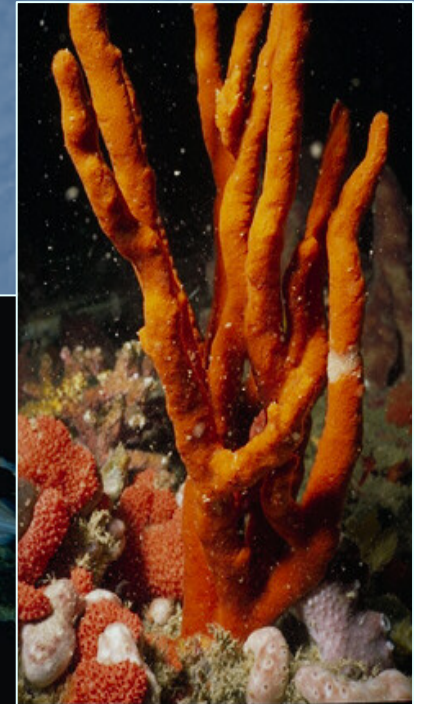




# Gray's Reef National Marine Sanctuary



## Research or Control Area Concept





# NOAA National Marine Sanctuary Program



## NMSA and System Goals:

- Designate and manage areas of the marine environment with special national significance
- Primary objective to protect marine resources, such as coral reefs, sunken historical vessels or unique habitats
- Research and monitoring
- Enhance public knowledge
- Facilitate compatible use



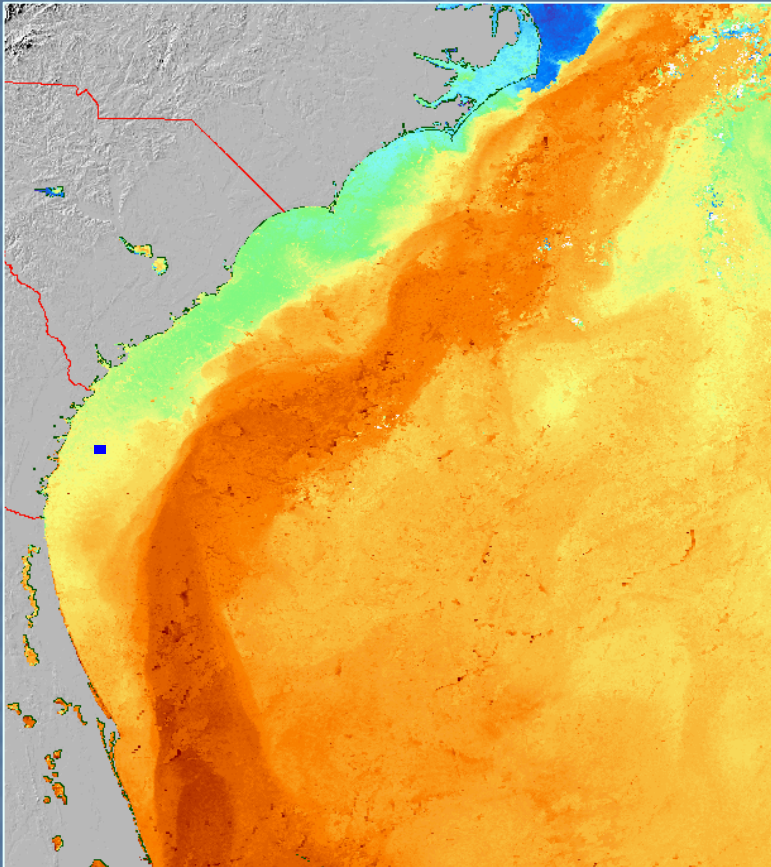
# A Research Area for Gray's Reef National Marine Sanctuary



- Designated in 1981
- Recognized 1986 as an International Biosphere Reserve
- Revised management plan 2006
- Only natural area in EEZ protected off the coast from Cape Hatteras NC to Cape Canaveral FL (SAB)



# Gray's Reef National Marine Sanctuary

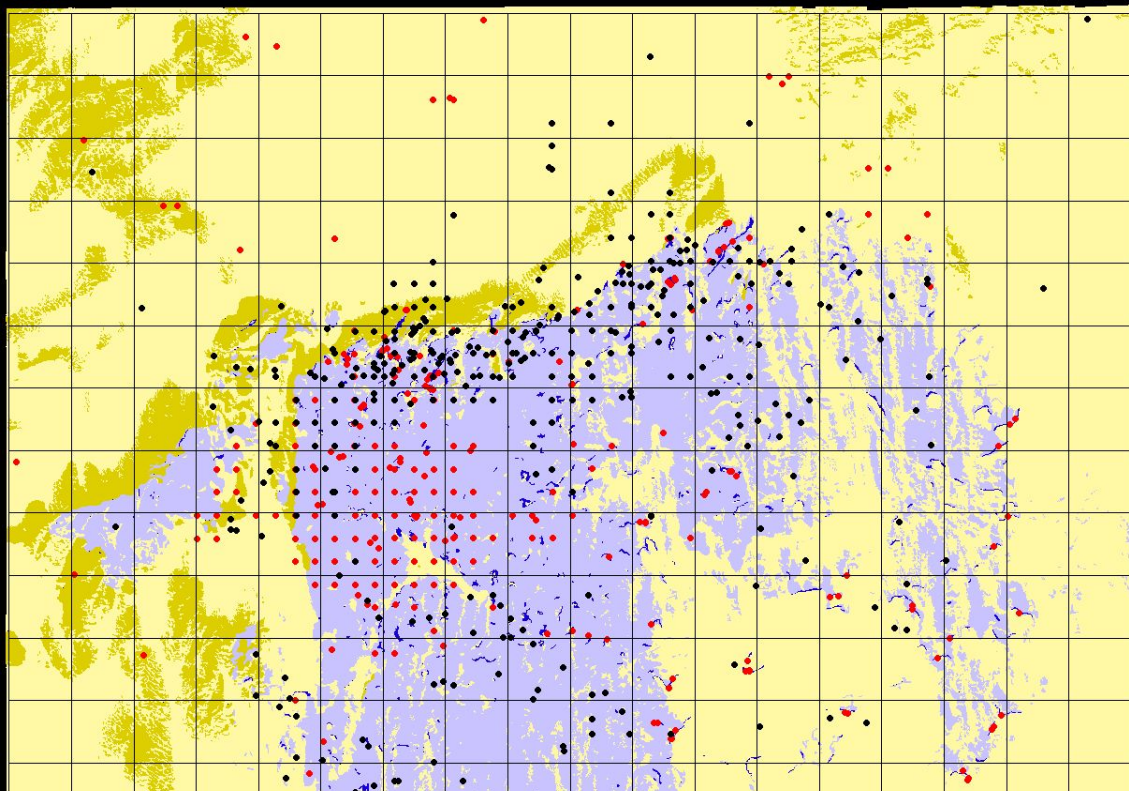


- Mixed temperate and subtropical fauna
- Important habitat for juvenile reef fishes
- A sentinel site for inner shelf live bottom reefs
  - Climate change
  - Fisheries recruitment
  - Contaminants
  - Ecosystem health.....





# Gray's Reef National Marine Sanctuary



■ Flat sand: 8%	■ Sparsely colonized live bottom: 25%
■ Rippled sand: 67%	■ Dense / ledge live bottom: 1%

● Research sites

○ Bottom-fishing boats



- Fished (recreational)
- Historical research
  - MMS, NCCOS benthic studies
  - MARMAP, REEF and other fish monitoring
  - Hydrographic
  - Invertebrate recruitment and monitoring



# Research/Control Area Concept Time Line



- 1999: Concept proposed during public scoping for revision of GRNMS management plan

**Problem:** There are no naturally occurring, live-bottom sites within the Sanctuary (or the region) established exclusively for research

**Outcome:** Increase opportunity to discriminate scientifically between natural and human-induced change to species populations in the Sanctuary





# Research/Control Area Concept Time Line



- 2003 Draft Management Plan:

Direct a working group established by the Sanctuary Advisory Council to study the marine research area concept

*Research Area Working Group – Sport diving, sport fishing, commercial fishing, law enforcement, scientists, educators, conservation, state, federal*





# Summary: The Need for a Research/Control Area



## • Why a research area?

- **None exist:** no natural inner or mid-shelf live bottom areas in the SAB set aside for research; we do not fully understand their function
- **Significant research questions exist at GRNMS that can only be answered with a control area.**
- **Data on the status and natural variability of fish communities, habitats and ecological systems within the sanctuary are essential for informed management**
- **To provide these data, a control area is needed within the sanctuary**
- **Such a control area will allow us to monitor conditions over time and to tell the difference between some human-induced and natural changes**
- **This is not a fishery management plan; this is resource protection (through research) and compatible use**





# Summary: The Research Questions



- **What are the research questions?**
  - **What impacts do extraction activities have on the reef and living marine resources?**
  - **What would fishery populations look like in the absence of fishing impacts? Is fishing an impact?**
  - **What impacts would the removal of targeted species have on overall fish community structure and the more “resident” fish?**
  - **What does benthic invertebrate community structure and/or reef trophic structure look like in the absence of fishing?**
  - **What are the spatial and temporal dynamics of fish communities in a natural population? Does fishing affect size, movements, spawning?**
  - **What variability in the natural system is independent of human impact?**
  - **How well is NOAA conserving the resources of Gray’s Reef National Marine Sanctuary?**



# Summary: The Benefits of a Research/Control Area



- **What benefits will accrue to the Sanctuary?**
  - **Better understanding of the role of inner shelf live bottom in the life history of reef fishes of the region**
    - **Nursery area?**
    - **Spawning ground?**
  - **Sentinel sites for climate change and other non-fishing effects**
  - **A Sanctuary from fishing, where species composition, size/age structure, trophic structure, behavior and community structure are natural and fishing effects are minimized**
  - **Increases the value of the Sanctuary for multiple compatible uses**



# Research/Control Area Concept Time Line



- **May 2004 – December 2005 – Research Area Working Group (RAWG) and GRNMS Advisory Council examines concept and sends recommendations to GRNMS; GRNMS adopts them**

## Recommendation # 1

Significant research questions exist at Gray's Reef National Marine Sanctuary (GRNMS) that can only be addressed by establishing a control (research) area. Therefore, it is the finding of NOAA GRNMS, based on the recommendation of the Sanctuary Advisory Council (SAC) and the Research Area Working Group (RAWG), that the research area concept should be further explored through a public review process.

## Recommendation # 2

The SAC recommends that as many appropriate tools as feasible, especially a GIS (Geographic Information Systems, geographic and spatial analysis software) site evaluation tool and a RAWG be used to investigate a research area with proper siting criteria.





# Research/Control Area Concept Time Line



## Recommendation # 3

The SAC recommends consideration of the diversity of habitat (with emphasis on high relief habitat) as the primary siting criterion. The RAWG should be maintained to support NOAA GRNMS in consideration of these various criteria (e.g., habitat, size, existing research and monitoring sites, bottom fishing data) in developing proposed options for a Draft Environmental Impact Statement (DEIS).

## Recommendation # 4

The SAC recommends minimizing impacts to user communities including fishing, diving, research, and resource management and considers this a priority under the research area concept. The SAC also endorses the RAWG finding that non-bottom impinging activities are not viewed as conflicting with the primary objectives of a proposed research area.





# Using GIS to Explore the Research Area Concept

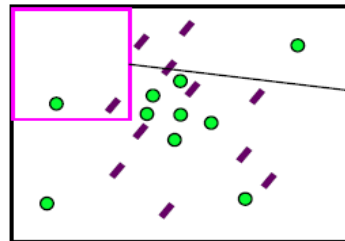


## Analysis process

### Sliding window...

1. Tally variables within and outside the window
2. Slide it over 100m
3. Re-tally
4. Comprehensively slide throughout the sanctuary
5. Results in a table 50 columns wide by n rows long

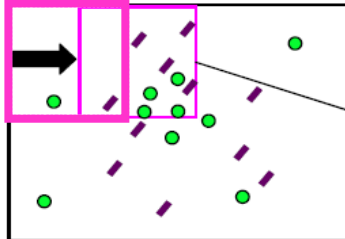
Start the window in northwest corner of the sanctuary, this is option 1.



/ Ledge  
 ● Research site  
 □ Boundary Option

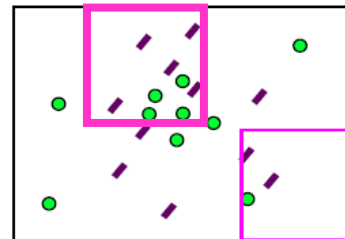
Option	# Ledges Inside	# Research Sites Inside	# Ledges Outside	# Research Sites Outside
1	1	1	9	9
2				
.				
.				
n				

Slide the window east to encompass a new set of variables, this is option 2.



Option	# Ledges Inside	# Research Sites Inside	# Ledges Outside	# Research Sites Outside
1	1	1	9	9
2	5	4	5	6
.				
.				
n				

Continue sliding until the entire sanctuary has been assessed, this is option N.



Option	# Ledges Inside	# Research Sites Inside	# Ledges Outside	# Research Sites Outside
1	1	1	9	9
2	5	4	5	6
.				
.				
n	2	1	8	9




# Using GIS to Explore the Research Area Concept

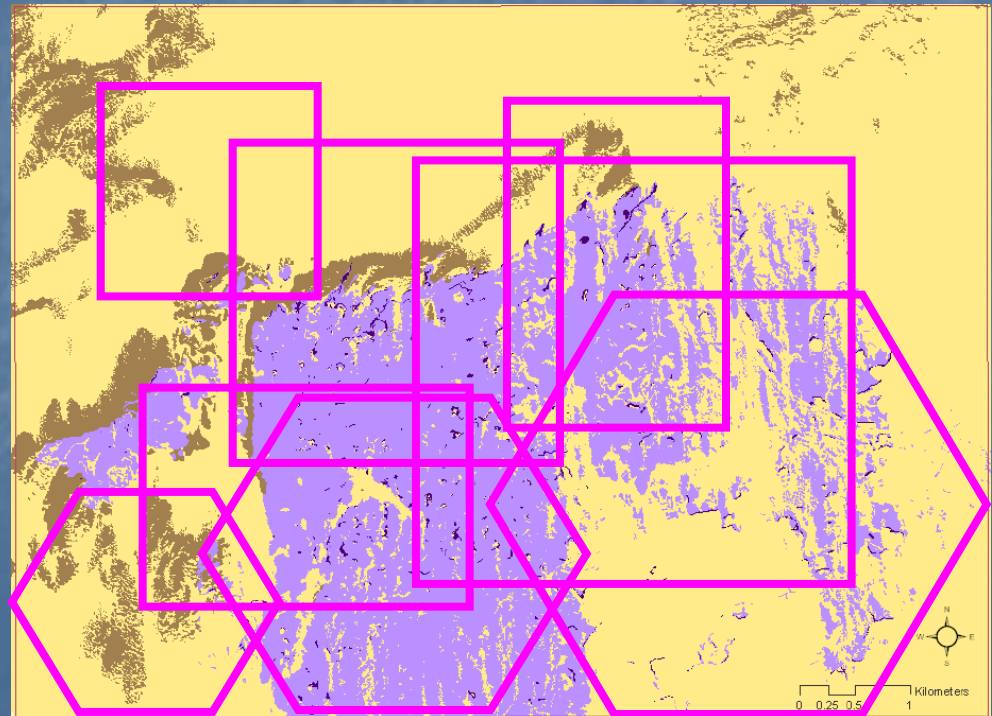


## Boundary configurations

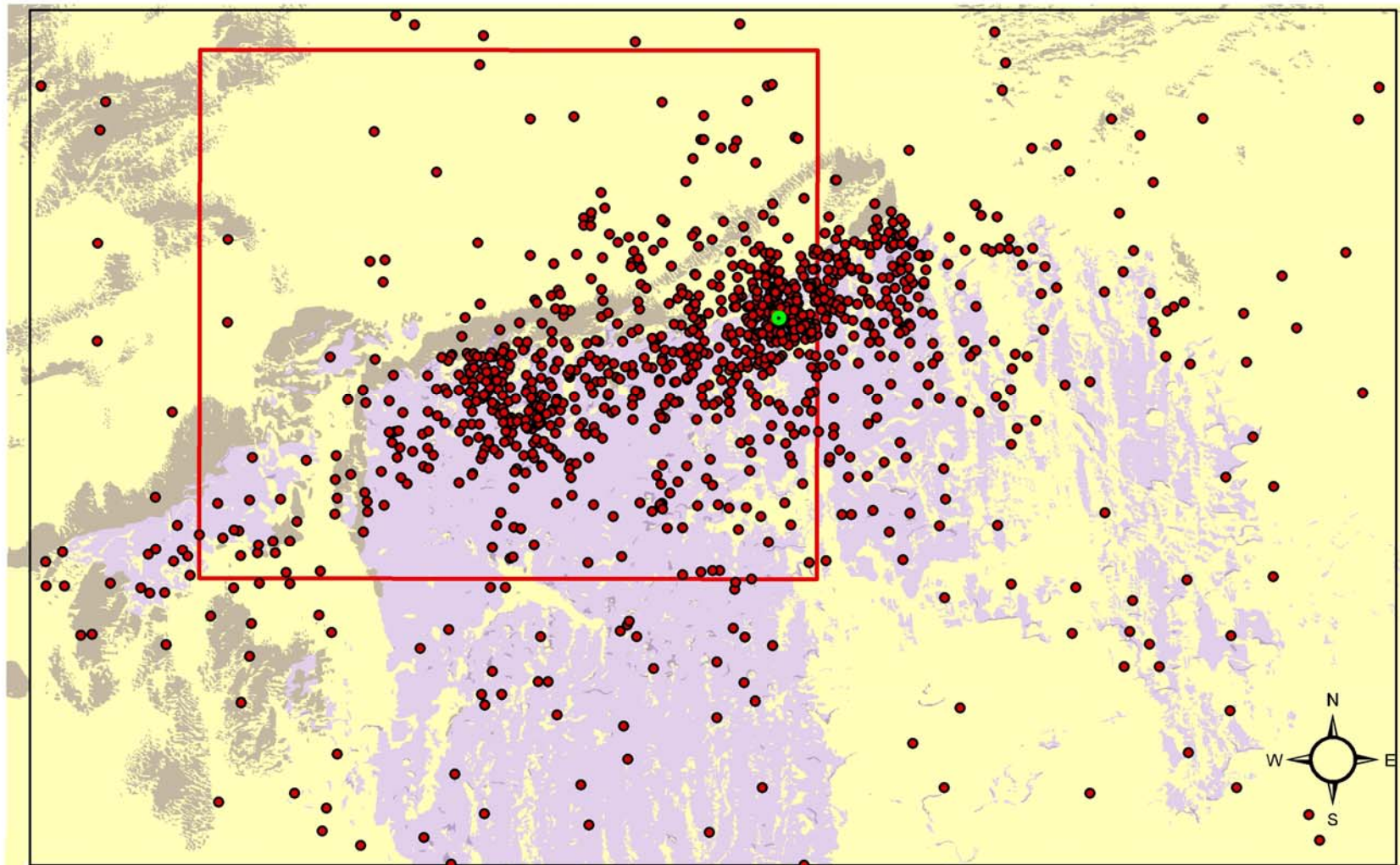
Shape	Size (km)
Square – sides parallel to lat/long	2×2
	3×3
	4×4
Square – rotated 30° (counter clockwise)	2×2
	3×3
	4×4
Square – rotated 45°	2×2
	3×3
	4×4
Rectangle – sides parallel to lat/long	2×3
	3×2
	4×2
Rectangle – rotated 30°	2×3
	3×2
	4×2
Rectangle – rotated 45°	2×3
	3×2
	4×2
Hexagon	4 km <sup>2</sup>
	6 km <sup>2</sup>
	9 km <sup>2</sup>

## 18 boundary configurations

- 3 shapes 
- 4 sizes- 4, 6, 9, and 16 km<sup>2</sup>
- 3 rotations- 0°, 30°, and 45°



## Scenario 1: Optimal Scientific Option



### Selection Criteria:

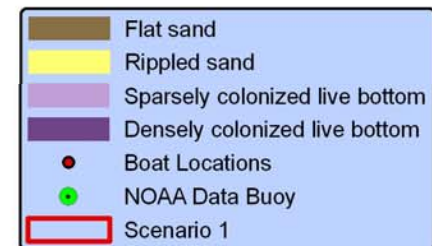
4 by 4 km squares; 30 of each ledge type (S, M, T)  
Representative proportions of other bottom types

### Resulting Characteristics:

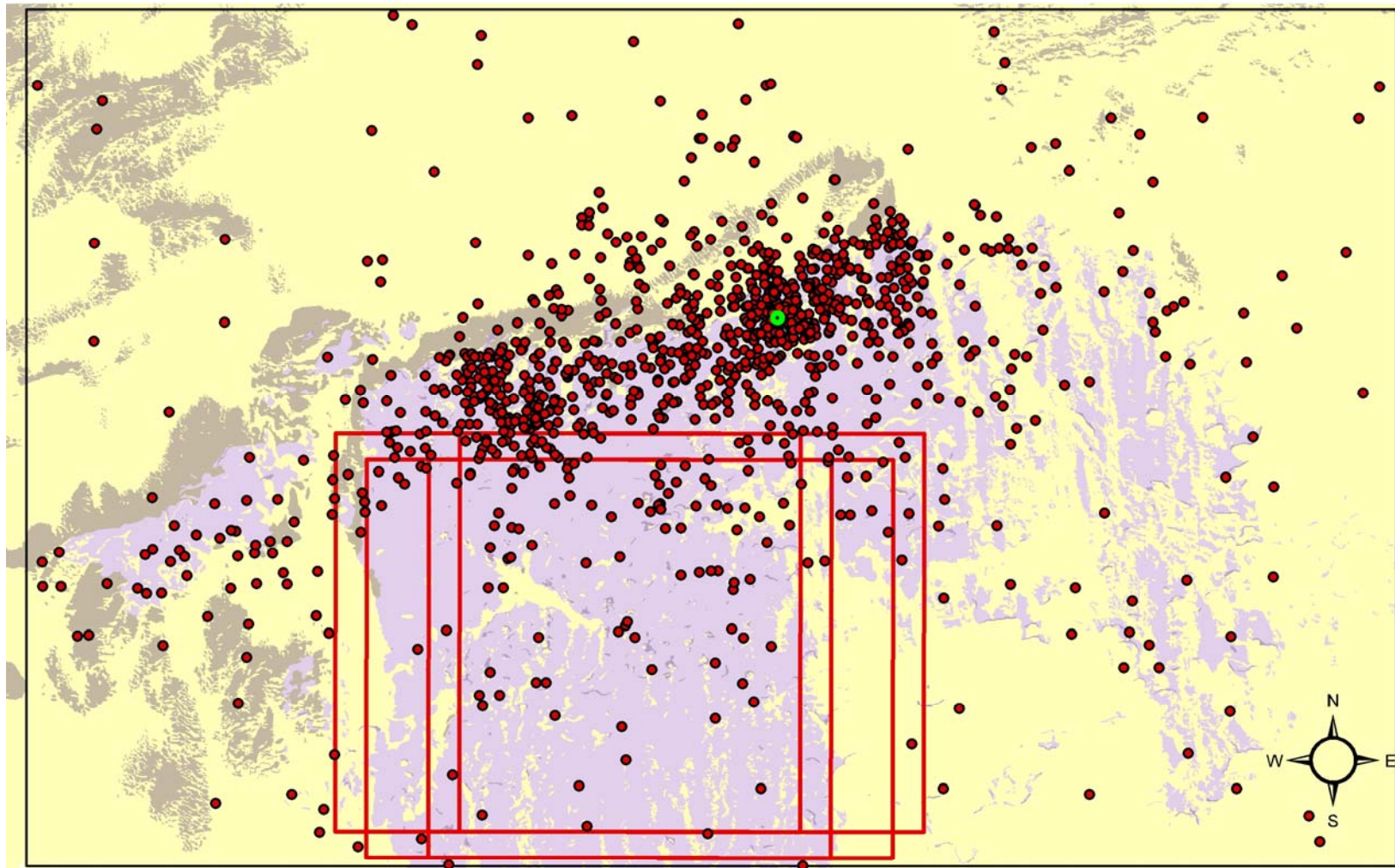
6 options; encompass ~2/3 of boat sightings

Sufficient ledge and other bottom types outside RA, available for comparative research (and fishing); includes data buoy, Long Term Mon. site

0 0.25 0.5 1  
Nautical Miles



## Scenario 2: Minimize Fishing Displacement



### Selection Criteria:

3 by 3 km squares; lowest level of fishing impact

30 of each ledge type (S, M, T)

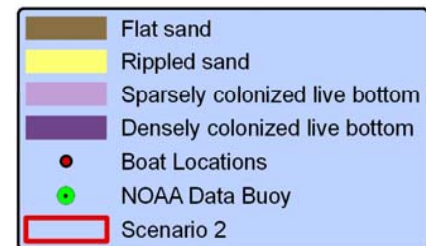
### Resulting Characteristics:

19 options; encompass ~15% of boat sightings

Sufficient ledge and other bottom types outside RA, available for comparative research (and fishing)

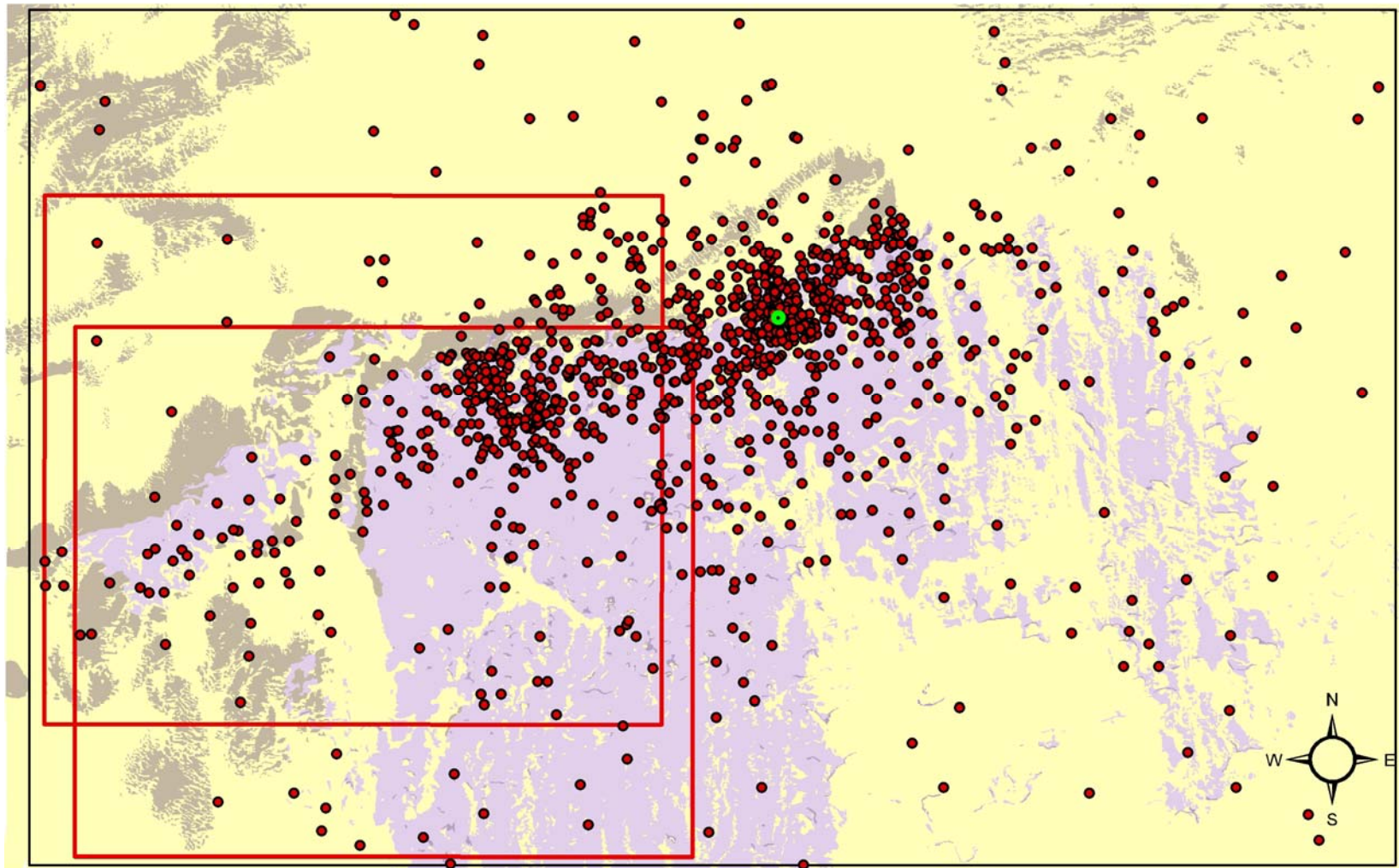
Little if any flat sand included; no data buoy or Long Term Mon. site

0 0.25 0.5 1  
Nautical Miles





## Scenario 3: Compromise Option



### Selection Criteria:

4 by 4 km squares; lower level of fishing

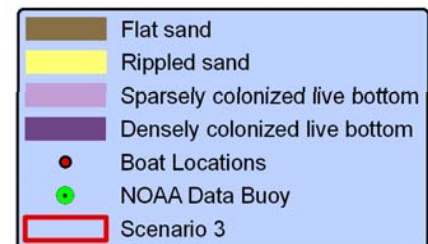
30 of each ledge type (S, M, T); representative proportions of other bottom types

### Resulting Characteristics:

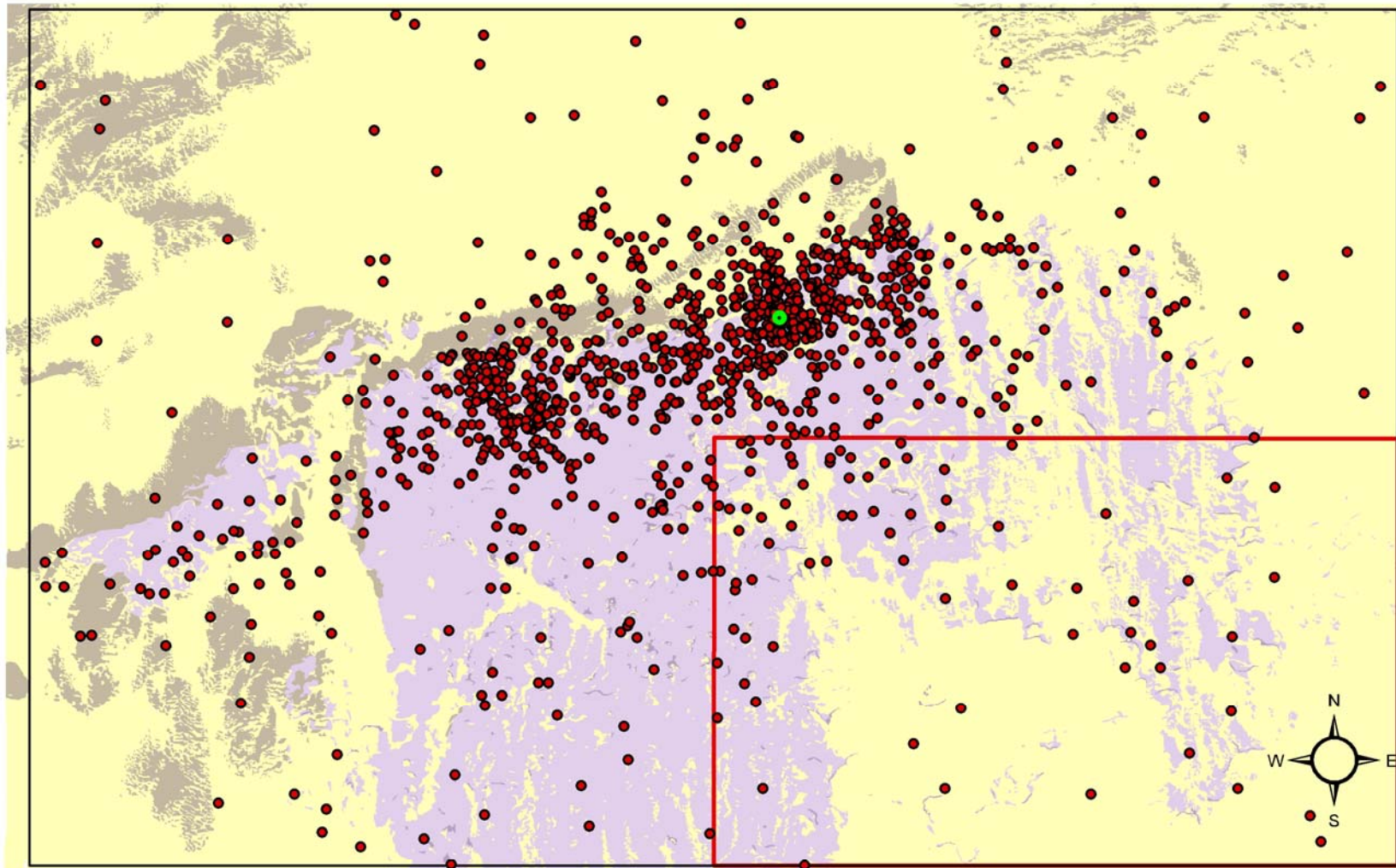
22 options; encompass ~1/3 of boat sightings

Sufficient ledge and other bottom types outside RA, available for comparative research (and fishing); includes Long Term Mon. site; no data buoy

0 0.25 0.5 1  
Nautical Miles



## Scenario 4: Southeast Quadrant



### Selection Criteria:

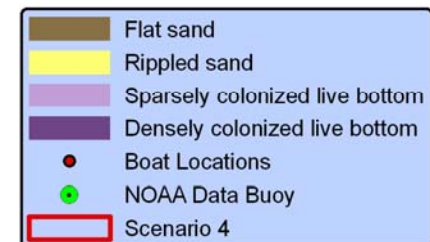
SE quadrant of GRNMS

### Resulting Characteristics:

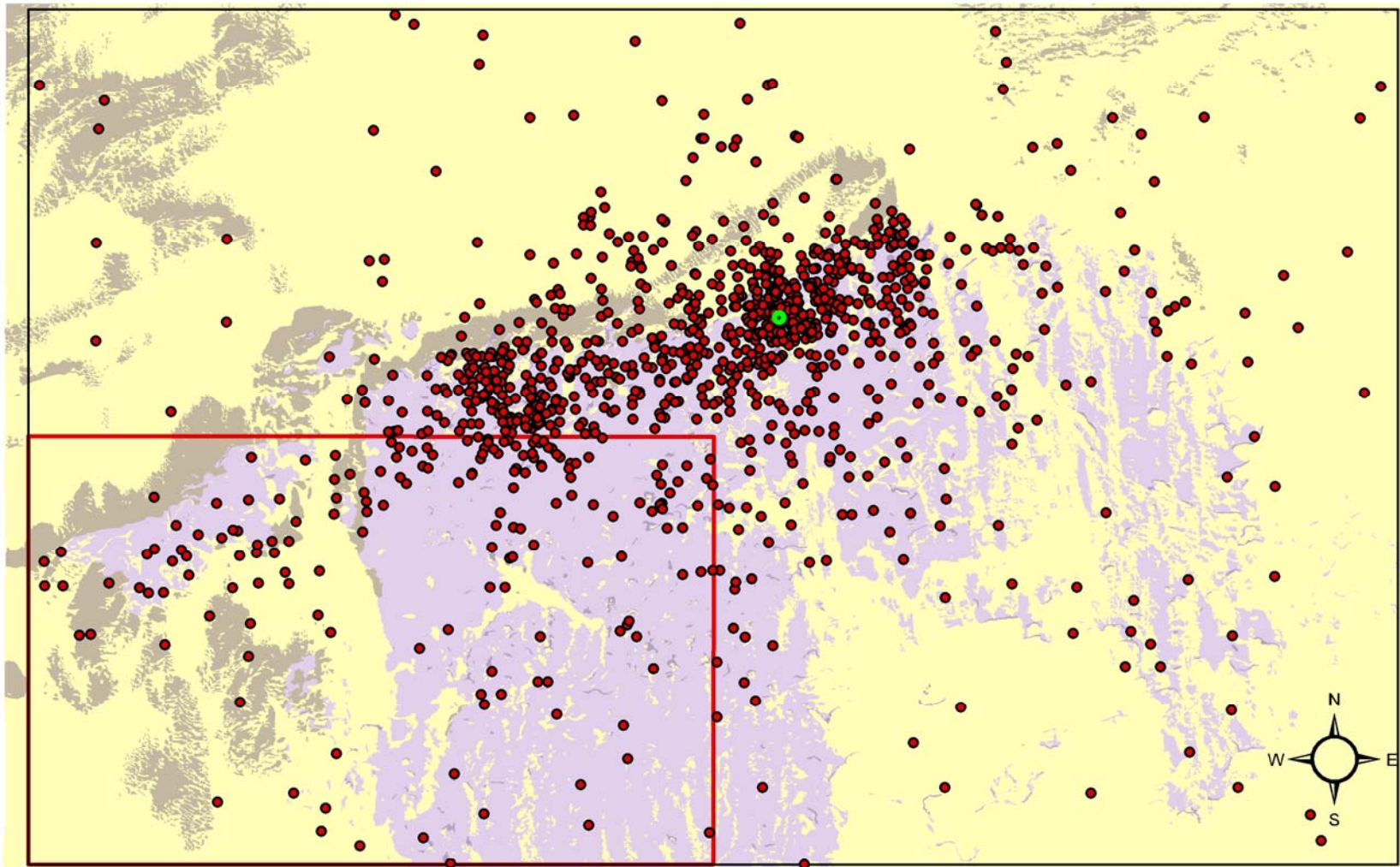
1 option; encompasses 9% of boats

Insufficient number of short (22), medium (25), and tall (23) ledges; no flat sand included; much less prior research; no data buoy or Long Term Mon. site  
Most ledge types are outside for comparative research (and fishing)

0 0.25 0.5 1  
Nautical Miles



## Scenario 5: Southwest Quadrant



### Selection Criteria:

SW quadrant of GRNMS

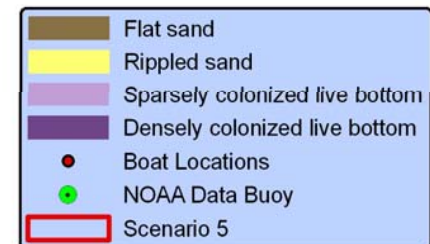
### Resulting Characteristics:

1 option; encompasses 10% of boats

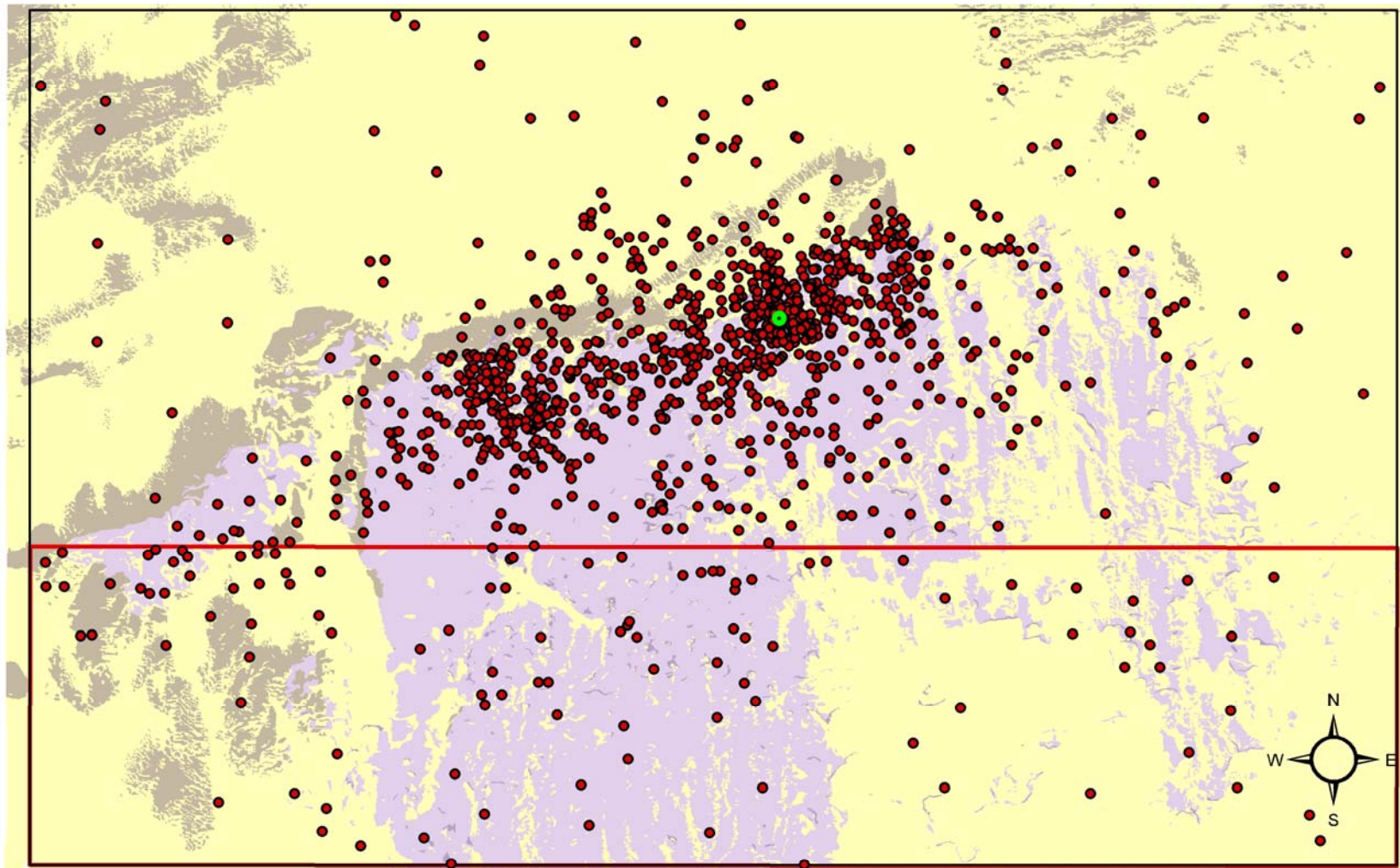
Insufficient number of tall (21) ledges inside

All bottom types are included; most ledge types outside for comparative research (and fishing); no data buoy or Long Term Mon. site; much less prior research

0 0.25 0.5 1  
Nautical Miles



## Scenario 6: Southern Expansion



0 0.25 0.5 1  
Nautical Miles

**Selection Criteria:** Enlarge from southern border until 30 ledges of each types are included (S, M, T)

**Resulting Characteristics:**

1 option (2.41 by 8.5 km; 21.28 km<sup>2</sup>); encompass 8.5% of boats

30 short, 52 medium, 36 tall; all bottom types are included

Sufficient ledge and other bottom types outside for comparative research (and fishing); no Long Term Mon. site or data buoy



# Additional Research Area Issues



- Additional information on trolling
- Effects of recreational diving
  - Effects of these activities on habitats, organisms, and a "control area"
- Enforcement
- No entry

# Preliminary Economic Analysis of Recreational Fishing in the Proposed GRNMS Research Area

## Georgia Saltwater Fishing Statistics 2006

146,000 Georgia Saltwater Anglers  
1,707,000 Georgia Saltwater Fishing Days

### Total Economic Impact of Saltwater Fishing in Georgia in 2006:

Total Expenditures	<b>\$119,250,000</b>
Total Impact – Sales	\$153,361,000
Total Impact – Income	\$63,021,000
Total Impact – Employment	1,892

Sources: American Sportfishing Association, Sportfishing in America, January 2008  
US Fish and Wildlife Service, 2006 National Survey of Fishing, Hunting and Wildlife  
Associated Recreation, 2006  
NOAA, NMFS, Marine Angler Expenditures in the Southeast Region, 1999  
NOAA, NMFS, The Economic Importance of Marine Angler Expenditures  
in the United States, 2004



# Methodology and Assumptions

- GRNMS boat location data sources: multiple, including aerial photography and on water GRNMS and DNR patrol boat records.
- Boat location data spans 1999 to 2007. 1,266 boat locations identified.
- Approximately **50 percent** of these occurred on **fishing tournament days**. **No difference in spatial distribution** of kingfish tournament days compared with non-tournament days.
- Assumptions for GRNMS fishing analysis:*
  - All boats identified are fishing
  - Average of 4 fishers per boat
  - Trip expenditure profile of **charter boats used** for trip expenditure profile of **tournament boats**
  - 50 percent private/rental and 50 percent charter/tournament
  - 95 percent Georgia resident and 5 percent non-resident
- This analyses **assumes that all economic value associated with the areas closed are lost**. Any factor that could mitigate or off-set the level of impact is not addressed. The estimated impacts are thought of as **“maximum potential losses.”** Rarely does society fail to at least mitigate or off-set most losses.



# GRNMS Fishing Expenditures

**4,694 person days = \$2,017,340 total fishing expenditures**

*(Statistical analysis of boat location data estimated a typical year of person days of fishing within GRNMS.)*

GRNMS		Average Person Day Expenditures		Total Expenditures	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	17	7	36,799	805
	Private/Rental	7	10	15,324	1,142
Food	Charter	30	25	66,907	2,946
	Private/Rental	14	35	31,862	4,135
Lodging	Charter	55	41	122,295	4,792
	Private/Rental	301	27	670,368	3,168
Public Transportation	Charter	15	110	34,371	12,897
	Private/Rental		41	-	4,814
Boat Fuel	Private/Rental	13	13	54,103	2,686
Charter Fees	Charter	178	144	397,559	16,899
Access/Boat Launching	Charter	6	7	12,896	821
	Private/Rental	6	4	12,788	439
Equipment Rental	Charter	193	77	429,718	9,059
	Private/Rental		11	-	1,306
Bait	Charter	13	16	28,031	1,835
	Private/Rental	11	8	25,090	947
Ice	Charter	2	4	4,344	481
	Private/Rental	2	3	5,396	318
<b>Total</b>	<b>Charter</b>	<b>508</b>	<b>431</b>	<b>1,132,919</b>	<b>50,535</b>
	<b>Private/Rental</b>	<b>355</b>	<b>151</b>	<b>814,931</b>	<b>18,954</b>





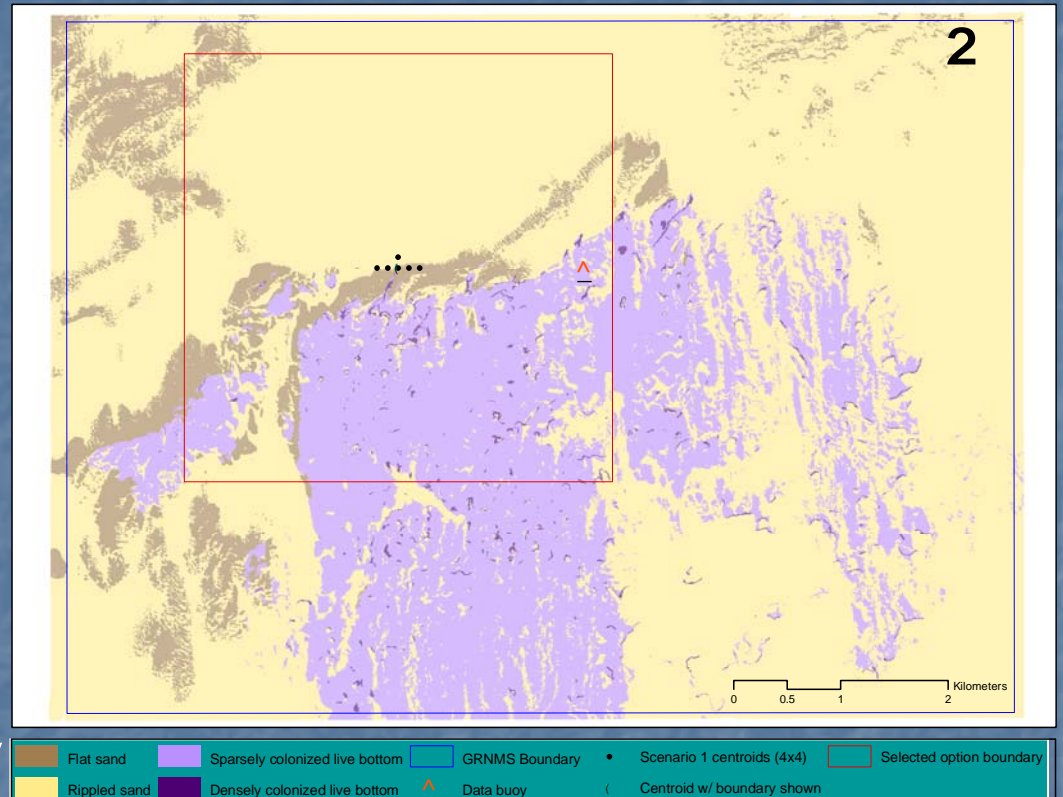
# Scenario 1: Optimal scientific option

## RA Selection Criteria:

- 4 by 4 km squares
- 30 of each ledge type (S, M, T)
- Representative proportions of other bottom types

## Resulting Characteristics:

- 6 options
- Sufficient ledge and other bottom types are outside the RA and available for comparative research (and fishing)
- All options include the data buoy
- All options include Long Term Mon. site
- Encompass ~2/3 of boat sightings



# Scenario 1 Impacts to Fishing Expenditures

**67.0 percent** of **GRNMS** fishing impacted = \$1,351,651

GRNMS		Expenditure Impacts Scenario 1	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	24,656	539
	Private/Rental	10,267	765
Food	Charter	44,829	1,974
	Private/Rental	21,348	2,770
Lodging	Charter	81,940	3,211
	Private/Rental	449,158	2,123
Public Transportation	Charter	23,029	8,641
	Private/Rental	-	3,225
Boat Fuel	Private/Rental	36,250	1,799
Charter Fees	Charter	266,371	11,322
Access/Boat Launching	Charter	8,640	550
	Private/Rental	8,568	294
Equipment Rental	Charter	287,918	6,070
	Private/Rental	-	875
Bait	Charter	18,781	1,229
	Private/Rental	16,811	635
Ice	Charter	2,910	323
	Private/Rental	3,615	213
<b>Total</b>	<b>Charter</b>	<b>759,075</b>	<b>33,860</b>
	<b>Private/Rental</b>	<b>546,017</b>	<b>12,699</b>



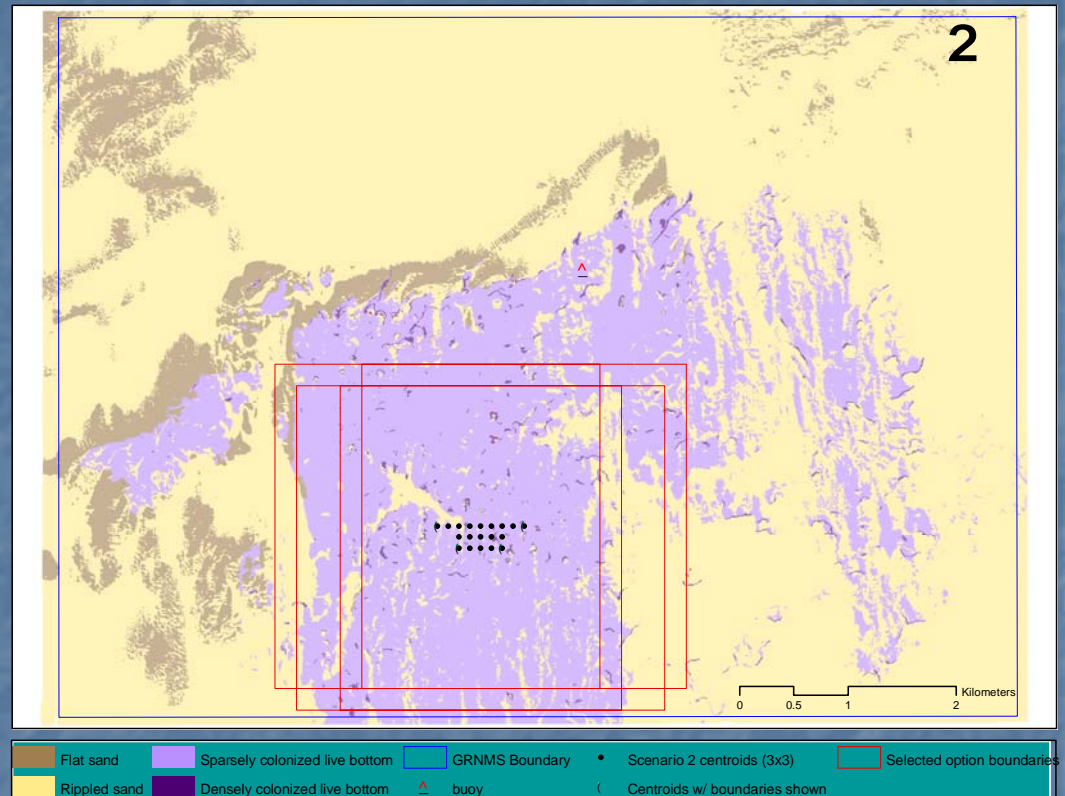
## Scenario 2: Minimize fishing displacement

### Selection Criteria:

- 3 by 3 km squares
- 30 of each ledge type (S, M, T)
- Lowest level of fishing impact

### Resulting Characteristics:

- 19 options
- Sufficient ledge and other bottom types are outside the RA and available for comparative research (and fishing)
- Little if any flat sand included
- No options include the data buoy
- No options include Long Term Mon. site
- Encompass ~15% of boat sightings, not in main fishing area



# Scenario 2 Impacts to Fishing Expenditures

Boundary 1: **12.4 percent** of **GRNMS** fishing impacted = \$250,055

Boundary 2: **12.2 percent** of **GRNMS** fishing impacted = \$246,676

Boundary 3: **8.8 percent** of **GRNMS** fishing impacted = \$177,404

Boundary 4: **8.7 percent** of **GRNMS** fishing impacted = \$175,715

GRNMS		Expenditure Impacts Scenario 2, Boundary 1		Expenditure Impacts Scenario 2, Boundary 2		Expenditure Impacts Scenario 2, Boundary 3		Expenditure Impacts Scenario 2, Boundary 4	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)	Resident Spenders (\$)	Nonresident Spenders (\$)	Resident Spenders (\$)	Nonresident Spenders (\$)	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	4,561	100	4,500	98	3,236	71	3,205	70
	Private/Rental	1,899	142	1,874	140	1,348	100	1,335	99
Food	Charter	8,293	365	8,181	360	5,884	259	5,828	257
	Private/Rental	3,949	513	3,896	506	2,802	364	2,775	360
Lodging	Charter	15,159	594	14,954	586	10,755	421	10,652	417
	Private/Rental	83,094	393	81,971	387	58,952	279	58,391	276
Public Transportation	Charter	4,260	1,599	4,203	1,577	3,023	1,134	2,994	1,123
	Private/Rental	-	597	-	589	-	423	-	419
Boat Fuel	Private/Rental	6,706	333	6,616	328	4,758	236	4,712	234
Charter Fees	Charter	49,279	2,095	48,613	2,066	34,961	1,486	34,628	1,472
Access/Boat Launching	Charter	1,598	102	1,577	100	1,134	72	1,123	71
	Private/Rental	1,585	54	1,564	54	1,125	39	1,114	38
Equipment Rental	Charter	53,265	1,123	52,545	1,108	37,789	797	37,429	789
	Private/Rental	-	162	-	160	-	115	-	114
Bait	Charter	3,475	227	3,428	224	2,465	161	2,442	160
	Private/Rental	3,110	117	3,068	116	2,206	83	2,185	82
Ice	Charter	538	60	531	59	382	42	378	42
	Private/Rental	669	39	660	39	475	28	470	28
<b>Total</b>	<b>Charter</b>	<b>140,429</b>	<b>6,264</b>	<b>138,531</b>	<b>6,179</b>	<b>99,629</b>	<b>4,444</b>	<b>98,680</b>	<b>4,402</b>
	<b>Private/Rental</b>	<b>101,013</b>	<b>2,349</b>	<b>99,648</b>	<b>2,318</b>	<b>71,665</b>	<b>1,667</b>	<b>70,982</b>	<b>1,651</b>



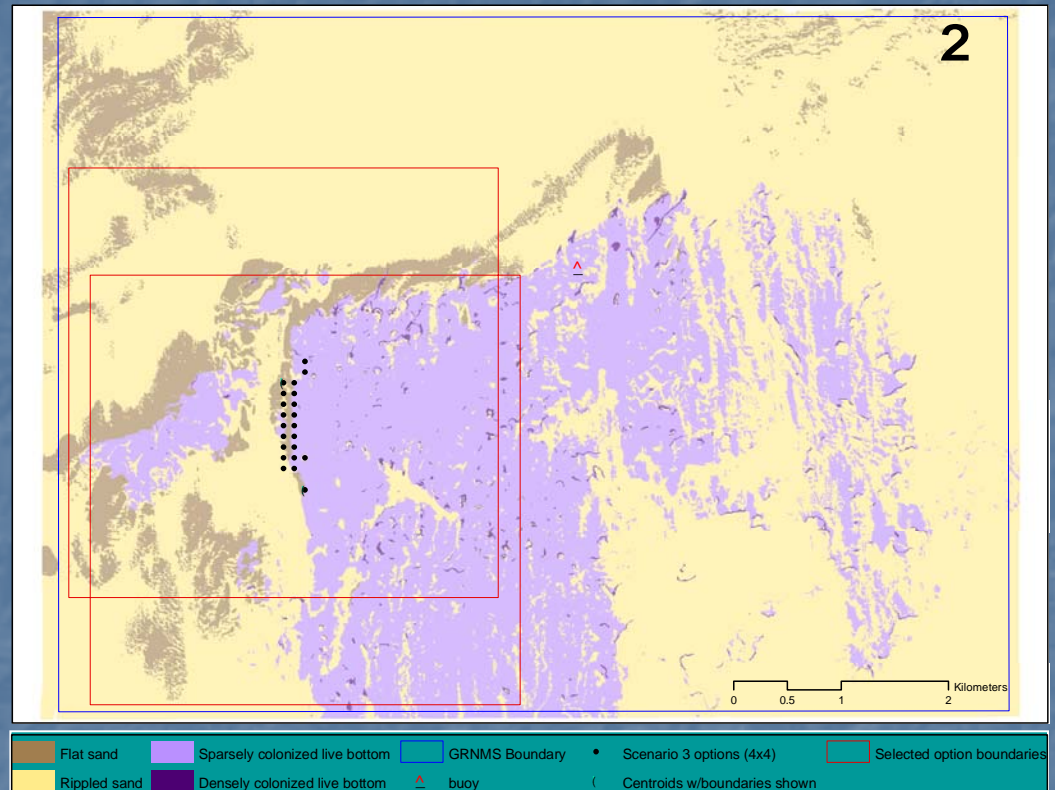
## Scenario 3: Compromise option

### Selection Criteria:

- 4 by 4 km squares
- 30 of each ledge type (S, M, T)
- Lower level of fishing
- Representative proportions of other bottom types

### Resulting Characteristics:

- 22 options
- Sufficient ledge and other bottom types are outside the RA and available for comparative research (and fishing)
- No options include the data buoy
- All options include Long Term Mon. site
- Encompass ~1/3 of boat sightings



# Scenario 3 Impacts to Fishing Expenditures

Boundary 1: **35.9 percent** of **GRNMS** fishing impacted = \$724,823

Boundary 2: **34.6 percent** of **GRNMS** fishing impacted = \$697,790

GRNMS		Expenditure Impacts Scenario 3, Boundary 1		Expenditure Impacts Scenario 3, Boundary 2	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	13,222	289	12,729	278
	Private/Rental	5,506	410	5,300	395
Food	Charter	24,040	1,059	23,143	1,019
	Private/Rental	11,448	1,486	11,021	1,430
Lodging	Charter	43,940	1,722	42,301	1,658
	Private/Rental	240,861	1,138	231,878	1,096
Public Transportation	Charter	12,349	4,634	11,889	4,461
	Private/Rental	-	1,730	-	1,665
Boat Fuel	Private/Rental	19,439	965	18,714	929
Charter Fees	Charter	142,842	6,072	137,514	5,845
Access/Boat Launching	Charter	4,633	295	4,461	284
	Private/Rental	4,595	158	4,423	152
Equipment Rental	Charter	154,396	3,255	148,638	3,134
	Private/Rental	-	469	-	452
Bait	Charter	10,071	659	9,696	635
	Private/Rental	9,015	340	8,679	328
Ice	Charter	1,561	173	1,502	166
	Private/Rental	1,939	114	1,866	110
<b>Total</b>	<b>Charter</b>	<b>407,054</b>	<b>18,157</b>	<b>391,872</b>	<b>17,480</b>
	<b>Private/Rental</b>	<b>292,802</b>	<b>6,810</b>	<b>281,882</b>	<b>6,556</b>



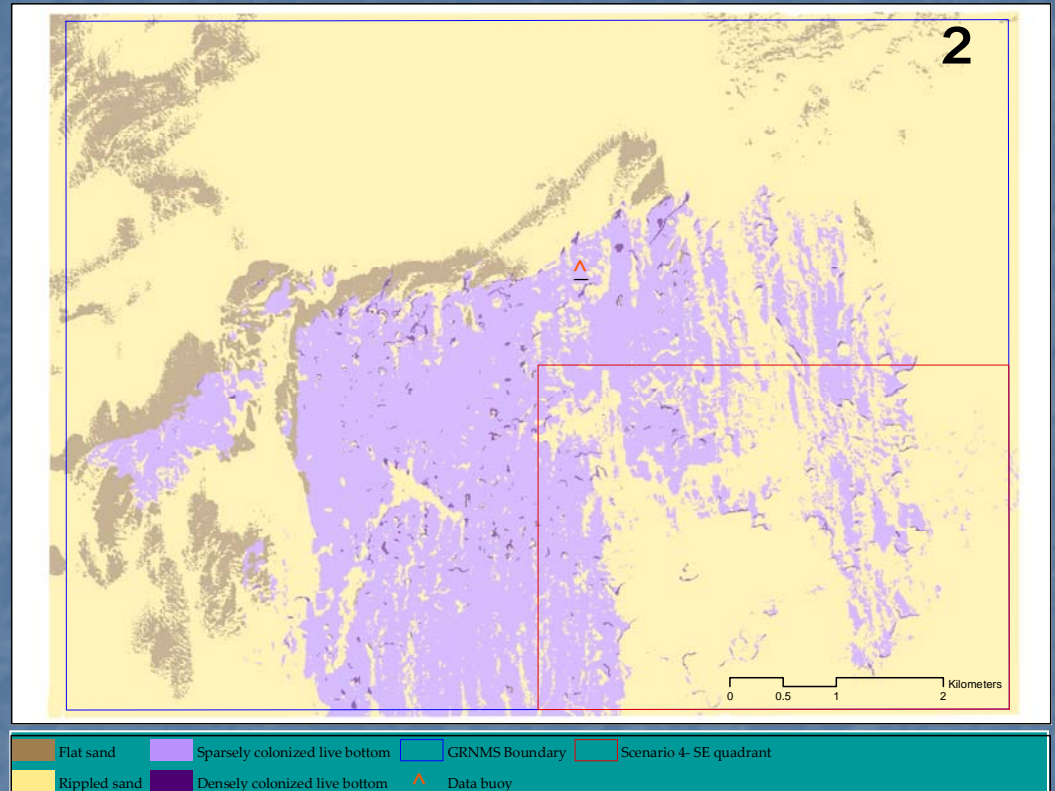
## Scenario 4: Southeast Quadrant

### Selection Criteria:

- SE quadrant of GRNMS

### Resulting Characteristics:

- 1 option
- **Insufficient number of short (22), medium (25), and tall (23) ledges**
- No flat sand included
- Most ledge types are outside for comparative research (and fishing)
- Long Term Mon. site and data buoy excluded
- Encompasses 9% of boats
- Much less prior research



# Scenario 4 Impacts to Fishing Expenditures

**6.7 percent** of **GRNMS** fishing impacted = \$135,165

GRNMS		Expenditure Impacts Scenario 4	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	2,466	54
	Private/Rental	1,027	76
Food	Charter	4,483	197
	Private/Rental	2,135	277
Lodging	Charter	8,194	321
	Private/Rental	44,916	212
Public Transportation	Charter	2,303	864
	Private/Rental	-	323
Boat Fuel	Private/Rental	3,625	180
Charter Fees	Charter	26,637	1,132
Access/Boat Launching	Charter	864	55
	Private/Rental	857	29
Equipment Rental	Charter	28,792	607
	Private/Rental	-	88
Bait	Charter	1,878	123
	Private/Rental	1,681	63
Ice	Charter	291	32
	Private/Rental	362	21
<b>Total</b>	<b>Charter</b>	<b>75,907</b>	<b>3,386</b>
	<b>Private/Rental</b>	<b>54,602</b>	<b>1,270</b>





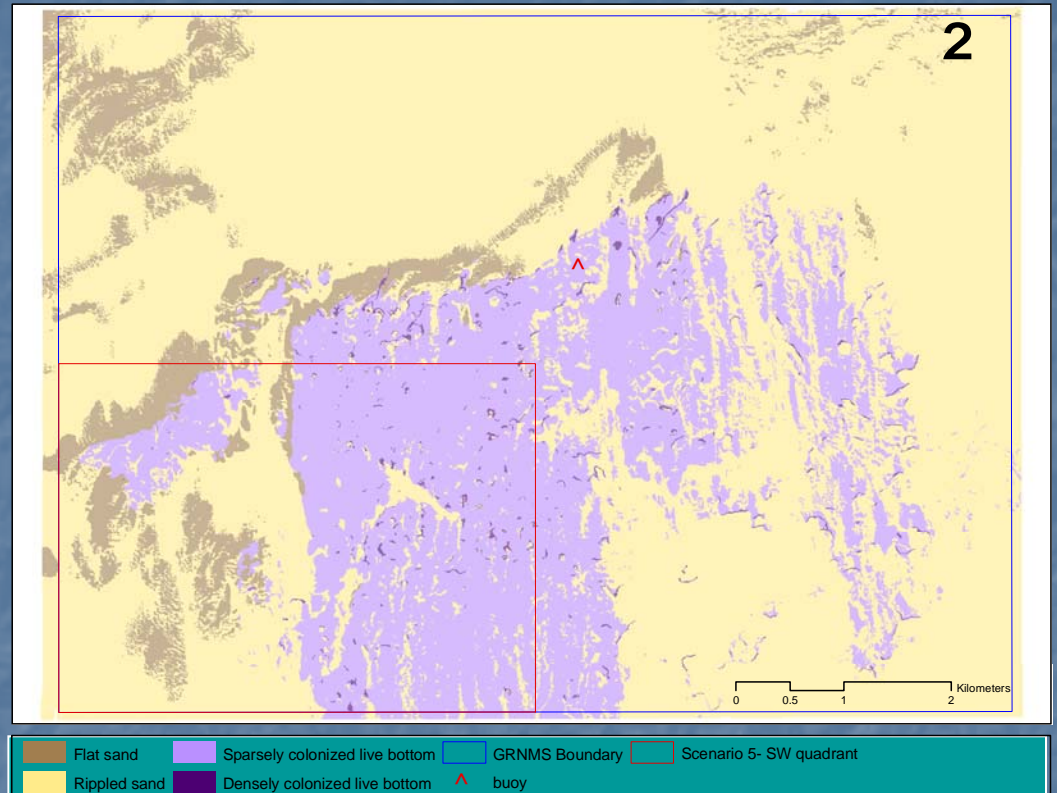
# Scenario 5: Southwest Quadrant

## Selection Criteria:

- SW quadrant of GRNMS

## Resulting Characteristics:

- 1 option
- **Insufficient number of tall (21) ledges inside**
- All bottom types are included
- Most ledge types are outside for comparative research (and fishing)
- Long Term Mon. site and data buoy excluded
- Encompasses 10% of boats
- Much less prior research



# Scenario 5 Impacts to Fishing Expenditures

**14.5 percent** of **GRNMS** fishing impacted = **\$292,295**

GRNMS		Expenditure Impacts Scenario 5	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	5,332	117
	Private/Rental	2,220	165
Food	Charter	9,694	427
	Private/Rental	4,617	599
Lodging	Charter	17,719	694
	Private/Rental	97,130	459
Public Transportation	Charter	4,980	1,869
	Private/Rental	-	697
Boat Fuel	Private/Rental	7,839	389
Charter Fees	Charter	57,603	2,448
Access/Boat Launching	Charter	1,868	119
	Private/Rental	1,853	64
Equipment Rental	Charter	62,262	1,313
	Private/Rental	-	189
Bait	Charter	4,061	266
	Private/Rental	3,635	137
Ice	Charter	629	70
	Private/Rental	782	46
<b>Total</b>	<b>Charter</b>	<b>164,150</b>	<b>7,322</b>
	<b>Private/Rental</b>	<b>118,076</b>	<b>2,746</b>



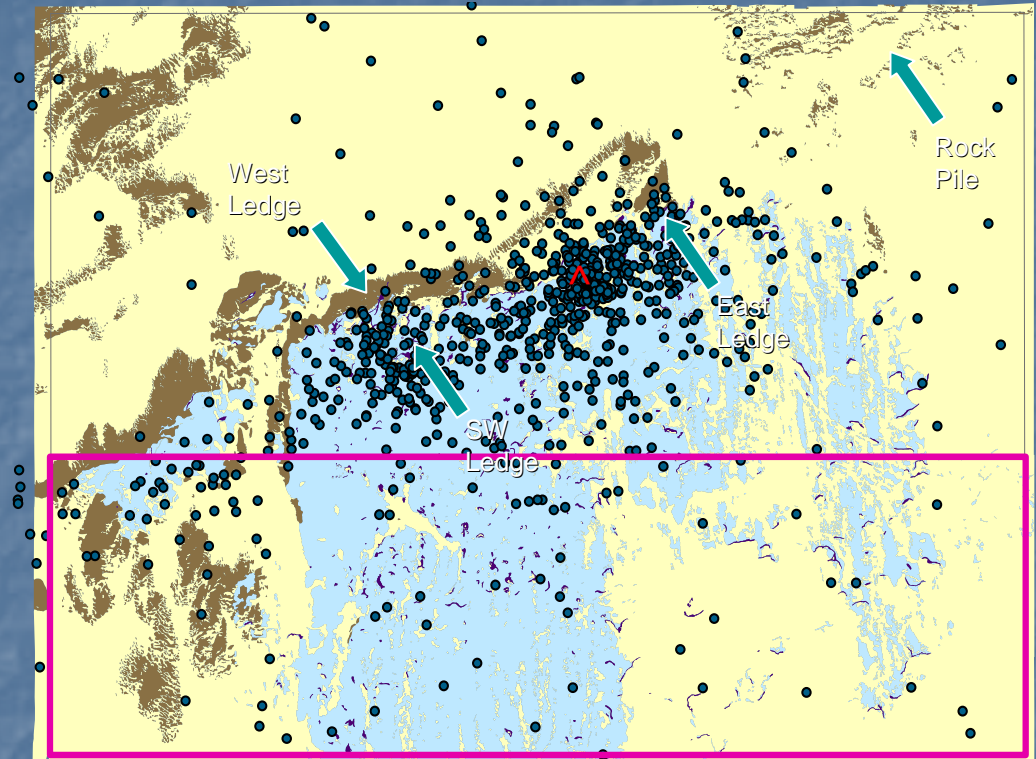
## Scenario 6 – Southern Expansion (with boat locations)

### Selection Criteria:

- Enlarge from southern border until 30 ledges of each types are included (S, M, T)

### Resulting Characteristics:

- 1 option
- 2.41 by 8.5 km
- 21.28 km<sup>2</sup>
- 30 short, 52 medium, 36 tall
- All bottom types are included
- Sufficient ledge and other bottom types are outside for comparative research (and fishing)
- Long Term Mon. site and data buoy excluded
- Encompasses 8.5% of boats



# Scenario 6 Impacts to Fishing Expenditures

**9.2 percent** of **GRNMS** fishing impacted = **\$185,852**

GRNMS		Expenditure Impacts Southern Expansion	
Trip Expenditures	Mode	Resident Spenders (\$)	Nonresident Spenders (\$)
Private Transportation	Charter	3,390	74
	Private/Rental	1,412	105
Food	Charter	6,164	271
	Private/Rental	2,935	381
Lodging	Charter	11,267	441
	Private/Rental	61,759	292
Public Transportation	Charter	3,167	1,188
	Private/Rental	-	443
Boat Fuel	Private/Rental	4,984	247
Charter Fees	Charter	36,626	1,557
Access/Boat Launching	Charter	1,188	76
	Private/Rental	1,178	40
Equipment Rental	Charter	39,589	835
	Private/Rental	-	120
Bait	Charter	2,582	169
	Private/Rental	2,311	87
Ice	Charter	400	44
	Private/Rental	497	29
<b>Total</b>	<b>Charter</b>	<b>104,373</b>	<b>4,656</b>
	<b>Private/Rental</b>	<b>75,077</b>	<b>1,746</b>



# Summary

It is estimated that the economic impact of a research area on Georgia recreational fishing will be between **0.11%** (scenario 4) and **1.13%** (scenario 1) of **statewide saltwater fishing expenditures**. This is considered to be the **maximum potential loss**.

Scenario #	Boundary #	% GRNMS Impacted	Impacted GRNMS Person Days	Impacts to GRNMS Saltwater Fishing Expenditures	% Impact to GA Person Days of Saltwater Fishing	% Impact to GA Total Saltwater Fishing Expenditures
1	1	67.0%	3,145	\$1,351,651	0.18%	1.13%
2	1	12.4%	582	\$250,055	0.03%	0.21%
2	2	12.2%	574	\$246,676	0.03%	0.21%
2	3	8.8%	413	\$177,404	0.02%	0.15%
2	4	8.7%	409	\$175,715	0.02%	0.15%
3	1	35.9%	1,687	\$724,823	0.10%	0.61%
3	2	34.6%	1,624	\$697,790	0.10%	0.59%
4	1	6.7%	315	\$135,165	0.02%	0.11%
5	1	14.5%	680	\$292,295	0.04%	0.25%
Southern Expansion		9.2%	432	\$185,852	0.03%	0.16%





# Research/Control Area Concept Time Line



- **January 31, 2008 – GRNMS Advisory Council meeting to present RAWG recommendations, boundary options, and socioeconomic analysis**
- **March 5 - April 21, 2008 – Public scoping**
- **December 2008 (tentative) – Develop Draft EIS, Draft RA management plan, and regulations, if needed**
- **Spring 2009 (tentative) - Public Comment**
- **Fall 2009 (tentative) – Final EIS, Final RA management plan, Final regulations if needed.**

# Scoping for Research Area Draft Environmental Impact Statement

Send comments to:

GRNMS, 10 Ocean Science Circle, Savannah, Georgia 31411

email: [grnms.researcharea@noaa.gov](mailto:grnms.researcharea@noaa.gov)

Fax: 912/598-2367

Public meetings 6:00-8:00 p.m.

- March 18 - Camden Public Library, Kingsland, Georgia
- March 20 - Armstrong Center, Savannah, Georgia
- March 24 - Statesboro Regional Library, Statesboro, Georgia
- March 25 - Stevens Wetlands Center, Richmond Hill, Georgia
- March 27 - Best Western Sea Island Inn, Beaufort, South Carolina

<http://graysreef.noaa.gov> for more information

