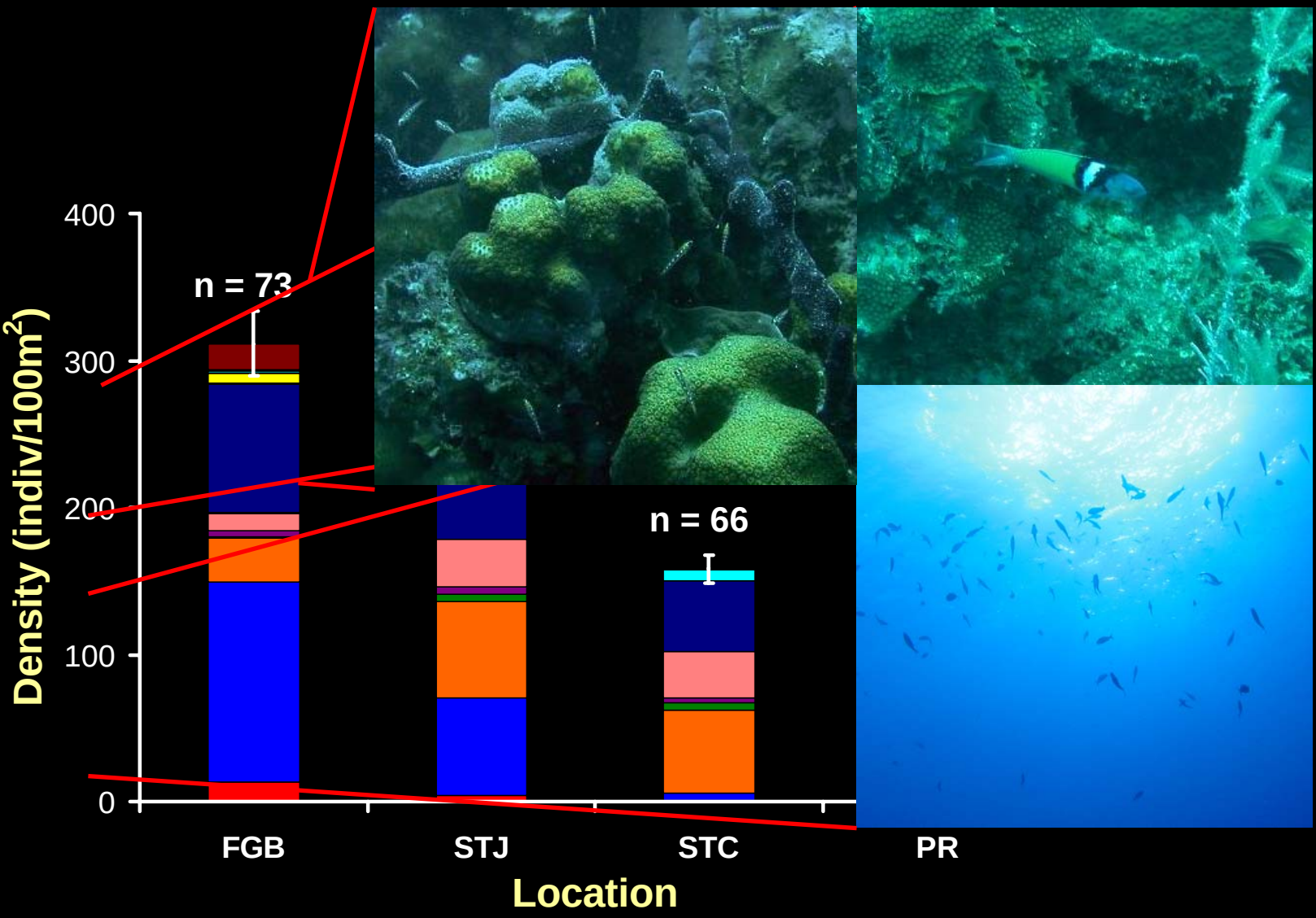
Not always a good story

Mean Richness

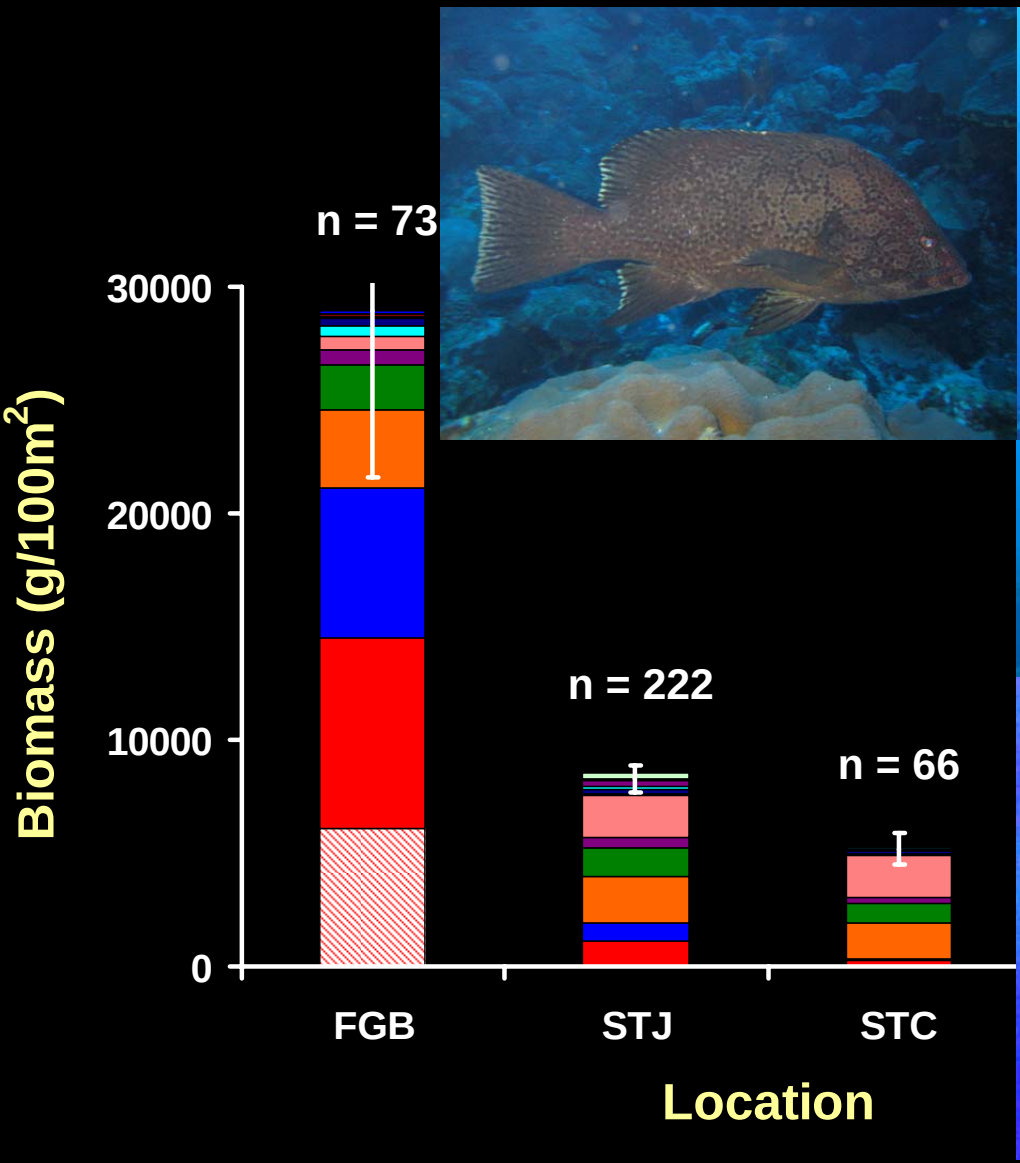
Sites > 60 ft depth



Mean Density



Mean Biomass



Conclusions

- A comparatively pristine ecosystem
  - Coral cover > 50%
    - High topographic complexity
  - Removed from impacts
    - Natural (hurricanes)
    - Anthropogenic (fishing, disease, anchoring)
  - Fish community structured differently
    - 3 dimensional
    - high biomass & high trophic level
- Implications for designation of “Research Area”
  - Baseline for areas beyond just the Sanctuary

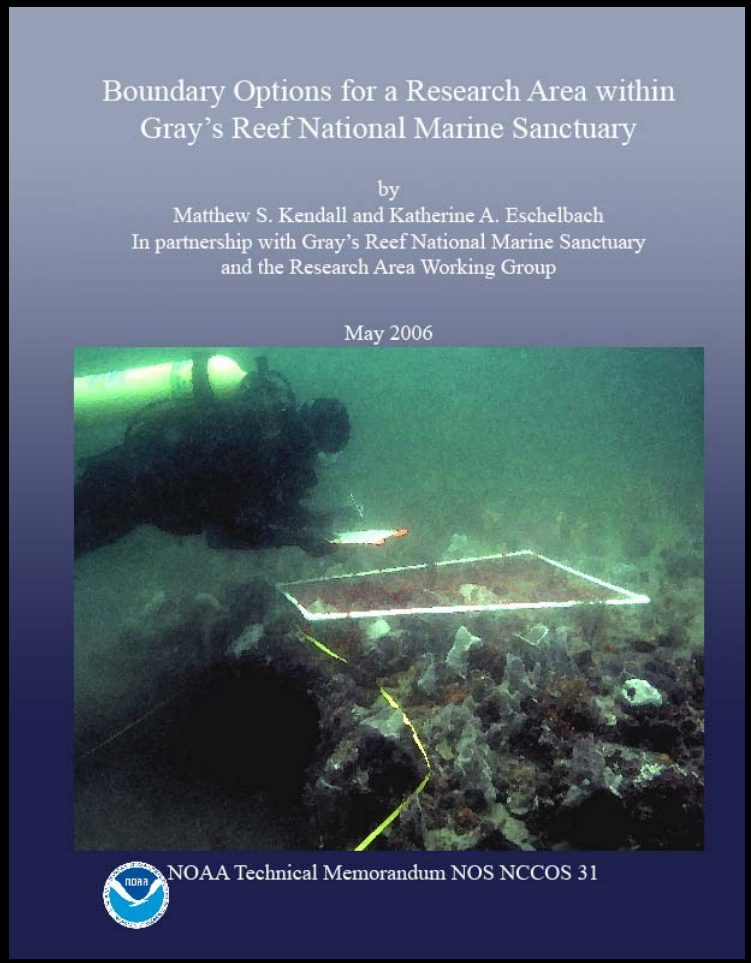

Burek

Acknowledgements

- NOAA's National Center for Coastal Ocean Science
- NOAA's Biogeography Branch
- Flower Garden Banks National Marine Sanctuary
- Crew of NOAA ship Nancy Foster

http://ccma.nos.noaa.gov/ecosystems/sanctuaries/fgb_nms.html

Research Area Delineation



- Goals & Objectives of effective RA
- RA characteristics
  - Amount of key habitats
  - Representative habitats
  - Prior research
  - Impact to users
  - Comparable area outside
- Determine potential boundary configurations and placement options
- Developed novel approach and GIS tool to aid in decision process