South Atlantic Deepwater Longline Survey (SADL)

Kevin Craig, Todd Kellison, Blake Price, Christina Schobernd

NMFS Southeast Fisheries Science Center

Wally Bubley and Kevin Spanik **SC Department of Natural Resources**









SADL Overview

- What?
 - Deepwater longline survey intended to support stock assessments and management
 - Indices of abundance
 - Age and length compositions
 - Life-history information (e.g., from otolith and repro samples)
 - Focal species blueline tilefish, golden tilefish, snowy grouper
- When?
 - Implemented in 2020, repeated annually (2021-2023)
 - Sampling typically occurs late July to early October
- How?
 - Cooperative effort with industry
 - Industry participants conduct sampling using standardized gear and sampling methodologies

Spatial Extent

- NC-VA border (36.5° N) to southwest of FL Keys (83° W)
- 75 366 m depth (246 1201 ft)
- 4 zones (NC-SC, SC-GA, North FL-Central FL, South FL)
- Industry participants sample within a single zone





Stratified random design

- Geographic strata
 - 1° latitudinal bins from 36° 25° lat
 - 0.5° latitudinal bin from 36° 36.5 lat
 - 1° longitudinal bins from 80° 83° lon
- Depth strata
 - 75-145 m and 146-366 m
- 30 geographic x depth cells







2023 Spatial expansion

- Current northern extent: 36.5° N, NC-VA border
- 2023 northern extent: 39° N, Delaware Bay
- Same survey methodology and stratification scheme as in the South Atlantic





2023 Northward extension



Sampling site selection

- Equal allocation of effort (no. sampling sites) across strata (e.g., depth x latitude)
 - > 2020: 3 sites per strata (low effort)
 - > 2021-2022: 6 sites per strata (high effort)
- 2020-2021 site selection 3 site types
 - Random (ArcGIS, > 2nm apart)
 - Universe random (database know hardbottom sites)
 - Captain's choice (site chosen by captain within specified strata boundaries)
- Fully random site selection beginning in 2022





Sampling Effort (2020 – 2022)



Low effort, Mixed site selection

Random = 63% Universe random = 26% CC = 11% High effort, Mixed site selection

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

High effort, Random selection

Random = 100%



Sampling Methodology

- Cooperative effort with industry participants
- Standardized gear
 - 3/16 inch main cable (galvanize steel)
 - 3 ft monofilament gangions (300 lb test)
 - 12/0 offset Mustad circle hooks
 - Mainline length: 4 mi in 2020; 3 mi in 2021-2022
 - > 150 hooks per mile
 - Baited squid (2x2 inch square)
 - Temperature logger at end of mainline
- Observers collect data and biological samples
- Trips 2-3 d up to 5-8 d in duration
- 3-4 sites per day, Sunrise to sunset
- August to October











Data Collection

- Data collected at sea by NMFS observer:
 - Station data
 - date, lat, lon, depth, and time of day
 - Catch data
 - All species identified, counted, and measured (i.e. TL and FL)
 - Biological samples
 - Priority species sampled for otoliths and reproductive tissues (gonads)
 - Non-priority and other species sampled as time permits
 - Bottom temperature recorded for site





Biological Sampling (otoliths, repro)

6 Priority Species

Common Name	Scientific Name
GOLDEN TILEFISH	Lopholatilus chamaeleonticeps
BLUELINE TILEFISH	Caulolatilus microps
YELLOWEDGE GROUPER	Epinephelus flavolimbatus
WARSAW GROUPER	Epinephelus nigritus
SNOWY GROUPER	Epinephelus niveatus
SPECKLED HIND	Epinephelus drummondhayi

(Minimum 20 per site)

Other Species

- Sampled at discretion of the observers (managed, rare, time available)
- Example: Red porgy, vermilion snapper, almaco jack, mutton snapper

24 Non-Priority Species

Common Name	Scientific Name		
BLACKLINE TILEFISH	Caulolatilus cyanops		
ANCHOR TILEFISH	Caulolatilus intermedius		
GOLDFACE TILEFISH	Caulolatilus chrysops		
GOLIATH GROUPER	Epinephelus itajara		
NASSAU GROUPER	Epinephelus striatus		
YELLOWFIN GROUPER	Mycteroperca venenosa		
YELLOWMOUTH	Mycteroperca interstitialis		
GROUPER			
MISTY GROUPER	Hyporthodus mystacimus		
MARBLED GROUPER	Dermatolepis inermis		
GRAY SBY GROUPER	Cephalopholis cruentata		
GAG GROUPER	Mycteroperca microlepis		
RED GROUPER	Epinephelus morio		
BLACK GROUPER	Mycteroperca bonaci		
SCAMP GROUPER	Mycteroperca phenax		
REDHIND	Epinephelus guttatus		
ROCK HIND	Epinephelus adscensionis		
MUTTON SNAPPER	Lutjanus analis		
YELLOWTAIL SNAPPER	Ocyurus chrysurus		
QUEEN SNAPPER	Etelis oculatus		
SILK SNAPPER	Lutjamıs vivamıs		
RED SNA PPER	Lutjamıs campechamıs		
GREATER AMBERJACK	Seriola dumerili		
BLACK BELLIED	Helicolenus dactylopterus		
ROSEFISH			
(Maximum 20 per site across species)			



2022 Species Composition (84 species)

Species	Count	%FO	Mean CPUE
Black Bellied Rosefish	575	14.37	0.752
Pale-Spotted Eel	465	41.38	0.597
Tilefish Golden	434	21.26	0.561
Blueline Tilefish	335	21.26	0.432
Atlantic Sharpnose	160	10.92	0.205
Dogfish	146	8.05	0.187
Almaco Jack	137	10.92	0.176
Red Porgy	136	10.34	0.175
Red Snapper	114	8.62	0.147
Snowy Grouper	102	20.69	0.134
Shortspine Dogfish	86	10.34	0.113
Night Shark	73	16.09	0.094
Mutton Snapper	72	5.75	0.093
Smooth Dogfish	55	6.90	0.071
Black Sea Bass	54	3.45	0.070
Roughskin Dogfish	52	10.92	0.067
Yellowedge Grouper	29	5.17	0.039
Greater Amberjack	26	8.62	0.033
Bluerunner Jack	25	4.02	0.032
Southern Hake	23	9.77	0.031
Ocellated Moray Eel	21	6.32	0.027
Margate Grunt	20	3.45	0.026
Tiger Shark	19	6.90	0.024
Scalloped Hammerhead	17	6.90	0.022
Sandbar Shark	16	5.75	0.021
Scamp Grouper	16	3.45	0.021
Smooth Puffer	16	2.30	0.020
Snakefish	14	4.60	0.018
Florida Smoothhound	14	1.15	0.018

(cont)

Blacktail Moray	13	5.75	0.017
Bigeye Sixgill Shark	12	4.02	0.015
Chain Catshark	12	2.87	0.015
Blackline Tilefish	9	2.30	0.011
Sharpnose Sevengill	8	3.45	0.011
Oyster Toadfish	8	2.30	0.010
Cuban Dogfish	7	2.87	0.009
Jolthead Porgy	7	1.72	0.009
Reticulate Moray Eel	7	1.15	0.009
Vermilion Snapper	6	2.87	0.008
Spotted Hake	6	2.87	0.008
Gag Grouper	6	2.30	0.008
Blackpored Eel	6	2.30	0.008
Bank Sea Bass	5	2.30	0.007
Queen Snapper	5	1.15	0.006
Cobia	5	2.87	0.006
Crevalle Jack	4	1.15	0.005
Red Grouper	4	2.30	0.005
Conger Eels	4	2.30	0.005
Shark Hammerhead	3	1.72	0.004
Blotched Catshark	3	0.57	0.004
Barrelfish	3	1.15	0.004
Sharks	3	1.72	0.004
Beardfish	3	0.57	0.004
Requiem Shark	3	1.15	0.004
Bignose Shark	3	1.15	0.004
Nurse Shark	2	1.15	0.003
Chub Mackerel	2	0.57	0.003
Spotted Moray Eel	2	1.15	0.003
Dusky Shark	2	1.15	0.003
Moray Eel Family	2	0.57	0.003

(cont)

Silky Shark	2	1.15	0.003
Wenchman Snapper	2	1.15	0.003
Whitebone Porgy	2	1.15	0.003
Rock Seabass	2	1.15	0.003
Spinycheek Scorpionfish	1	0.57	0.001
Black Grouper	1	0.57	0.001
White Trevally	1	0.57	0.001
Gray Triggerfish	1	0.57	0.001
Coral Hake	1	0.57	0.001
Merluciid Hake	1	0.57	0.001
Blacktip Shark	1	0.57	0.001
Silk Snapper	1	0.57	0.001
Speckled Hind	1	0.57	0.001
Cubera Snapper	1	0.57	0.001
Silver Hake	1	0.57	0.001
Yellowmouth Grouper	1	0.57	0.001
King Snake Eel	1	0.57	0.001
Flounders	1	0.57	0.001
Clearnose Skate	1	0.57	0.001
Remora	1	0.57	0.001
Great Barracuda	1	0.57	0.001
Inshore Lizardfish	1	0.57	0.001
Prickly Brown Ray	1	0.57	0.001
Southern Stingray	1	0.57	0.001



Key Managed Species

Species	Proportion positive - 2020	Proportion positive - 2021	Proportion positive - 2022
Blueline Tilefish	0.17	0.25	0.21
Tilefish Golden	0.22	0.25	0.21
Snowy Grouper	0.17	0.27	0.21
Almaco Jack	0.13	0.16	0.11
Mutton Snapper	0.15	0.09	0.06
Red Snapper	0.13	0.09	0.09
Red Porgy	0.09	0.07	0.10
Greater Amberjack	0.11	0.06	0.09
Blackline Tilefish	0.02	0.02	0.02
Gag Grouper	0.11	0.05	0.02
Yellowedge Grouper	0.04	0.04	0.05
Scamp Grouper	0.07	0.04	0.03

Modest (4-6%) decline between 'mixed' and 'random' site selection



2021 Species Distributions n = 187 stations

Blueline Tilefish



Golden Tilefish

Snowy Grouper





-78° -770

Biological Samples

- 2 sagittal otoliths
- Gonad samples









Future Plans

- 2023 (expanded) survey completed Oct 15
- Plan for 2024
 - Fully randomized design with similar effort level
 - Mid-Atlantic expansion TBD
 - Life history samples currently being processed (SCDNR)
 - Meeting with industry participants (March)
- SSC working group convened (June Aug 2023)





