

Fishery-independent 2020 bottom longline survey for the Mid-Atlantic Golden Tilefish (*Lopholatilus chamaeleonticeps*) stock

Collaborating Partners:

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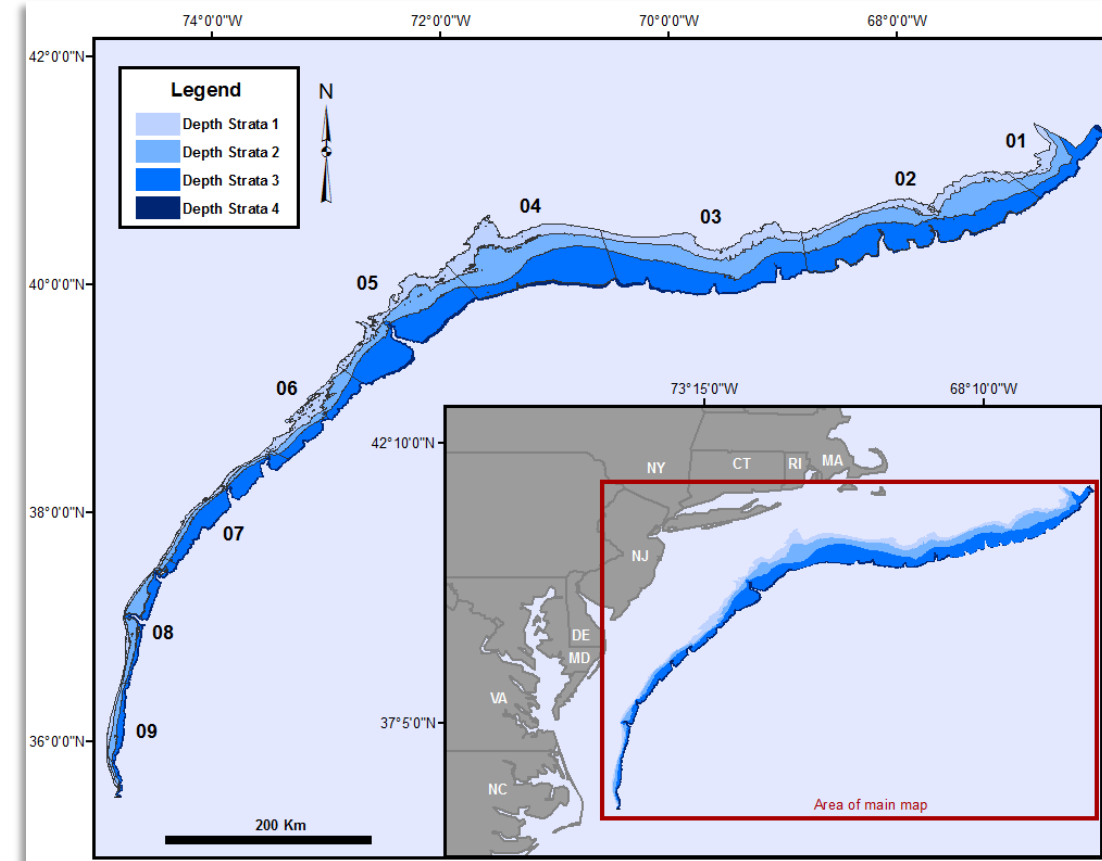
Laurie & John Nolan (F/V Sea Capture)

Matthew Seely, Brandon Muffley & José Montañez (MAFMC)

2017 Pilot Survey Design

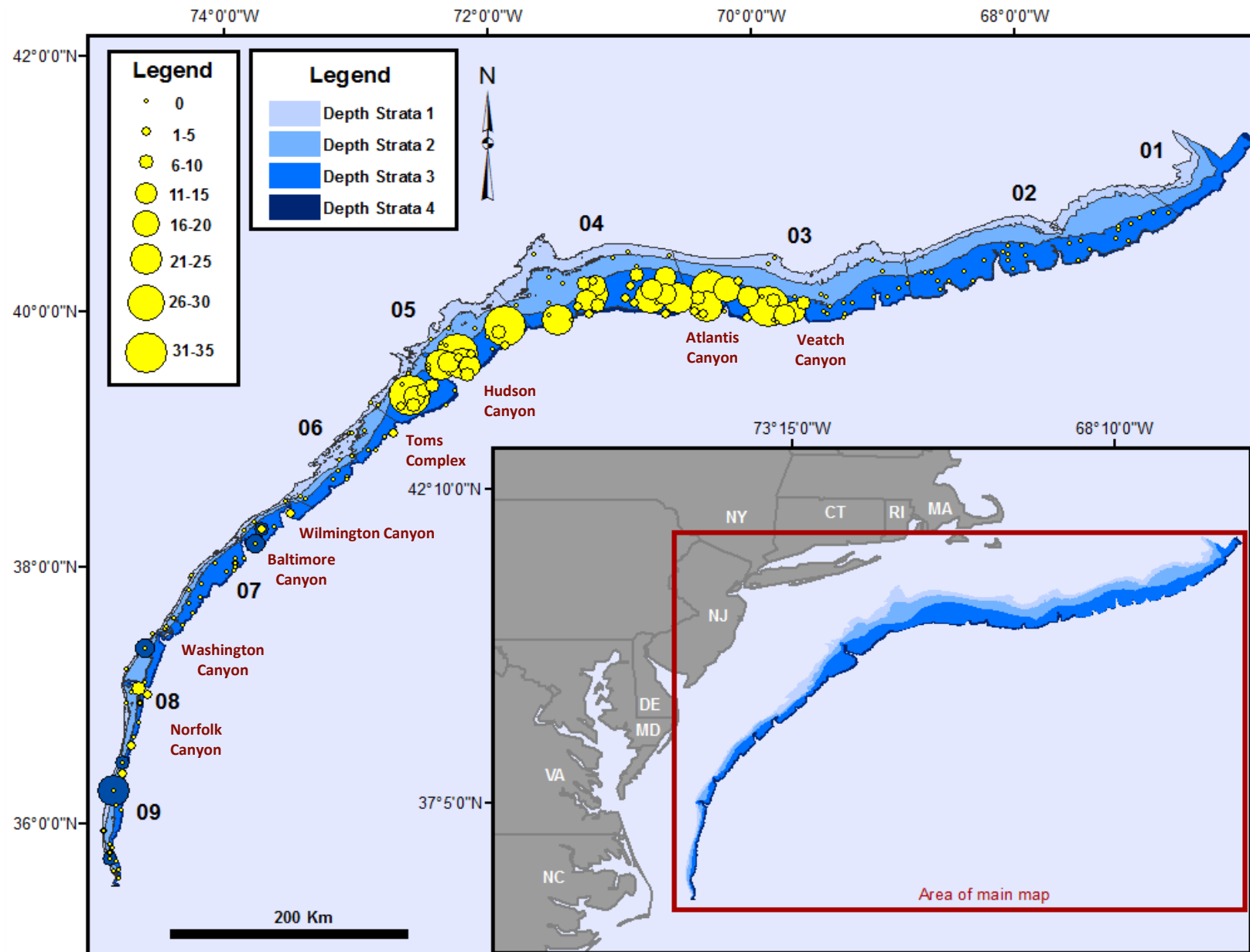
Survey design: Consisted of sampling stations representing the “core” fishing areas and deeper/shallower “expanded” region to evaluate areas outside of the traditional fishery.

- Stratified random sampling design
 - 9 north-south regions & 4 depth ranges
 - 41-44.9 fa (75-82 m)
 - 45-53.9 fa (82-97 m)
 - 54-137.9 fa (97-252 m)
 - 138-166 fa (252-304 m)
 - Stations were allocated to strata in proportion to area
 - No stations allocated to most northern N-S strata (01)
 - Minimum of 3 stations per depth strata (01,04)



2017 Pilot Distribution of GTF & BTL

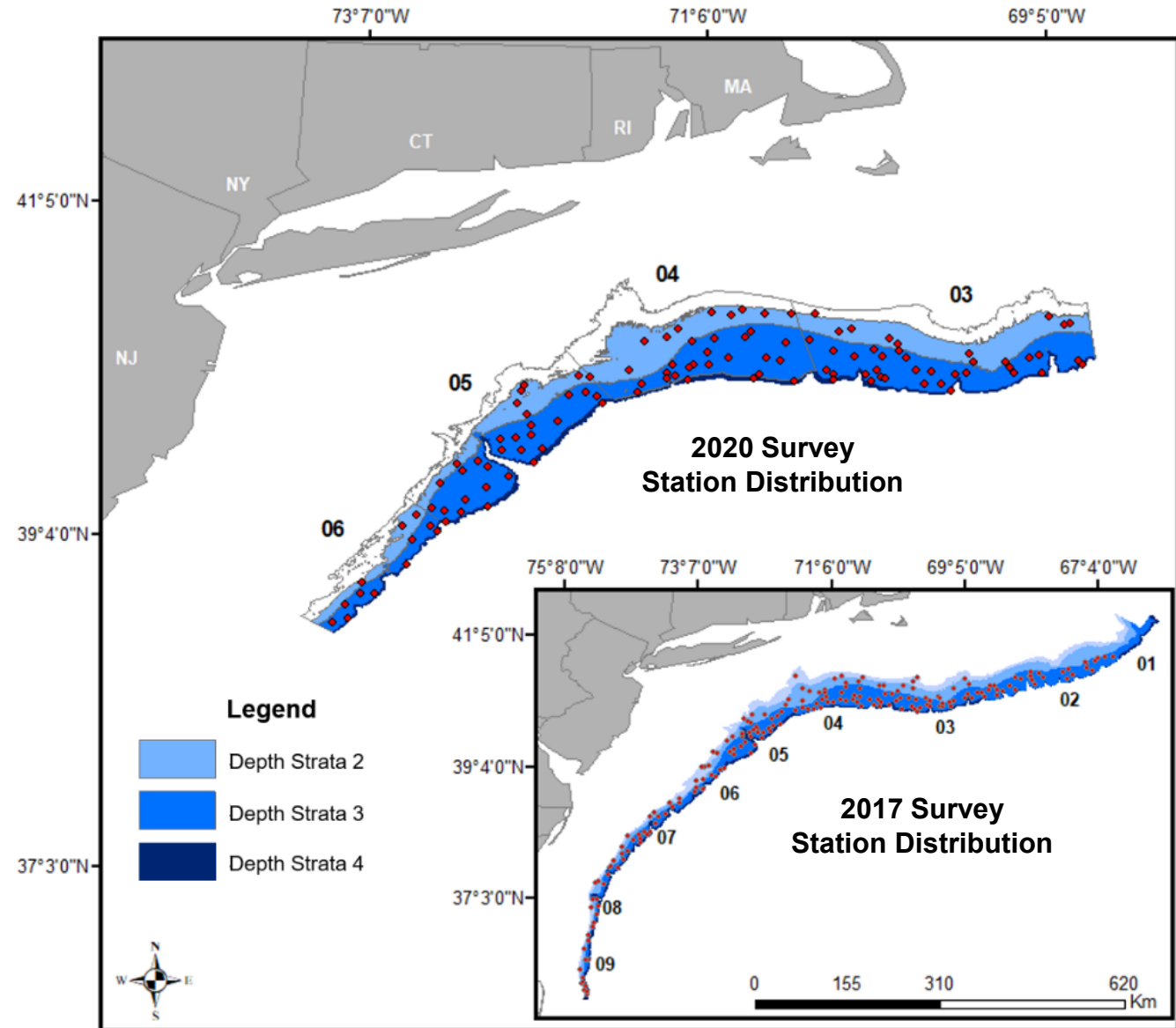
- Survey:
 - 194 stations
 - 25 days
 - July-August



2020 Survey Design Modifications

- Target “CORE” area of GTF abundance
 - Low incidence of Blueline
 - No catch in Strata 1 (75-82 m)
 - Reduce number of stations: 115
 - Reduce effort: Single 14-day cruise

Strata	Area (km ²)	% Total Area	# Proposed	# Actual
03-2	2320.7	14.3	9	10
03-3	3184.3	19.6	27	27
03-4	177.3	1.1	3	4
04-2	2167.4	13.4	10	9
04-3	2538.4	15.7	20	19
04-4	240.7	1.5	3	2
05-2	1236.1	7.6	6	7
05-3	2720.4	16.8	22	22
05-4	208.6	1.3	3	3
06-2	630.7	3.9	3	3
06-3	727.7	4.5	6	6
06-4	57.3	0.4	3	3



2020 Survey Gear & Deployment Modifications

- Hook sizes: distributed by a ratio of 50-50
 - small = 8/0
 - regular = 12/0
- Bait sized relative to hook size
- Minimum soak duration = 50 minutes
- Sets between sunrise and sunset
- Bait outcome
- Temperature logger per set
- Current meter per set



Image credit: P. Nitschke

Catch Summary

Survey:

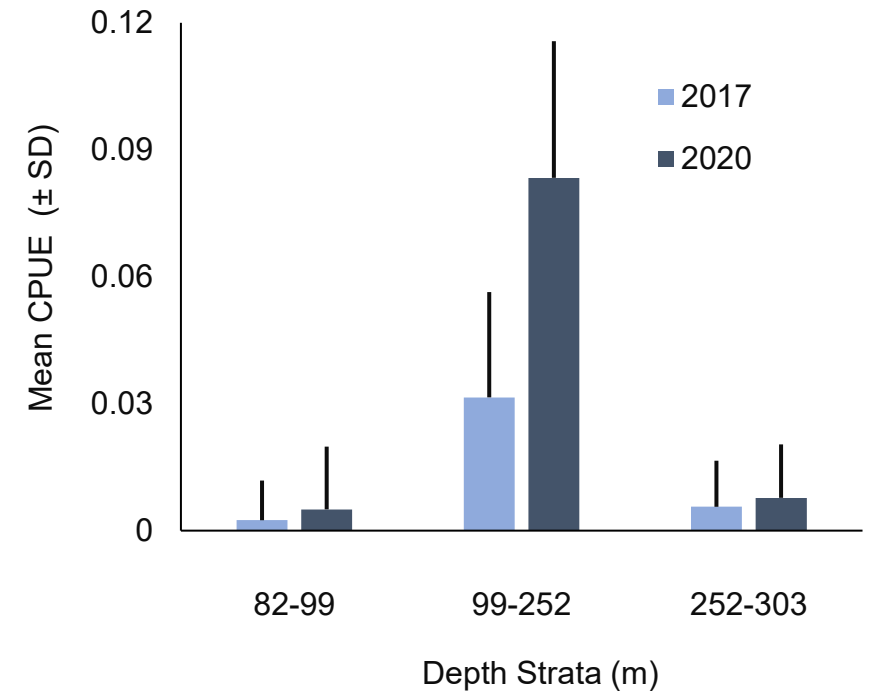
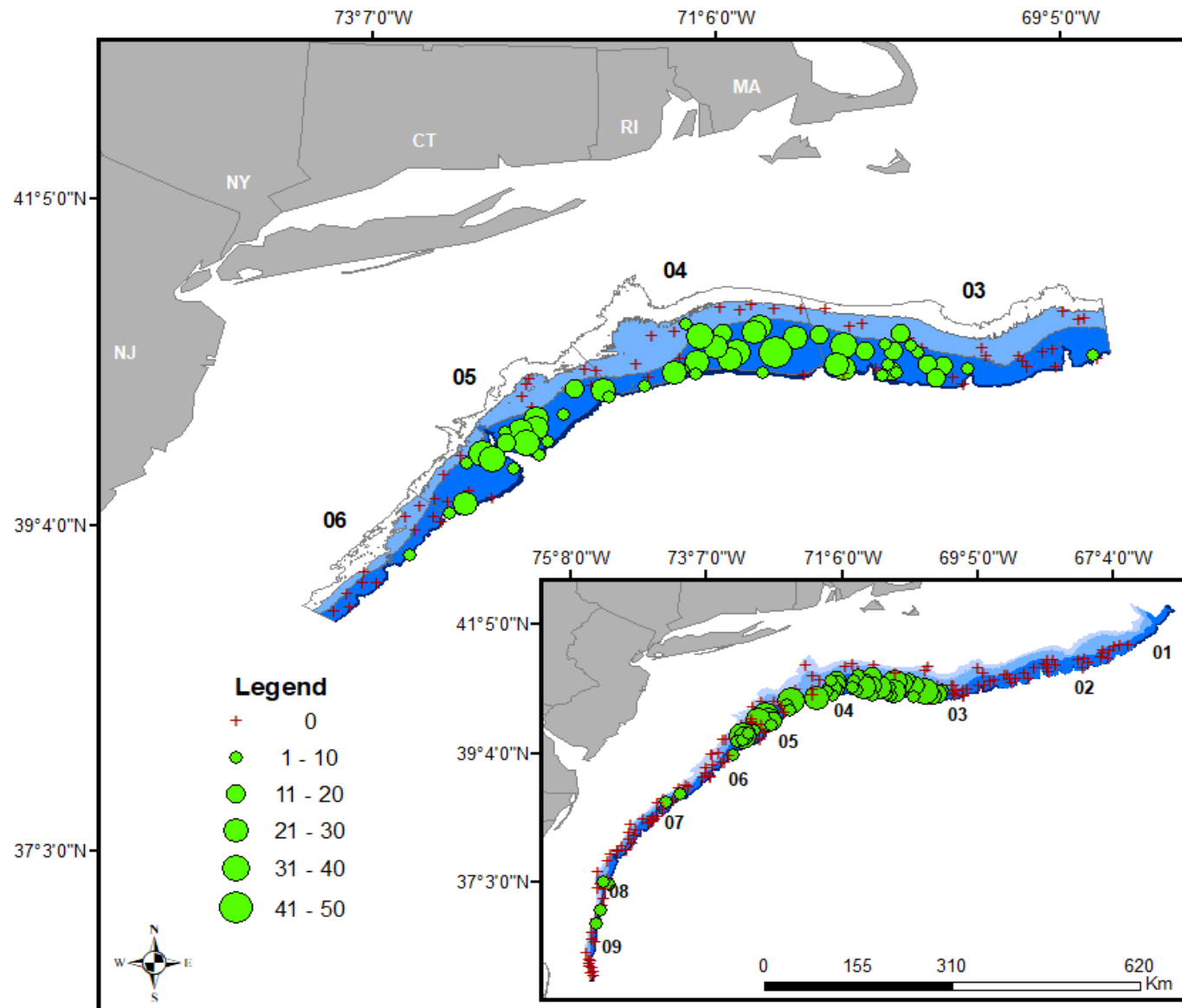
- 115 stations
- 14 days
- July 2020

Sampling:

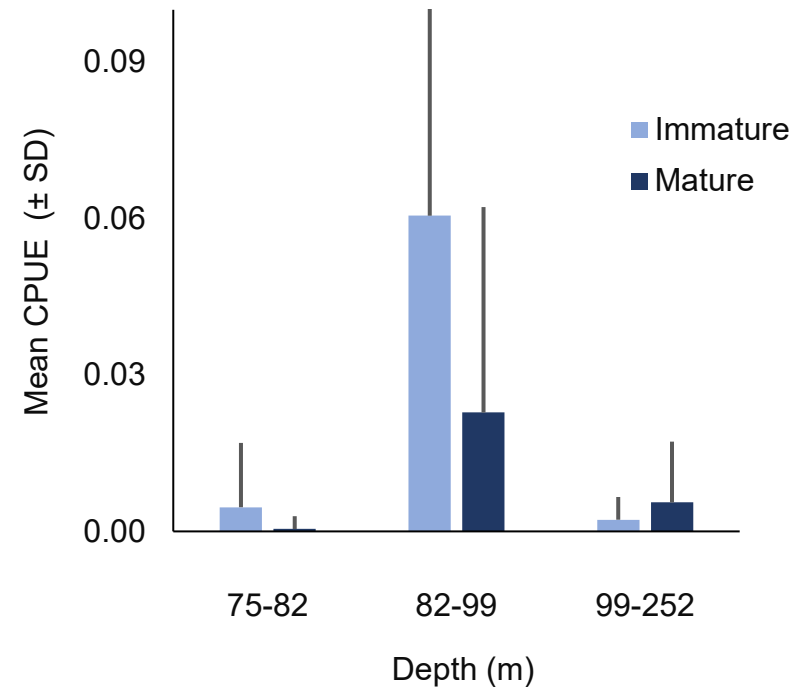
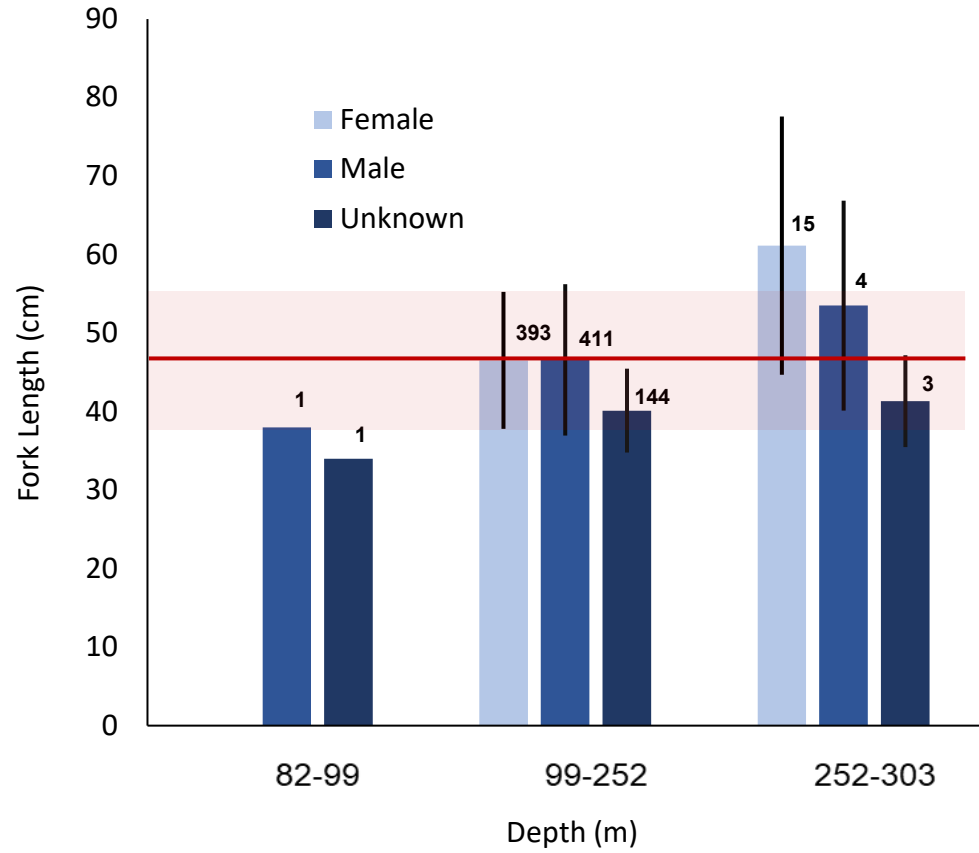
- 184 GTF
 - Fin
 - Muscle
 - Liver
 - Stomach
 - Otoliths

Species	Common Name	Hook Size		Total
		Small	Regular	
<i>Caulolatilus microps</i>	Blueline Tilefish	1	0	1
<i>Scyliorhinus retifer</i>	Chain Dogfish	76	19	95
<i>Congridae</i>	Conger Eel	4	6	10
<i>Anguillidae</i>	Eel spp.	1	0	1
<i>Lopholatilus chamaeleonticeps</i>	Golden Tilefish	673	298	971
<i>Myxine glutinosa</i>	Hagfish	5	0	5
<i>Leucoraja erinacea</i>	Little Skate	5	5	10
<i>Lophius americanus</i>	Monkfish	1	0	1
<i>Helicolenus dactylopterus</i>	Black bellied Rose	3	2	5
<i>Carcharhinus plumbeus</i>	Sandbar Shark	1	2	3
<i>Merluccius albidus</i>	Offshore Hake	2	0	2
<i>Mustelus canis</i>	Smooth Dogfish	226	302	528
<i>Squalus acanthias</i>	Spiny Dogfish	2	1	3
<i>Urophycis regia</i>	Spotted Hake	556	178	734
<i>Paralichthyes dentatus</i>	Summer Flounder	1	0	1
<i>Merluccius bilinearis</i>	Silver Hake	16	4	20
TOTAL		1573	817	2390

GTF Abundance & Distribution

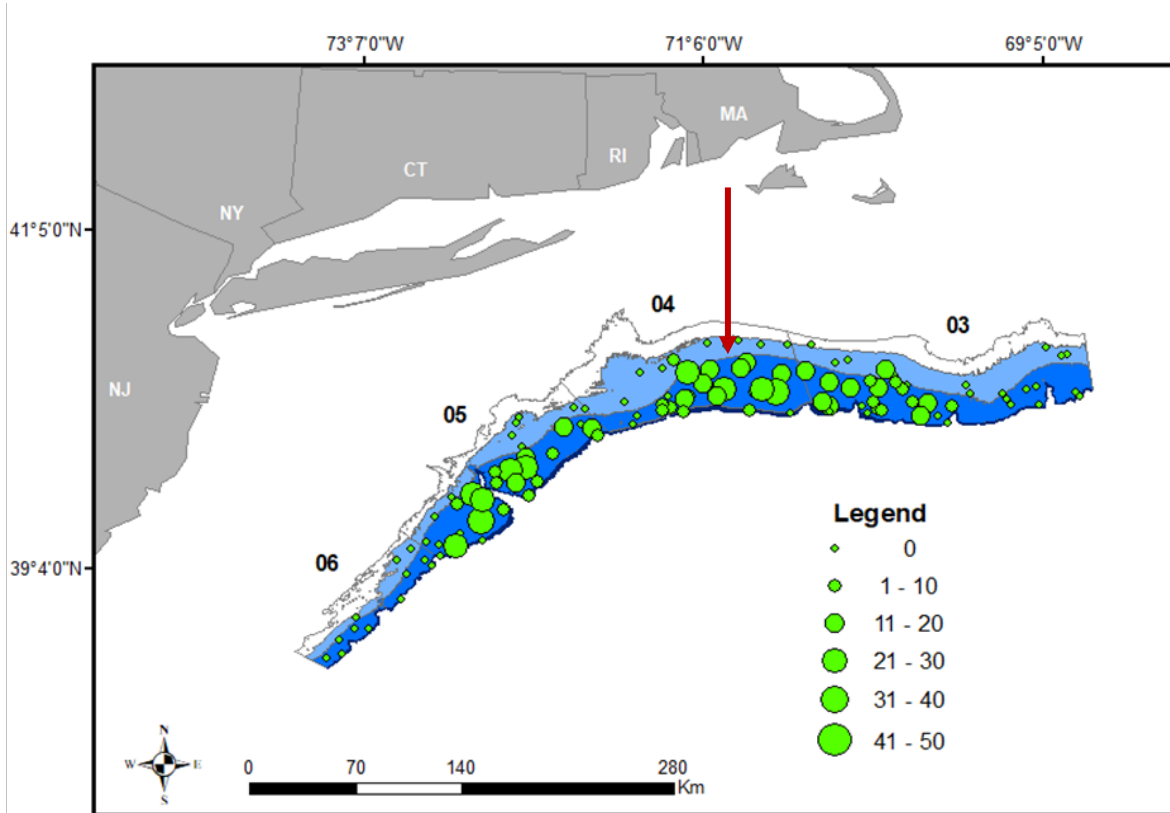


GTF Size-Structure & Maturity

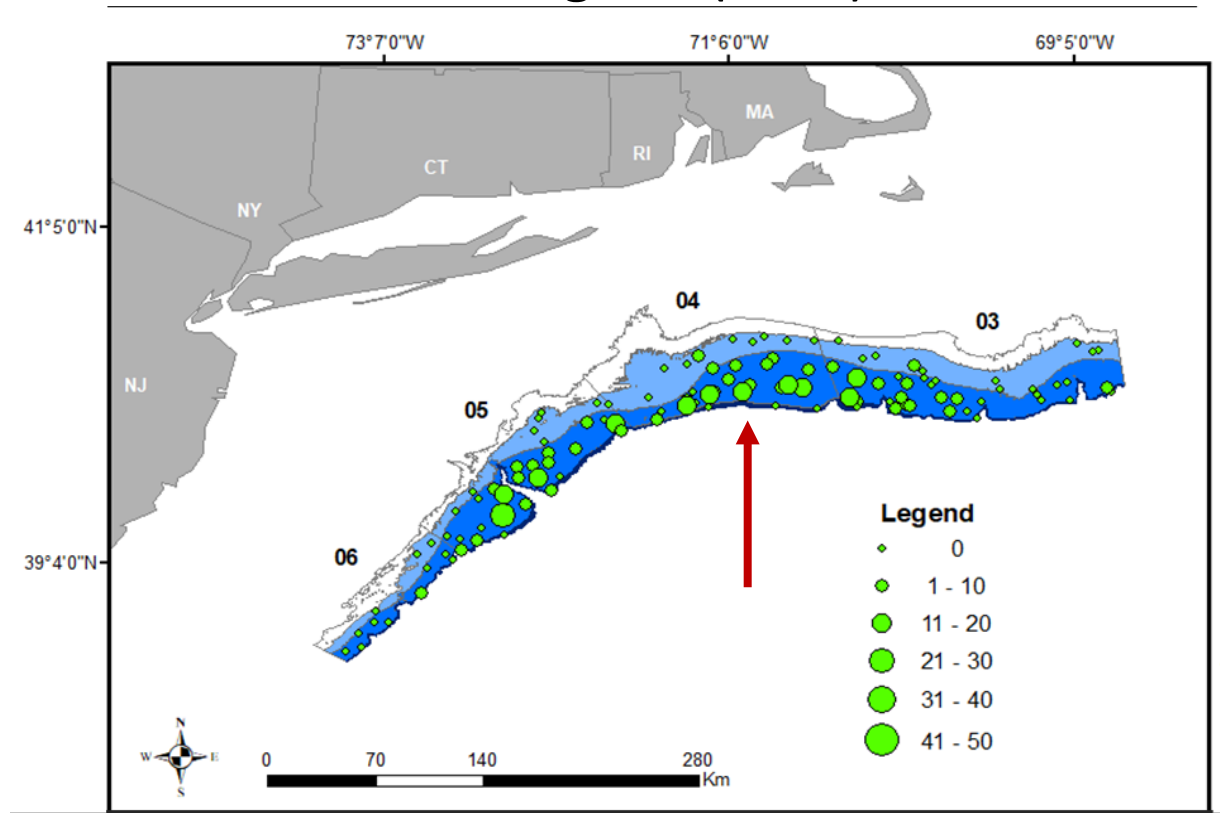


Catch Distribution by Hook Size

Small (8/0)



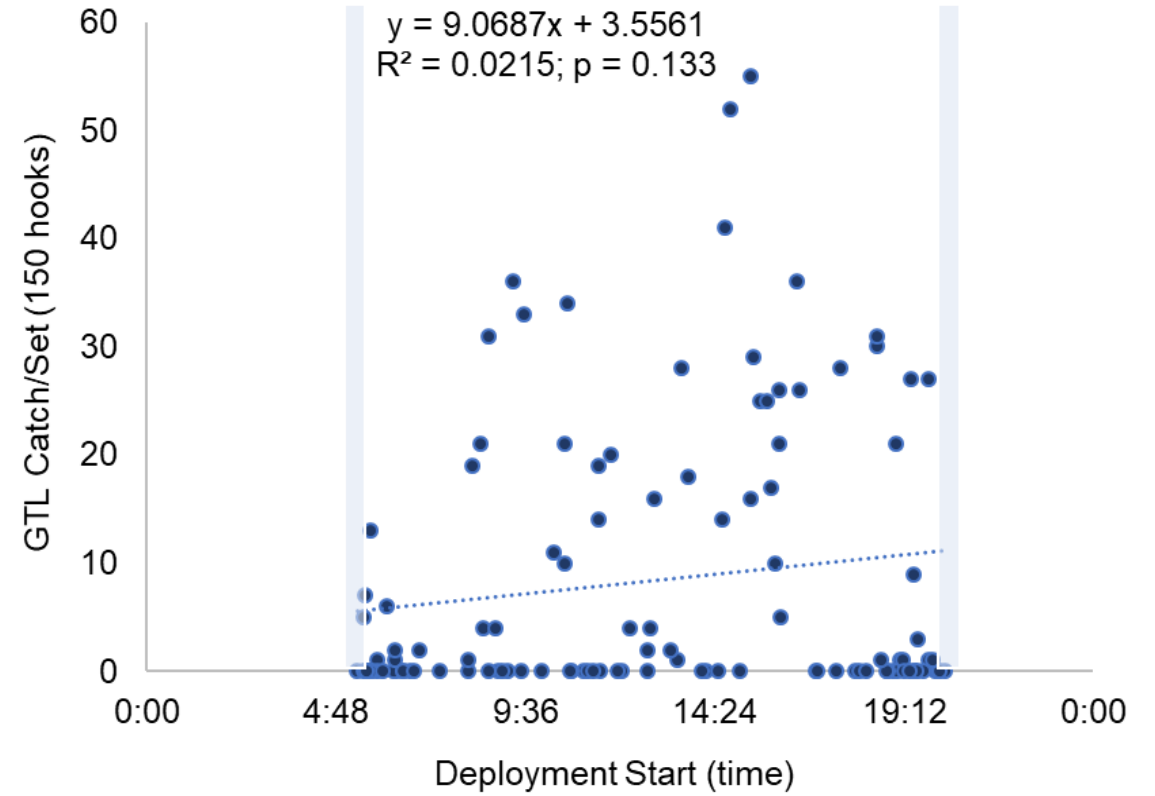
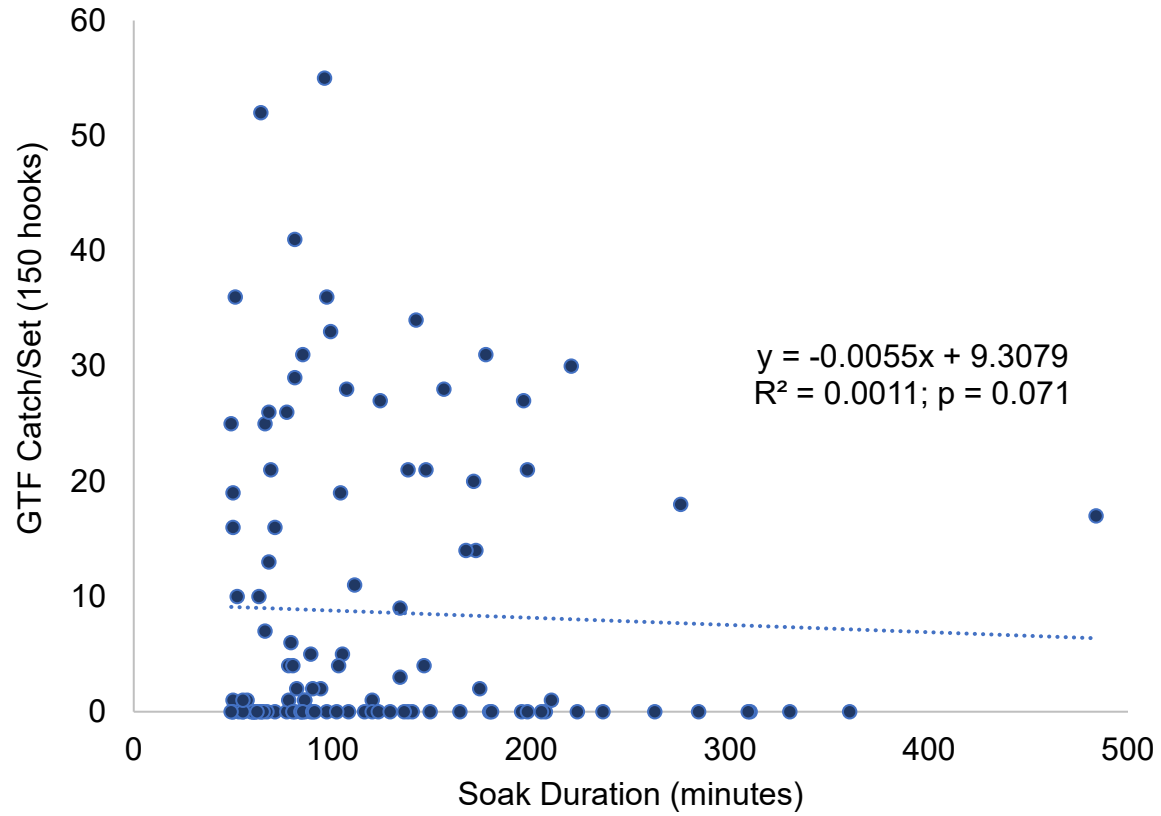
Regular (12/0)



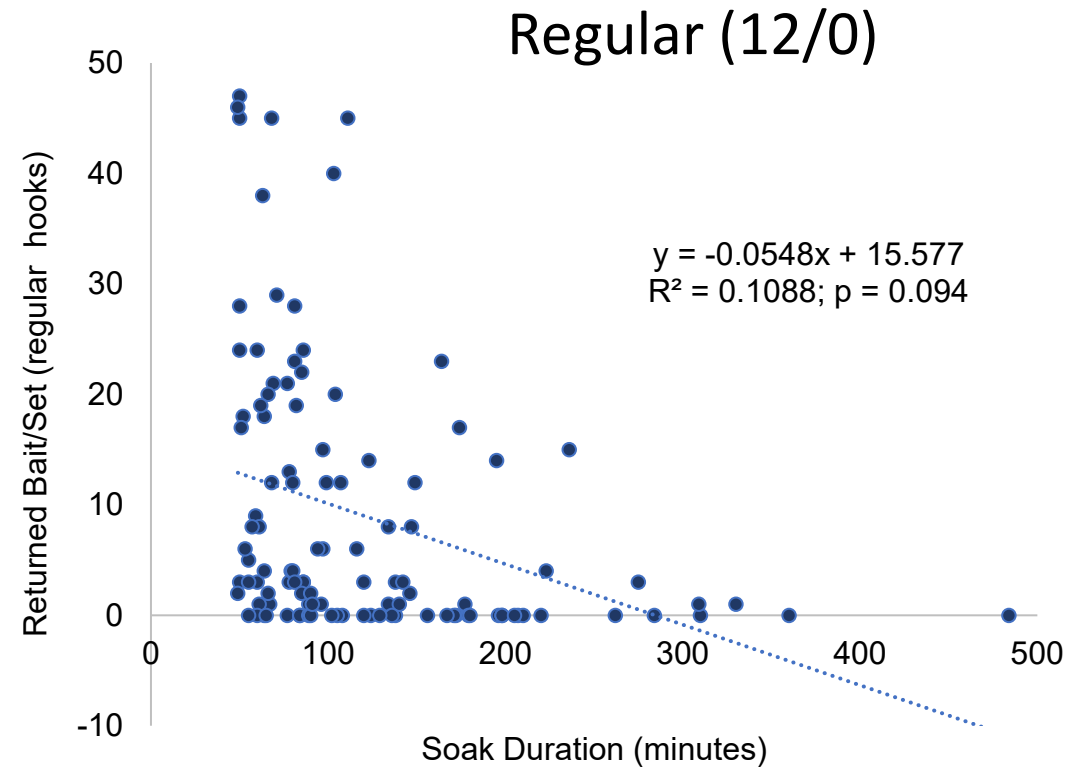
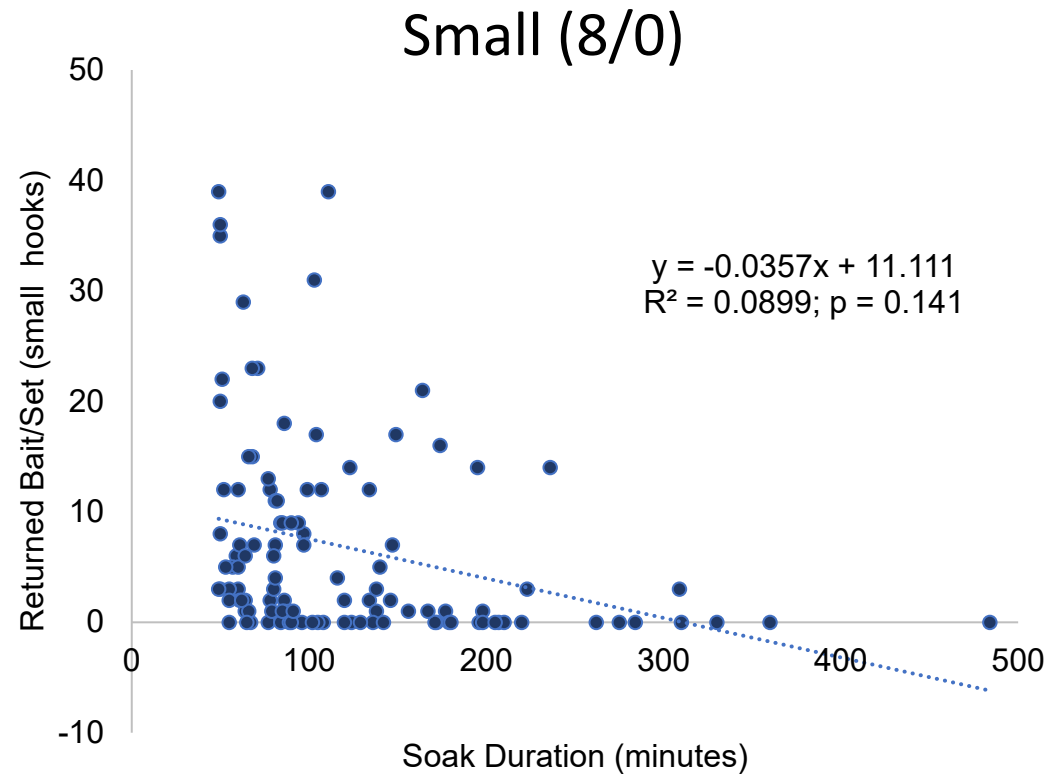
Hook Deployment & Retrieval

Strata	# Hooks Deployed	# Returned Bait	# Returned Bait SM/REG	Total Catch	Total GTF Catch	GTF Catch SM/REG	% Empty
03--2	1500	99	44/55	175	20	16/4	82
03--3	4050	376	176/200	466	227	159/68	79
03--4	600	45	20/25	48	0	0/0	85
04--2	1350	271	127/144	117	2	1/1	71
04--3	2850	343	139/204	715	371	254/117	63
04--4	300	47	17/30	12	3	3/0	80
05--2	1050	12	4/8	86	0	0/0	91
05--3	3300	468	189/279	585	337	234/103	68
05--4	450	1	1/0	37	10	6/4	92
06--2	450	39	23/16	17	0	0/0	88
06--3	900	51	17/34	109	0	0/0	82
06--4	450	0	0/0	23	1	0/1	95
<i>Total</i>	<i>17250</i>	<i>1752</i>	<i>757/995</i>	<i>2390</i>	<i>971</i>	<i>673/298</i>	<i>76%</i>

Soak Duration & Timing



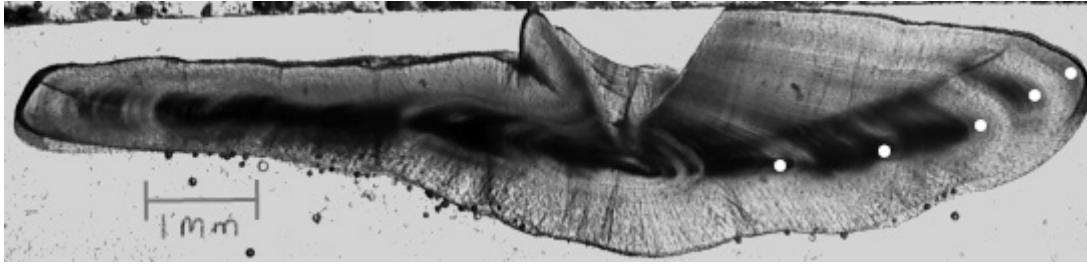
Soak Duration - Bait Outcome



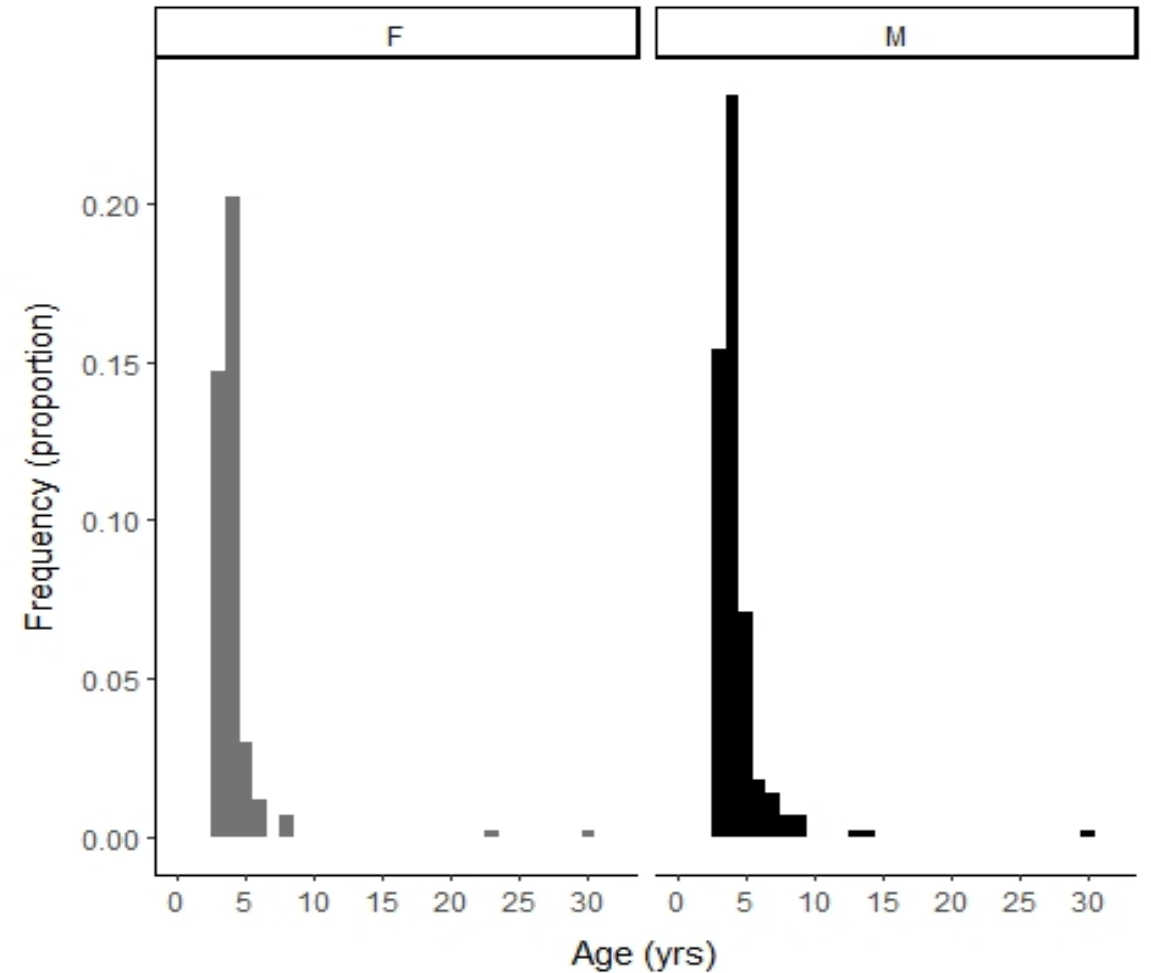
2020 Survey Summary

- Consistency with the 2017 survey
 - Core area of abundance – between Hudson Canyon and Veatch Canyon
 - Dominant depth strata – 03: 54-137.9 fa (97-252 m)
 - Catch dominated by smaller GTF – 46 ± 9.4 cm
 - Small hooks had higher catch – 673 vs. 298
- Bait retention across the survey was 10%
 - Regular hooks retained bait at a higher frequency than small hooks.
- No relationship between GTF catch and soak duration or time of deployment for either hook size.
- No relationship between soak duration and bait return for either hook size.

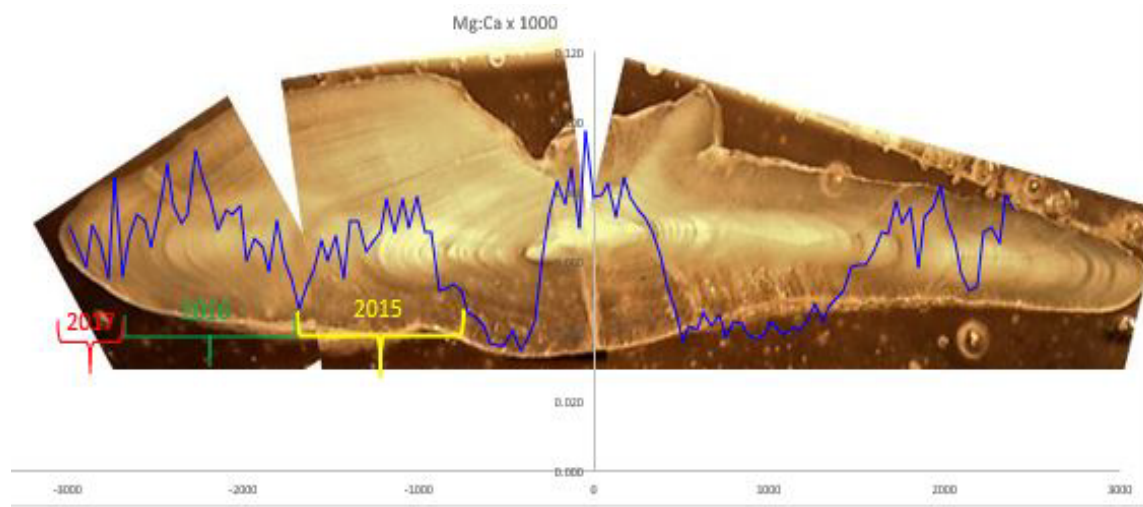
2017 GTF Age Distribution



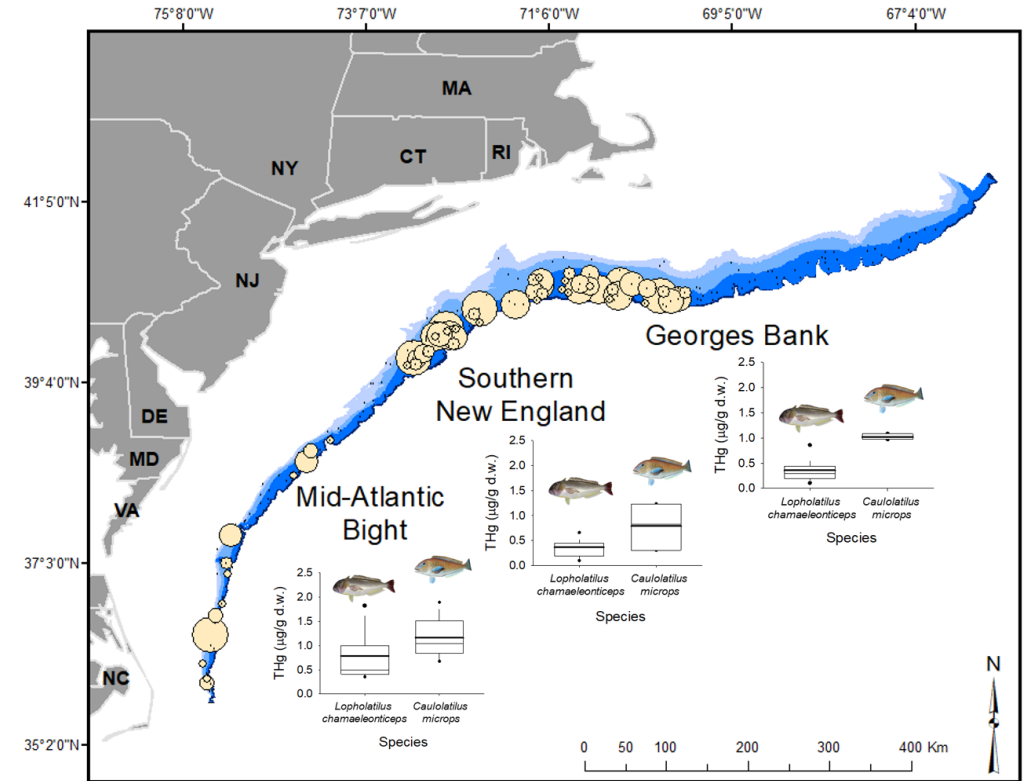
Sex	<i>n</i>	Fork Length (cm)	Weight (kg)
Female	195	43.8 ± 7.7 (29.0–101.0)	1.2 ± 1.2 (0.3–13.0)
Male	241	48.0 ± 11.4 (26.0–110.0)	1.7 ± 2.1 (0.1–22.1)
Unknown	49	41.3 ± 4.6 (29.0–49.0)	0.9 ± 0.3 (0.3–1.8)



Additional Research Contributions



Dawson et al. unpublished data



Roose et al. unpublished data

- Dawson KM. Use of otolith microchemistry to infer early life history characteristics of Golden Tilefish (*Lopholatilus chamaeleonticeps*) in the NW Atlantic. *MS Thesis submission: May 2021*.
- Roose H, Paterson G, Frisk MJ, Cerrato RM, Nitschke P, Olin JA. Regional patterns of mercury bioaccumulation among northwest Atlantic Golden (*Lopholatilus chamaeleonticeps*) and Blueline (*Caulolatilus microps*) Tilefish. *Expected Submission: Environmental Pollution April 2021*.
- Olin JA, Shipley ON, Cerrato RM, Nitschke P, Magen C, Frisk MG. 2020. Separation of realized ecological niche axes among sympatric Tilefishes provides insight into potential drivers of co-occurrence in the NW Atlantic. *Ecology and Evolution* 10: 10886–10898.
- Snyder SM, Olin JA, Pulster EL, Murawski SA. 2020. Spatial contrasts in hepatic and biliary PAHs in Tilefish (*Lopholatilus chamaeleonticeps*) throughout the Gulf of Mexico, with comparison to the Northwest Atlantic. *Environmental Pollution* 258: 113775.