

South Atlantic Region Fishery Independent Surveys Update

SAFMC Habitat AP Meeting

Kevin Spanik

South Carolina Department of Natural Resources



Outline

- Overview of Regional Fishery Independent surveys:
 - SERFS Reef Fish Survey
 - SEAMAP-SA Coastal Trawl Survey
 - SEAMAP-SA Pamlico Sound Trawl Survey
 - SEAMAP-SA Coastal Longline Survey
 - Deepwater Longline Survey (SADL)
 - Background
 - Methodology
 - Examples of recent data

Let's get the acronyms out of the way...

- MARMAP = Marine Resources Monitoring Assessment and Prediction program (SC DNR)
- SEFIS = Southeast Fishery Independent Survey (NOAA Beaufort)
- SEAMAP-SA = Southeast Area Monitoring and Assessment Program – South Atlantic

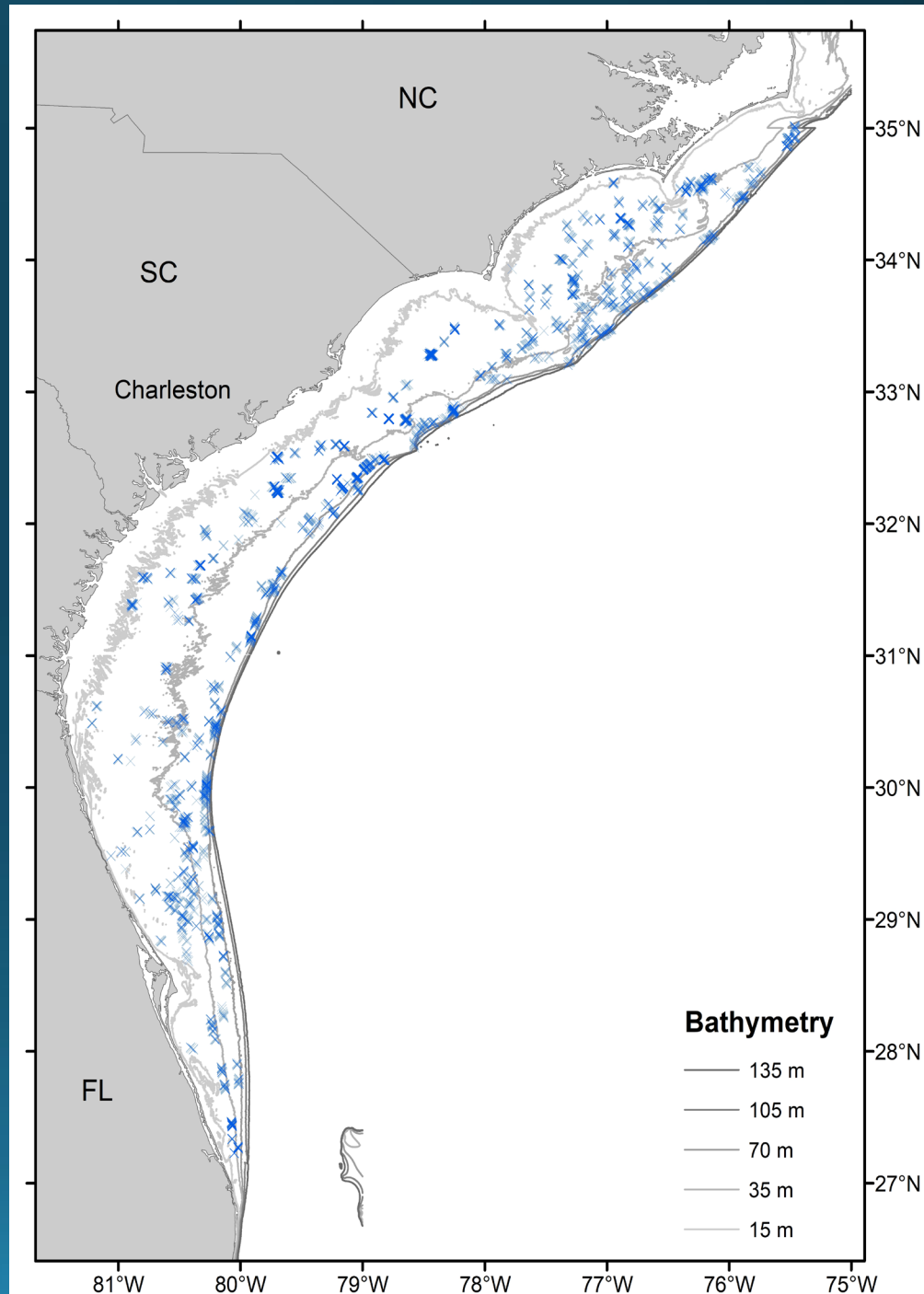
SouthEast Reef Fish Survey (SERFS)

- MARMAP + SEFIS + SEAMAP-SA Reef Fish
 - Long-term fishery-independent survey (est. 1972)
 - Abundance and life history of U.S. South Atlantic snapper/grouper



SERFS Survey Area

- Cape Hatteras, NC – Port St. Lucie, FL
- Live-bottom / hard-bottom habitat
- 15-135 m depth
- April-October
- At least 1,500 gear deployments per year
 - Randomly selected from universe of ~5,000 stations

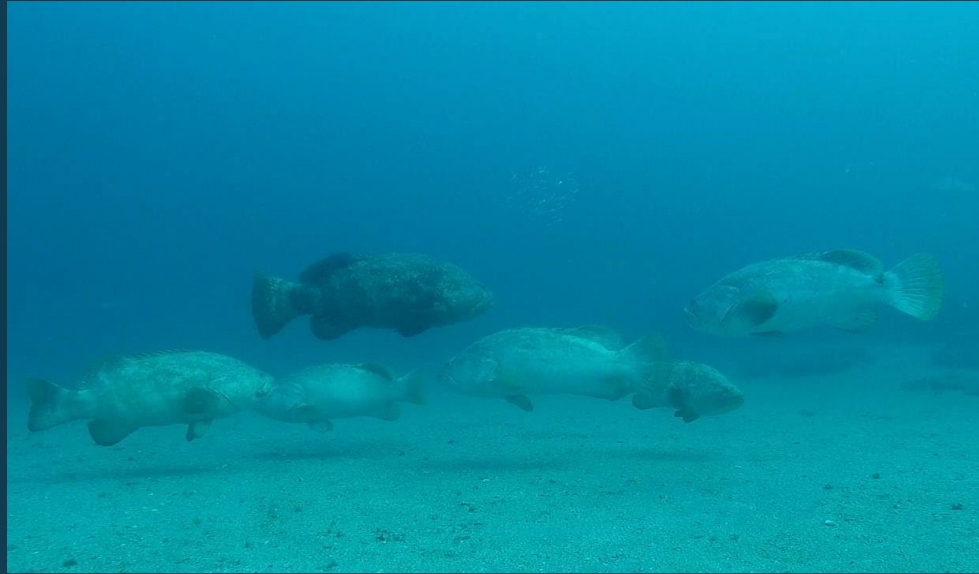


SouthEast Reef Fish Survey (SERFS)

- Primary gear: chevron trap
 - Longline (mainly 20 hook SBLL)
 - Hook and line
- Video cameras (est. 2009)
 - Abundance
 - Assemblages
 - Rare/cryptic/large species
 - Habitat characterization
 - Species interactions



SERFS Video



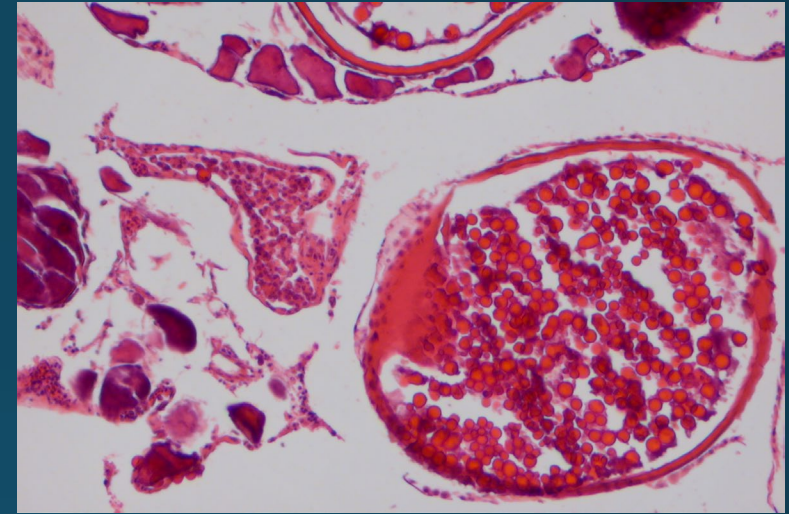
SERFS biological data

- Age and Growth
 - Otoliths, spines, etc.



SERFS biological data

- Age and Growth
 - Otoliths, spines, etc.
- **Reproduction**
 - Gonad histology
 - Fecundity



SERFS biological data

- Age and Growth
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- Reproduction
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- **Diet**
 - Whole stomachs



SERFS biological data

- Age and Growth
 - Otoliths, spines, etc.
- Reproduction
 - Gonad histology
 - Fecundity
- Diet
 - Whole stomachs
- **Population structure, stable isotopes, habitat use, mercury**
 - Fin clips, Muscle tissue, eye lenses



SERFS Most Encountered Species

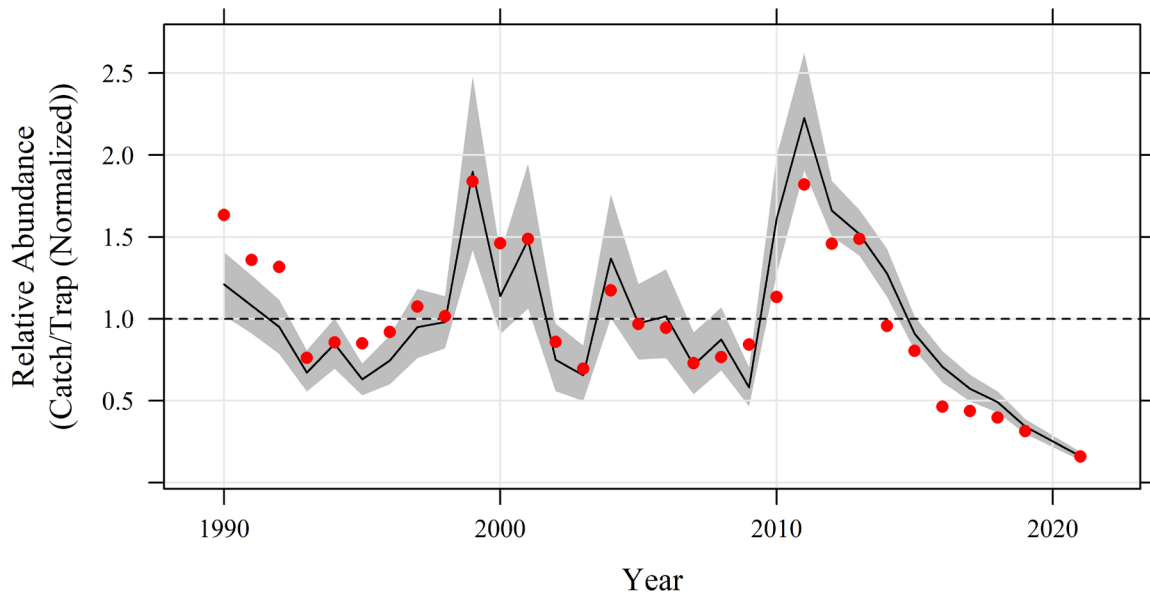
Common Name (2019 CHV Rank)	Chevron	Short BLL	Total
1. <i>Tomtate</i> (1)	22,698		22,698
2. <i>Vermilion Snapper</i> (3)	3,584	1	3,585
3. <i>Black Sea Bass</i> (2)	3,583		3,583
4. <i>Red Snapper</i> (6)	1,969	9	1,978
5. <i>Scup/Longspine Porgy</i> (4)	1,834		1,834
6. <i>White Grunt</i> (5)	914		916
7. <i>Gray Triggerfish</i> (8)	890		890
8. <i>Red Porgy</i> (7)	852	10	862
9. <i>Sand Perch</i> (9)	566		566
10. <i>Spottail Pinfish</i> (10)	489		489
11. <i>Bank Sea Bass</i> (11)	430		430
12. <i>Knobbed Porgy</i> (12)	151		151
13. <i>Snowy Grouper</i> *	12	107	119
16. <i>Silk Snapper</i> *	68	5	73
19. <i>Scamp</i> *	23	16	39
22. <i>Gag</i> (20)	26	2	28

Increase
Decrease

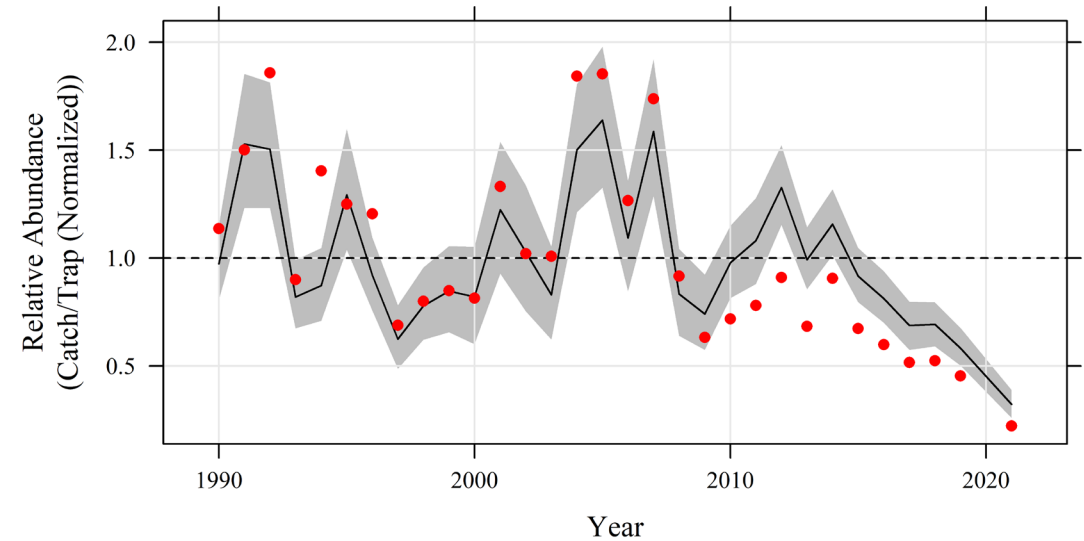
*increased SBLL efforts

SERFS Recent trends

Black Sea Bass

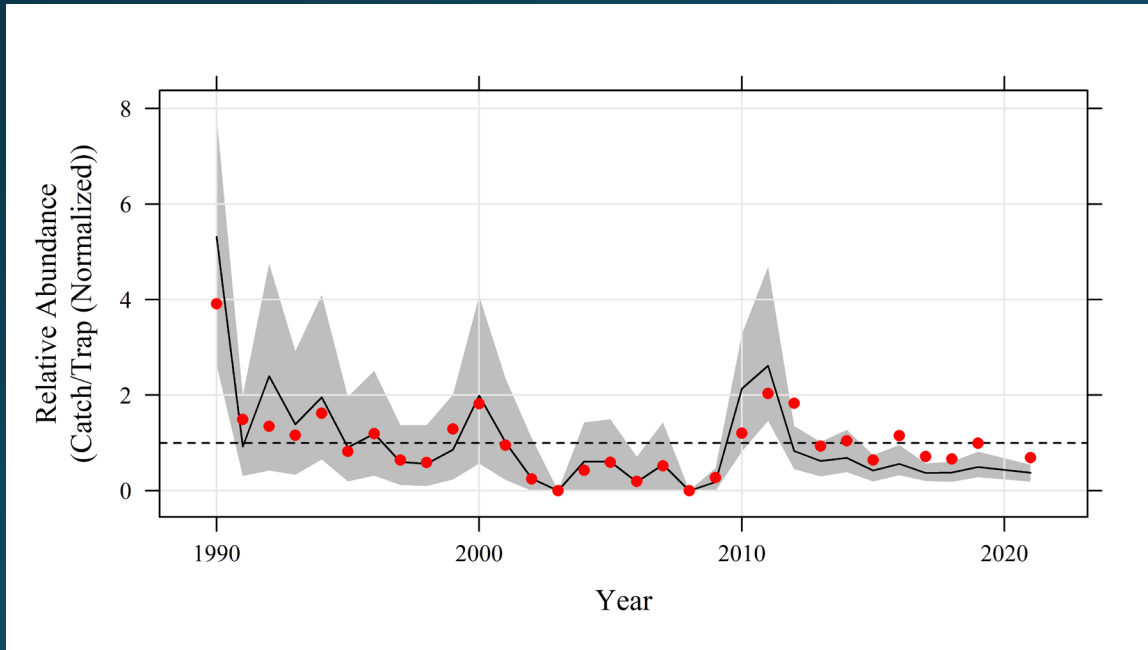


Red Porgy

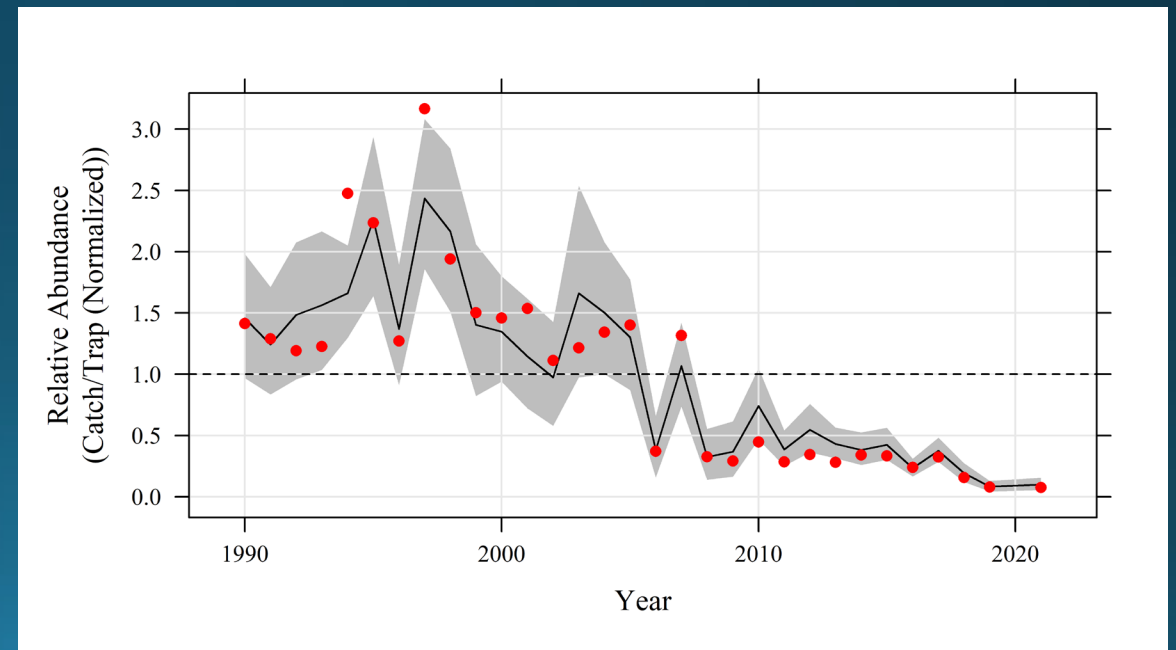


SERFS Recent trends

Gag Grouper

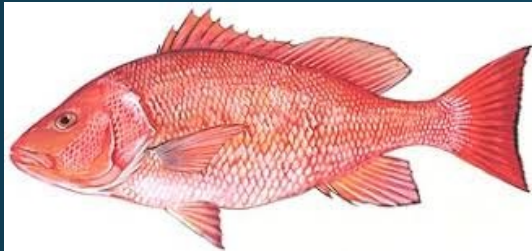


Scamp Grouper

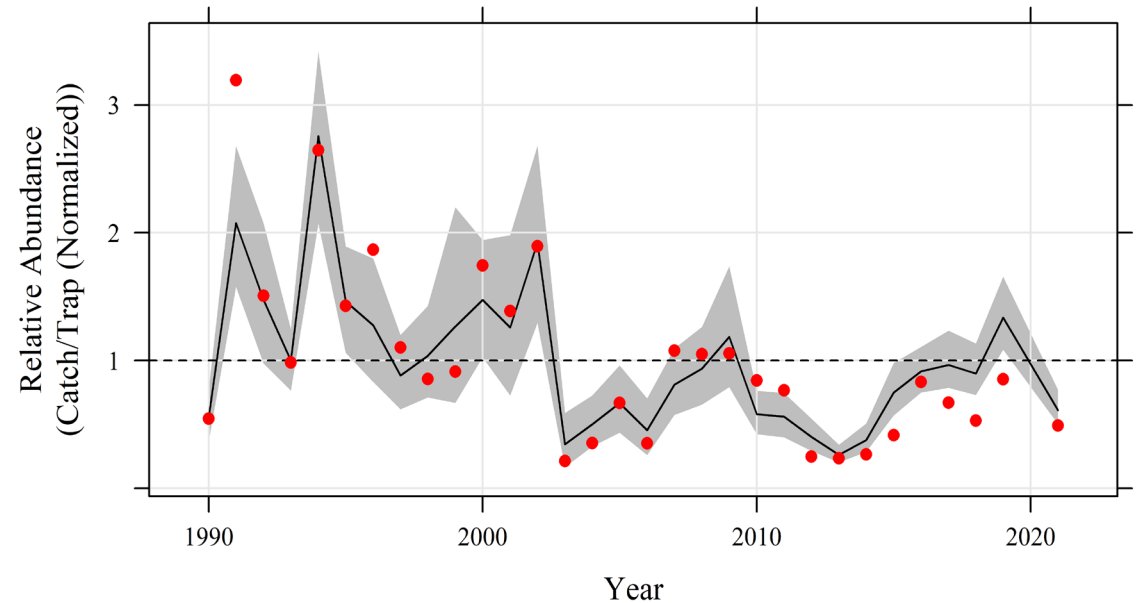
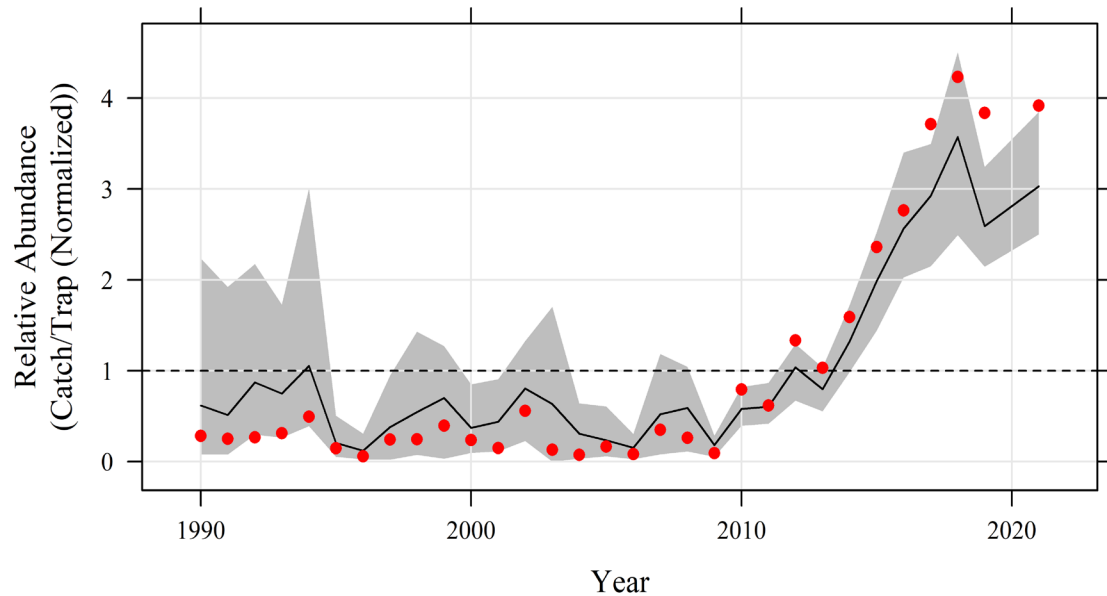


SERFS Recent trends

Red Snapper



Vermilion Snapper



SERFS use and dissemination of results

Support for stock assessments and management:

SEDAR 66 Golden Tilefish

SEDAR 68 Scamp Research Track

SEDAR 71 Gag Research Track

SEDAR 73 Red Snapper

SEDAR 76 Black Sea Bass

SEDAR 79 Mutton Snapper

SEDAR 82 Gray Triggerfish

SAFMC: Staff continues to provide update for management

Annual trends (Trends Report)

Peer reviewed scientific publications

Presentations

SEAMAP Coastal Trawl Survey

- Only long-term regional trawl survey in SE
Est. 1986
- Abundance and life history for
diverse assemblage of fishes
and invertebrates



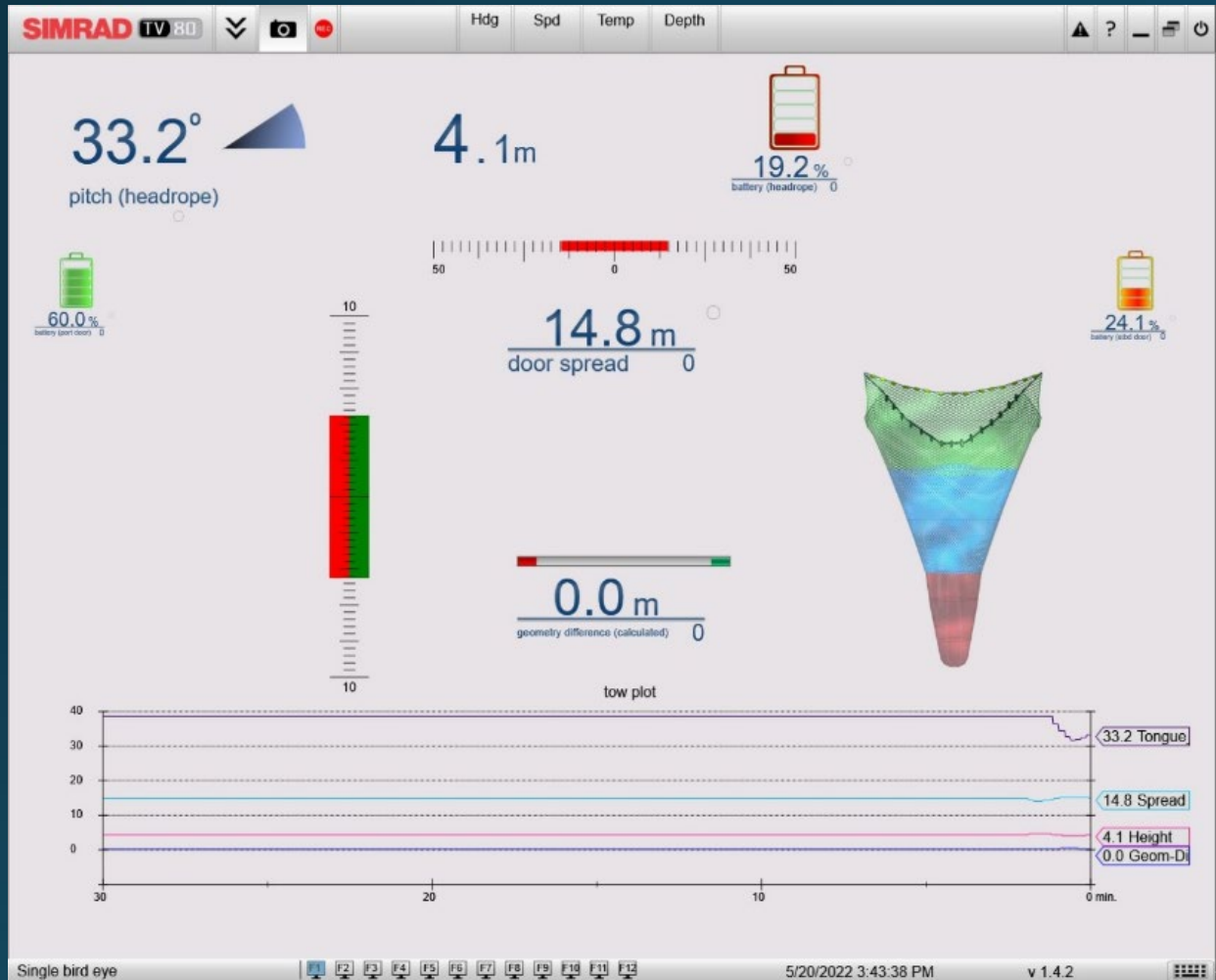
R/V Lady Lisa

SEAMAP Coastal Trawl Survey Area

- Cape Hatteras, NC – Cape Canaveral, FL
- Shallow coastal waters (15-30 ft)
- Seasonal cruises (Spring, Summer, Fall)
- ~ 102 stations targeted each season



SEAMAP Coastal Trawl Survey



- 22.9 m mongoose-type Falcon trawls (2)
 - No TED (data on turtles)
 - Simrad PX Multisensor mensuration gear deployed in summer 2021
 - Door spread and tongue height
 - Trawl geometry

SEAMAP Coastal Trawl Survey



- 20 min tows
- Catch from one net processed

SEAMAP Coastal Trawl Survey biological data

Priority Fish

- Age and Growth
- Reproduction
- Diet

Priority Invertebrates

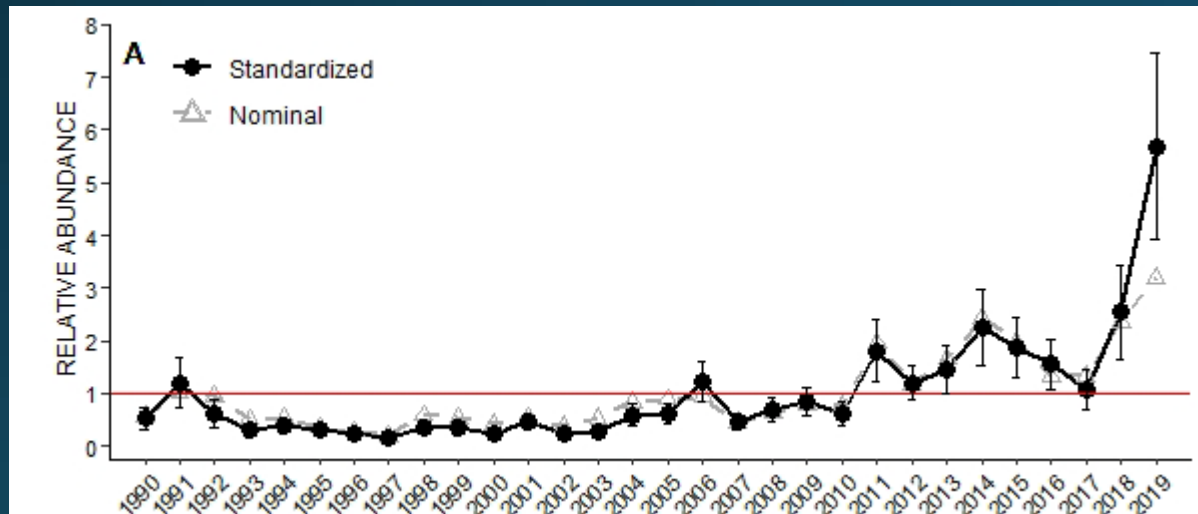
- Egg development
- Recent mating evidence

SEAMAP Coastal Trawl Survey: Most Encountered Species 2021

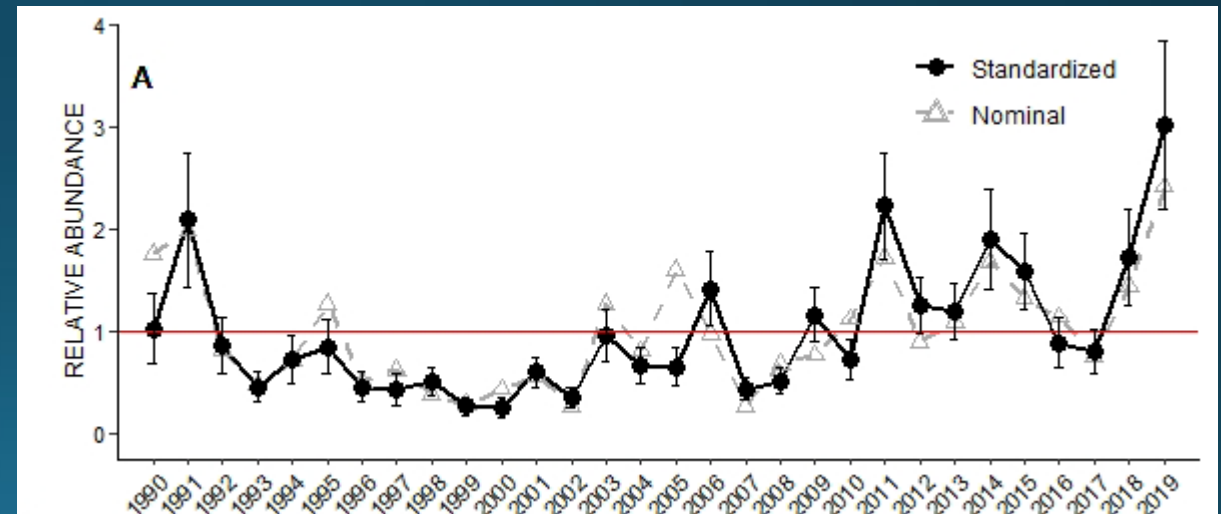
Abundance Rank	Priority species	Total Number	Total Weight (kg)
1	<i>Micropogonias undulatus</i> (Atlantic Croaker)	96,715	5,474
2	<i>Leiostomus xanthurus</i> (Spot)	42,773	2,522
3	<i>Litopenaeus setiferus</i> (White Shrimp)	21,528	532
5	<i>Farfantepenaeus aztecus</i> (Brown Shrimp)	9,216	109
8	<i>Peprilus triacanthus</i> (Butterfish)	6,982	193
12	<i>Menticirrhus americanus</i> (Southern Kingfish)	4,691	421
17	<i>Peprilus paru</i> (American Harvestfish)	2,880	230
21	<i>Cynoscion regalis</i> (Weakfish)	1,765	199
31	<i>Scomberomorus maculatus</i> (Spanish Mackerel)	388	50
32	<i>Sphyrna tiburo</i> (Bonnethead)	330	248
36	<i>Rhizoprionodon terraenovae</i> (Atlantic Sharpnose)	280	370
37	<i>Brevoortia tyrannus</i> (Atlantic Menhaden)	276	10
39	<i>Pomatomus saltatrix</i> (Bluefish)	259	28

Coastal Trawl Survey: Recent trends

Atlantic Croaker



Spot

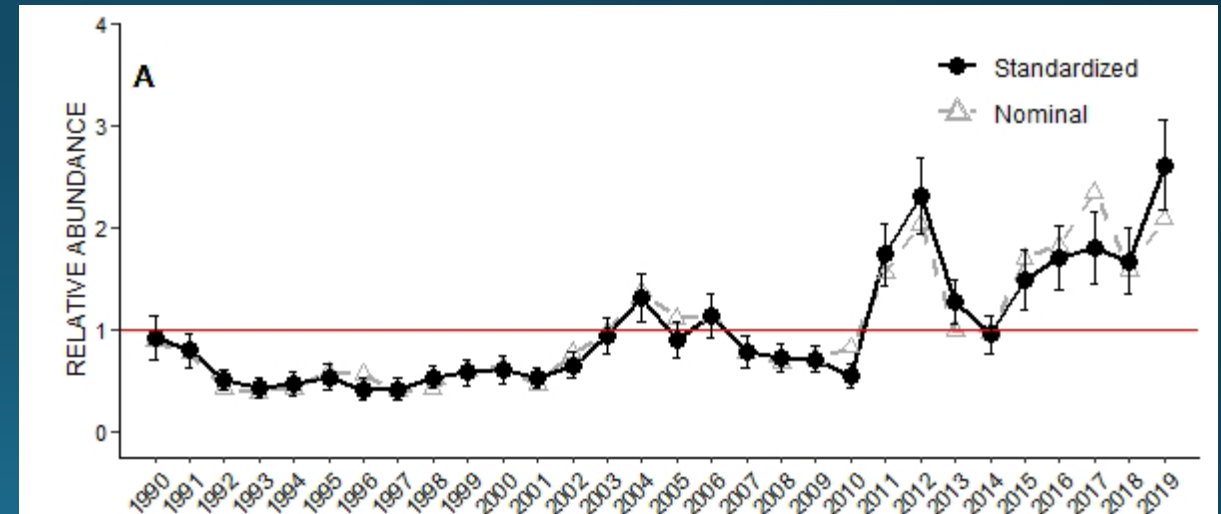
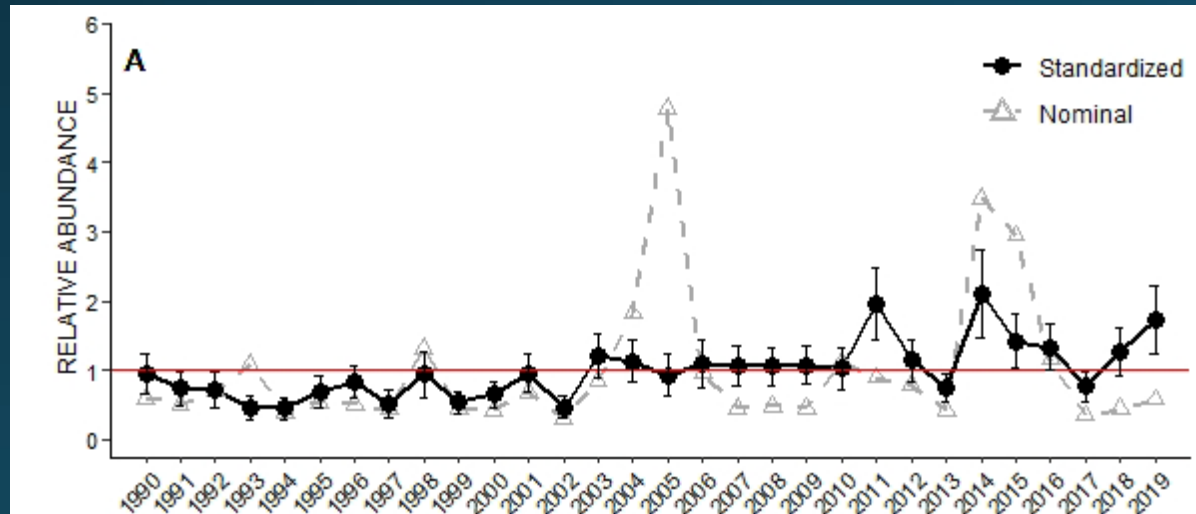


Coastal Trawl Survey: Recent trends

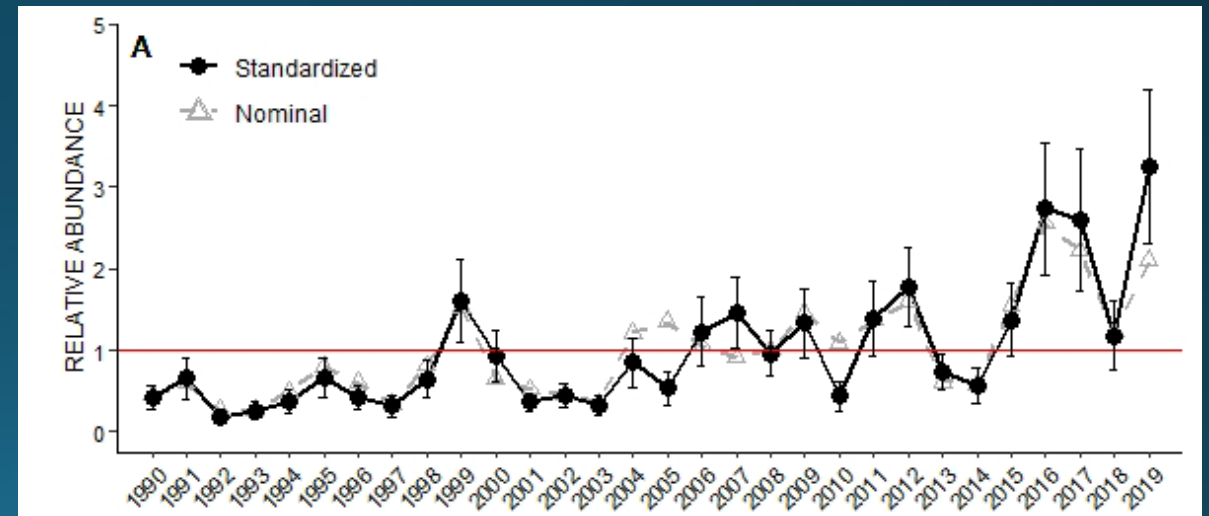
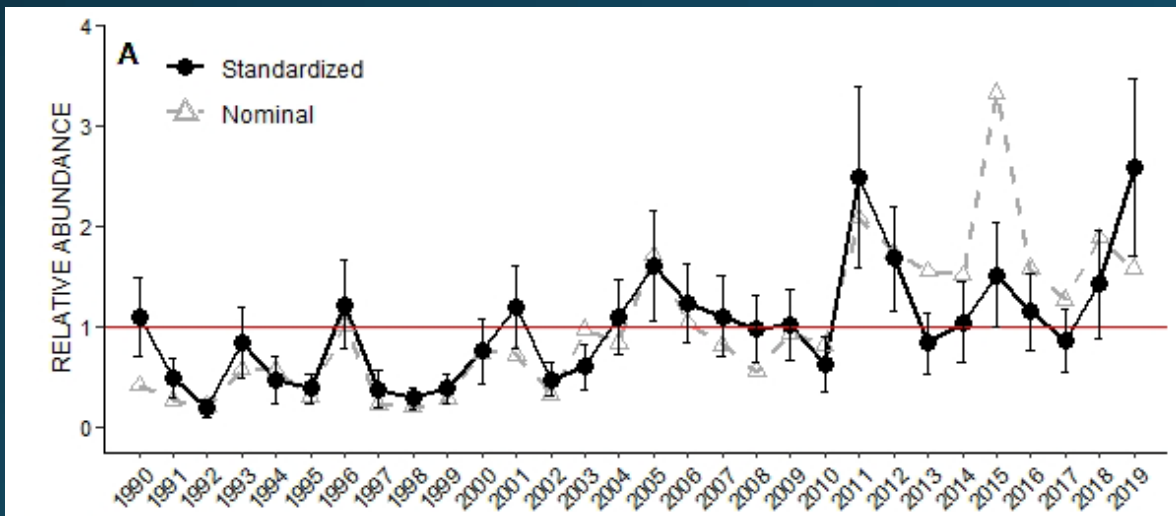
Weakfish



Southern Kingfish



Coastal Trawl Survey: Recent trends



Coastal Trawl Survey

use and dissemination of results

Support for stock assessments and management:

2021	ASMFC	SC Compliance Report for Spanish Mackerel, 2020 Fishing Year
2021-22	SEDAR	Spanish Mackerel Stock Assessment
2022	ASMFC	Review of the FMP for Atlantic Menhaden
2022	ASMFC	Atlantic Menhaden Stock Assessment Update
2022	ASMFC	Review of the FMP for Bluefish, 2021 Fishing Year

Peer-Reviewed Publications:

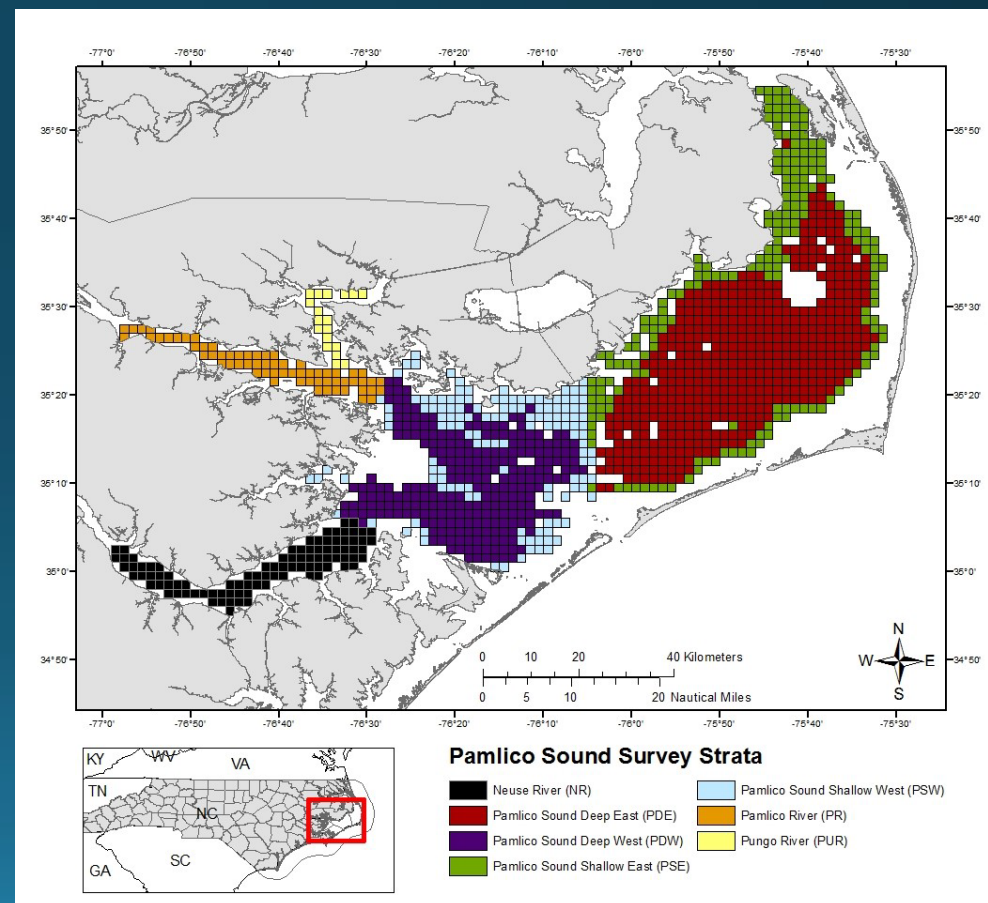
Arendt, M., R.P. Webster, & J.A. Schwenter. 2022. Kemp's ridley sea turtles. Endangered Species Research.

Zimney, A. and T. Smart. 2022. Incomplete sampling and standardization of indices of abundance. Fishery Bulletin.

SEAMAP- SA

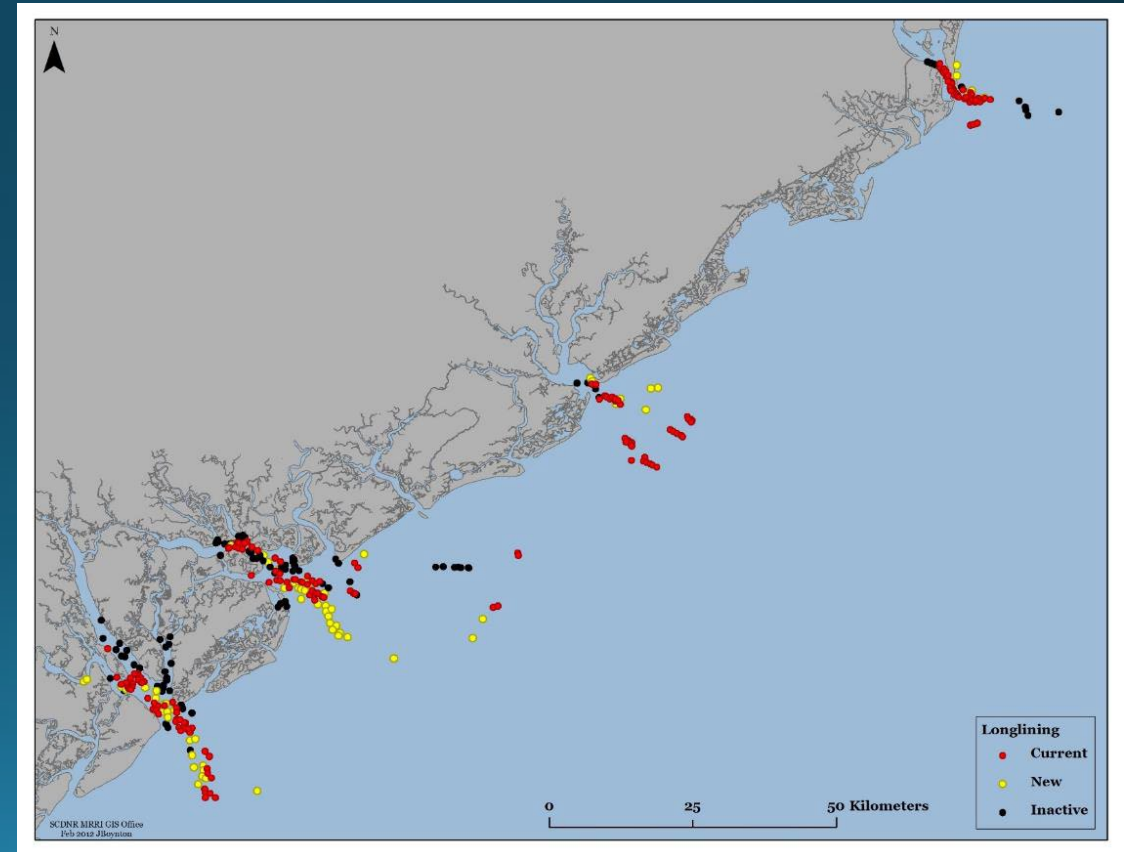
Pamlico Sound Trawl Survey

- NC DMF, Est. 1987
- Pamlico Sound and associated rivers/bays
- June and September annually
- Stratified random sampling
- 104 stations per year
- Twin 30 ft Mongoose type trawls
- 20 min tows
- Catch combined and processed together
- Life History studies for priority species



SEAMAP-SA Coastal Longline Survey

- NMFS COASTSPAN / Cooperative shark tagging partnership
- NC (NCDMF), SC (SC DNR), GA (GA DNR)
- Est. 1993 at SCDNR
- Adult Red Drum, Coastal sharks
- Sounds & nearshore live bottom
- Random site within each stratum from 253 random sites
- ~3-20 m depth

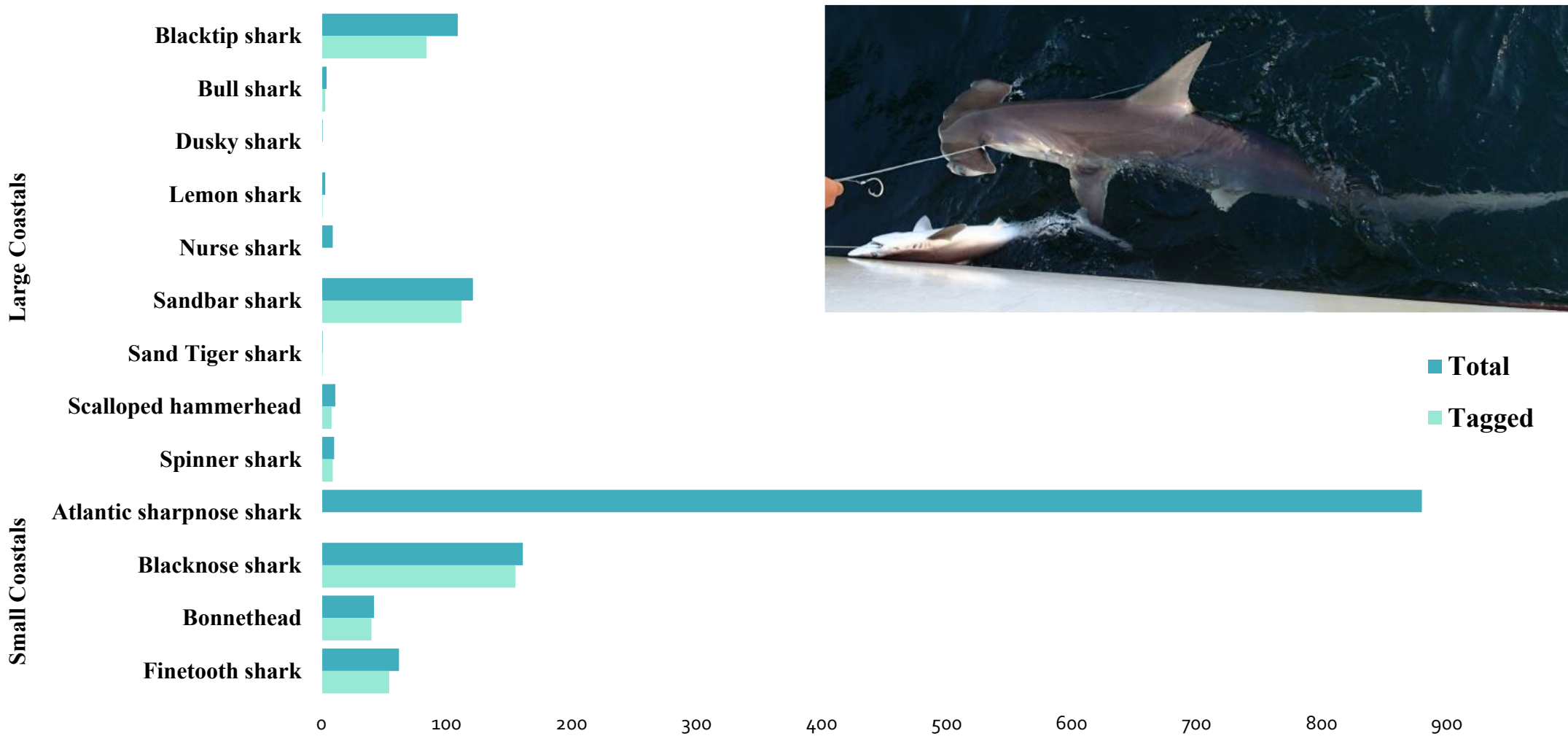


Coastal Longline Survey

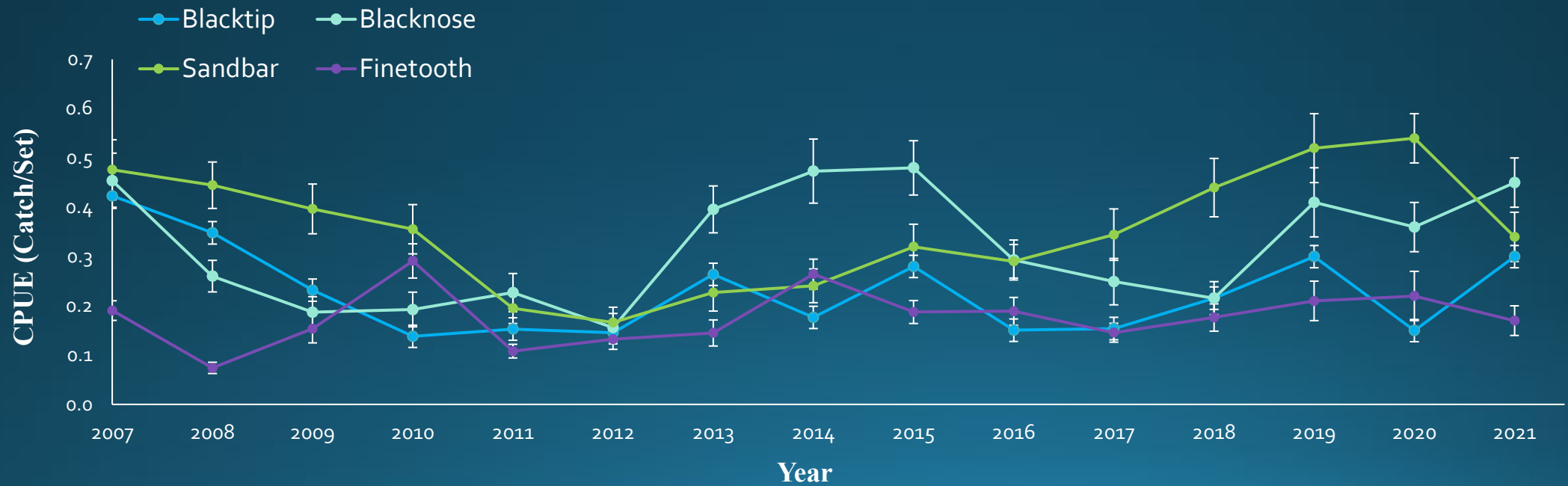
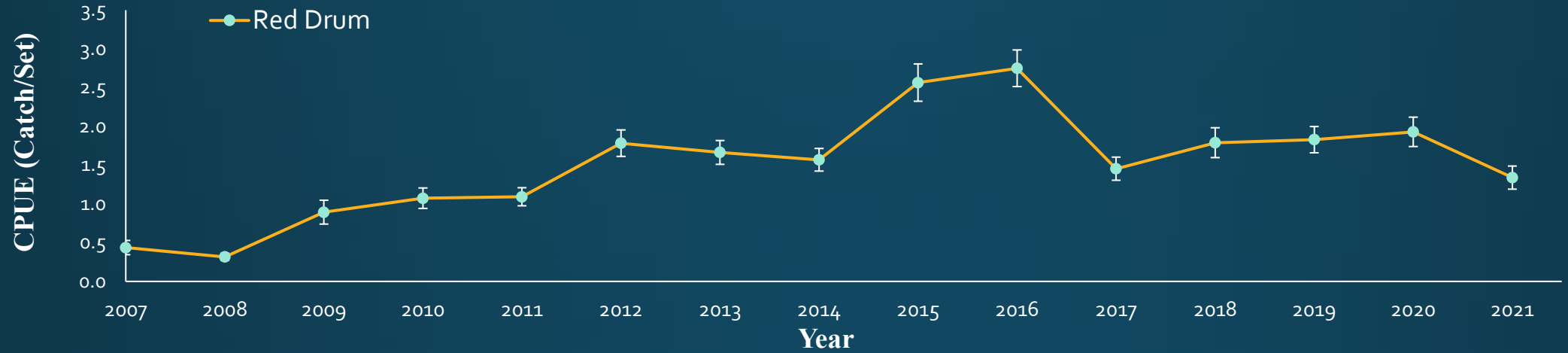
- Gear: 1/3 mile longline, 40 hook
- ~30 min soak times
 - Daylight hours
- Most tagged and released
- Subsampled for life history studies
 - Age & growth
 - Population genetics
 - Diet
- Broodstock for SCDNR mariculture



Coastal Longline Survey Shark Species Composition 2021



Coastal Longline Survey Recent Trends



Coastal Longline Survey: use and dissemination of results

Support for stock assessment and management:

Atlantic Sharpnose Shark (n=12,180), SEDAR 13

Adult Red Drum (n=7747), SEDAR 44

Sandbar Shark (n=1891), SEDAR 54

Blacknose Shark (n=1624), SEDAR 21

Blacktip Shark (n=1207), SEDAR 65-fall 2019

Finetooth Shark (n=912), SEDAR 13

Lemon Shark (n=62), assessment ongoing

Scalloped/Carolina Hammerhead (n=71), SEDAR 77

Peer-reviewed scientific publications

Presentations

South Atlantic Deepwater Longline Survey (SADL)

- **What?**
 - Deepwater longline survey intended to generate indices of abundance and life-history information (e.g., from otolith and reproductive samples) to support stock assessments and management
 - Focal species - tilefishes and deepwater groupers
- **How?**
 - Cooperative effort with industry
- **When?**
 - Implemented in 2020, repeated in 2021, 2022
 - Anticipated to continue annually

South Atlantic Deepwater Longline Survey (SADL)

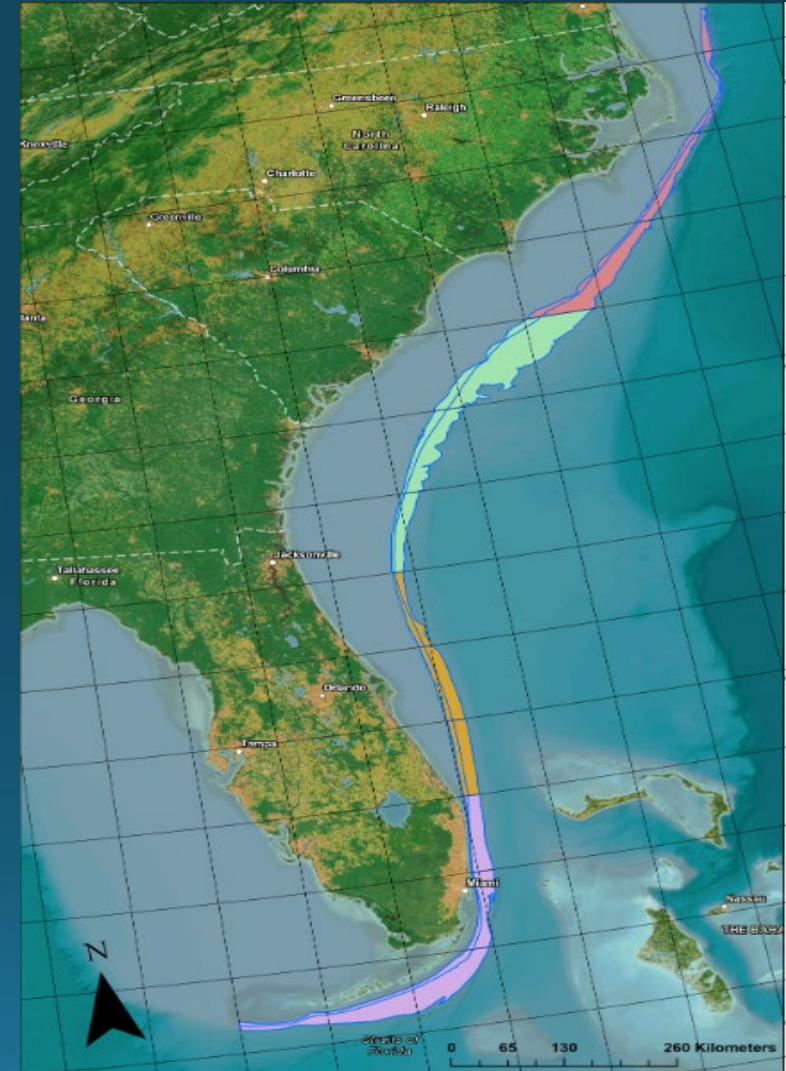
- Industry participants - contracted by SCDNR
 - 2020 - two participants
 - 2021 - four participants
- Data collection at sea by NMFS observer
 - Site-specific details (date, time, latitude and longitude, depth)
 - Species-specific lengths, abundance, and biological samples (otoliths and reproductive samples), when possible for selected species
 - Bottom temperature recorded for each deployment (sensor attached to gear)



South Atlantic Deepwater Longline Survey (SADL)

Survey methodology

- NC to FL Keys
- 75 - 366 m
- Stratified by depth and latitude
- Gear
 - 3-mile mainline
 - 150 hooks per mile
 - 12/0 offset circle hooks
 - Bait = squid (2-inch squares)



SADL Results - 2020 vs 2021



Random = 63%
Universe random = 26%
CC = 11%



Random = 48%
Universe random = 29%
CC = 23%

SADL Results: 2020-2021

Species	Number caught - 2020	Number caught - 2021	Proportion positive - 2020	Proportion positive - 2021
Blueline Tilefish	38	1371	0.17	0.25
Tilefish Golden	166	898	0.22	0.25
Snowy Grouper	29	229	0.17	0.27
Almaco Jack	23	134	0.13	0.16
Mutton Snapper	36	82	0.15	0.09
Red Snapper	11	73	0.13	0.09
Red Porgy	14	58	0.09	0.07
Greater Amberjack	5	31	0.11	0.06
Blackline Tilefish	1	26	0.02	0.02
Gag Grouper	7	18	0.11	0.05
Yellowedge Grouper	5	13	0.04	0.04
Scamp Grouper	16	11	0.07	0.04

SADL Results: Index development

Species	Number caught - 2020	Number caught - 2021	Proportion positive - 2020	Proportion positive - 2021
Blueline Tilefish	38	1371	0.17	0.25
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Long-term monitoring value

- **Abundance over time**
 - Management history, changes in fishing pressure
- **Species distributions over time**
 - Range expansions/contractions
- **Hydrographic conditions over time**
 - Climate change
- **Data publically available**

Acknowledgements

- SERFS Staff
- SEAMAP Coastal Trawl Survey Staff
- SEAMAP Longline Survey Staff
- SCDNR and Vessel Operations
- SADL
 - Todd Kellison
 - NMFS Observers
 - Cooperative research partners
 - Dewey Hemilright F/V Tar Baby
 - Steve Shelley F/V Mollie D
 - Jim and Mike Freeman F/V Little Jo
 - Vincent Bonura F/V Gale Mist

Questions?



Supplemental Slides

Biota Metrics

- **Attached Biota Type:**
- **ALGAE:** $\geq 50\%$ attached biota is macroalgae
- *Macroalgae does not include short fouling/turf/filamentous algae.*
- *Record filamentous algae in comments section*
- **OTHER:** $\geq 50\%$ attached biota is coral, sponge, etc.
- **MIXED:** 50/50 algae and OTHER attached biota
- **UNKNOWN:** biota type cannot be estimated
- **N/A:** no attached biota present
-
- **Attached Biota Height:**
- **LOW:** maximum height is < 0.5 m
- **HIGH:** maximum height is > 0.5 m
- **UNKNOWN:** biota height cannot be estimated
- **N/A:** no attached biota present

Substrate Metrics

- **Consolidated Substrate (Percent):** *defined as visible rocks or boulders the size of a fist or larger, or visible hard pavement habitats*
- **BARE: (0-2%)**
- **SPARSE: (2-33%)**
- **MODERATE: (34-66%)**
- **DENSE: (67-100%)**
- **UNKNOWN: substrate cannot be estimated**

- **Consolidated Substrate Size:**
- **COARSE:** $\geq 50\%$ consolidated sediment < 1.0 m in diameter
- **CONTINUOUS:** $\geq 50\%$ consolidated sediment > 1.0 m in diameter
- **UNKNOWN: substrate cannot be seen** > 1.0 meter
- **N/A: no consolidated sediment present**

- **Consolidated Substrate Relief:**
- **LOW: maximum relief is < 0.3 m**
- **MODERATE: maximum relief is $0.3 - 1.0$ m**
- **HIGH: maximum relief is > 1.0 m**
- **UNKNOWN: relief cannot be estimated**
- **N/A: no consolidated substrate relief present**

South Atlantic Deepwater Longline Survey (SADL)

Survey methodology

- **Site selection - three site types**
 - Random
 - Universe random
 - Captain's choice
- **Combination of site types allocated to each depth x latitude cell**
- **Equal allocation of effort across cells**
- **Anticipate stratified random site selection beginning in 2022**

