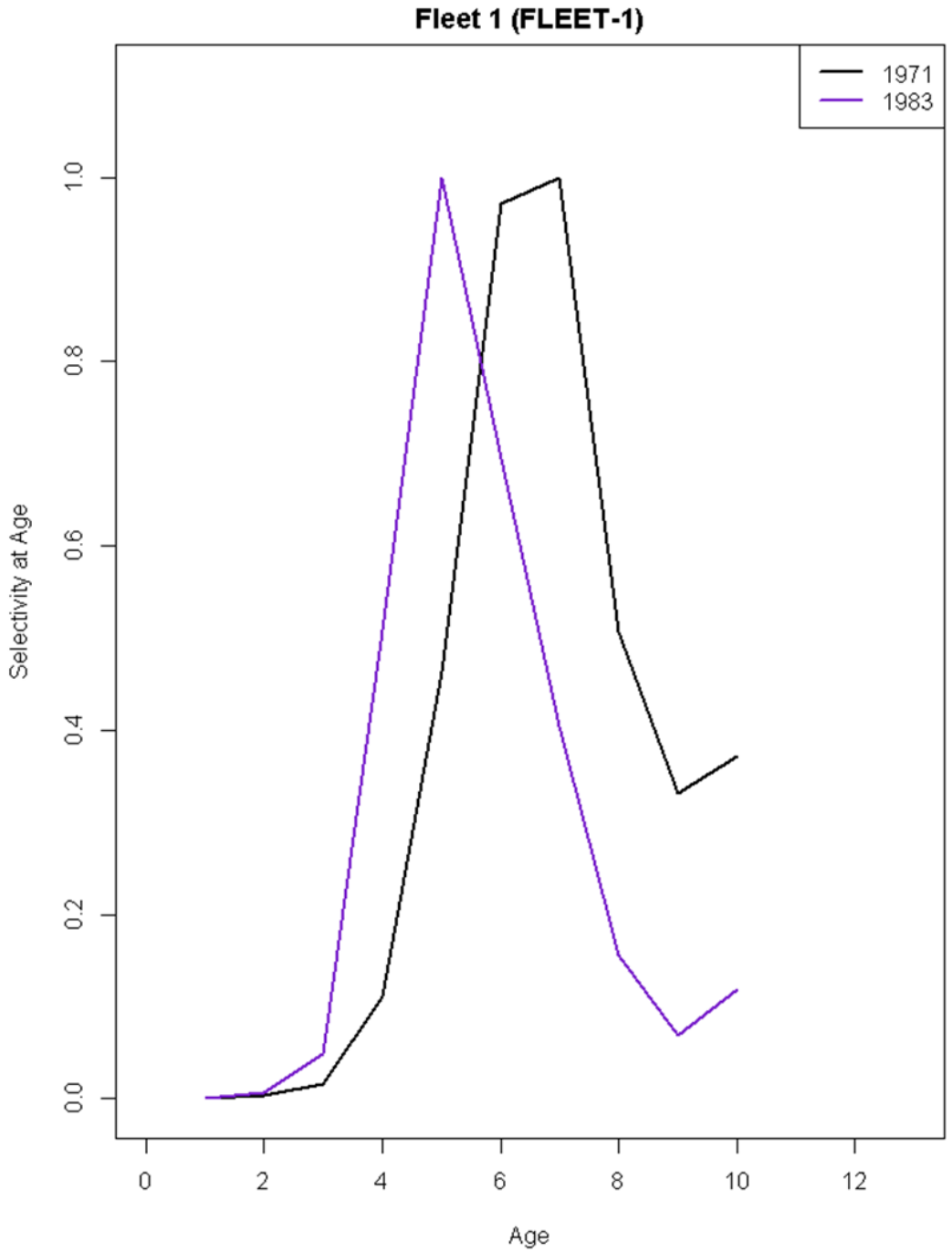
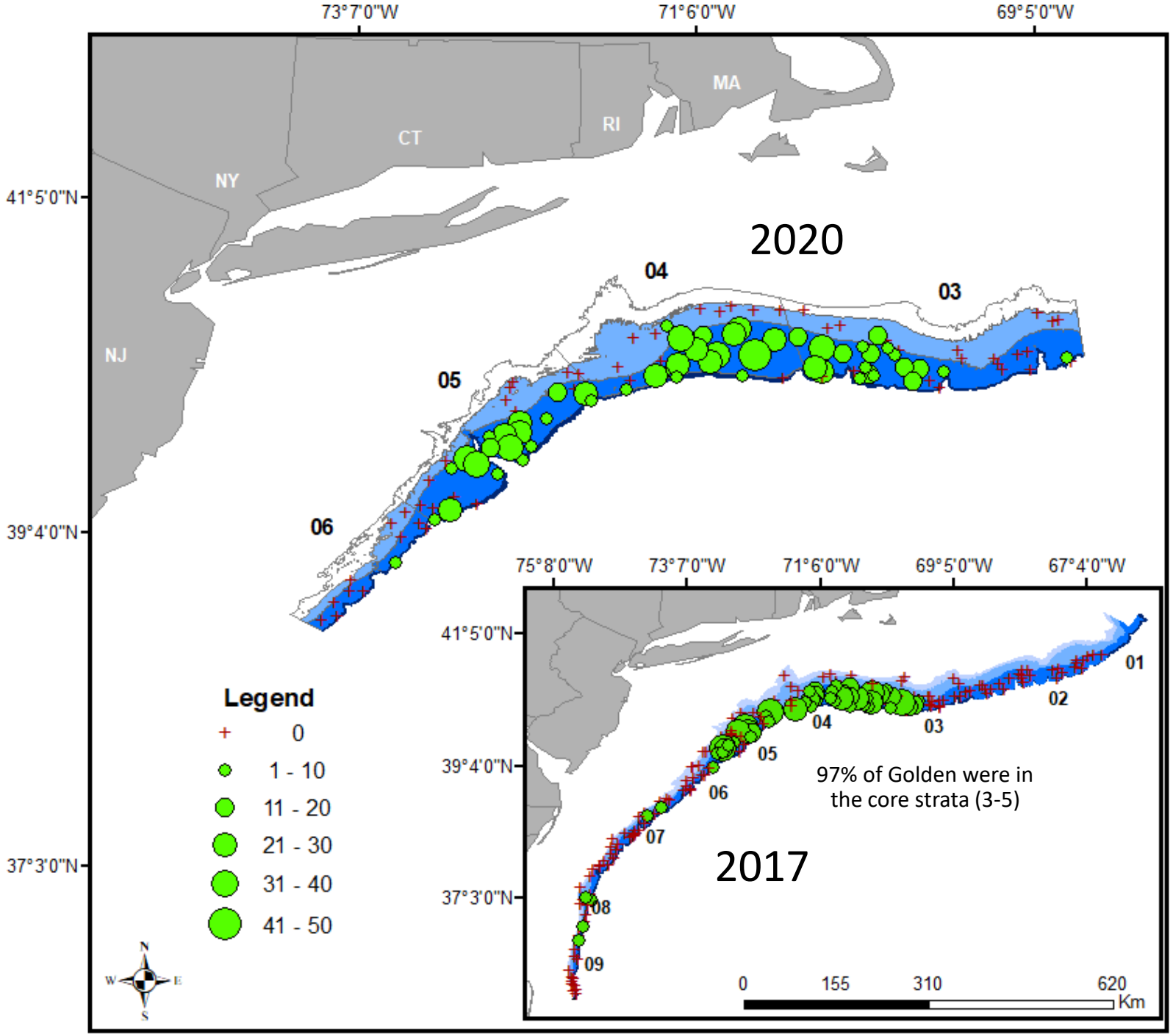
Golden Tilefish
Hook Selectivity Comparison from Two Longline Surveys

Paul Nitschke (NEFSC-NOAA), Jill A. Olin (MTU),
Laurie & John Nolan (F/V Sea Capture)
Matthew Seely, Brandon Muffley & José Montañez (MAFMC)

Hypothesis: A dome shaped selectivity pattern exists in the fishery.




73°7'0"W
71°6'0"W
69°5'0"W
41°5'0"N
39°4'0"N
37°3'0"N
MA
RI
CT
NY
NJ
2020
04
03
05
06
Legend
0
1 - 10
11 - 20
21 - 30
31 - 40
41 - 50
N
W
E
S
75°8'0"W
73°7'0"W
71°6'0"W
69°5'0"W
67°4'0"W
41°5'0"N
39°4'0"N
37°3'0"N
01
02
03
04
05
06
07
08
09
97% of Golden were in
the core strata (3-5)
2017
0
155
310
620
Km

Hook Selectivity
150 hooks/station
1 Nautical Mile

- 2017 Pilot

20% small - 60% medium – 20% Large

- 2020 survey

50% small - 50% medium

8/0 small - 12/0 medium – 14/0 Large

Hook Selectivity
150 hooks/station
1 Nautical Mile
Catch Rates by Hook size

8/0 small - 12/0 medium – 14/0 Large

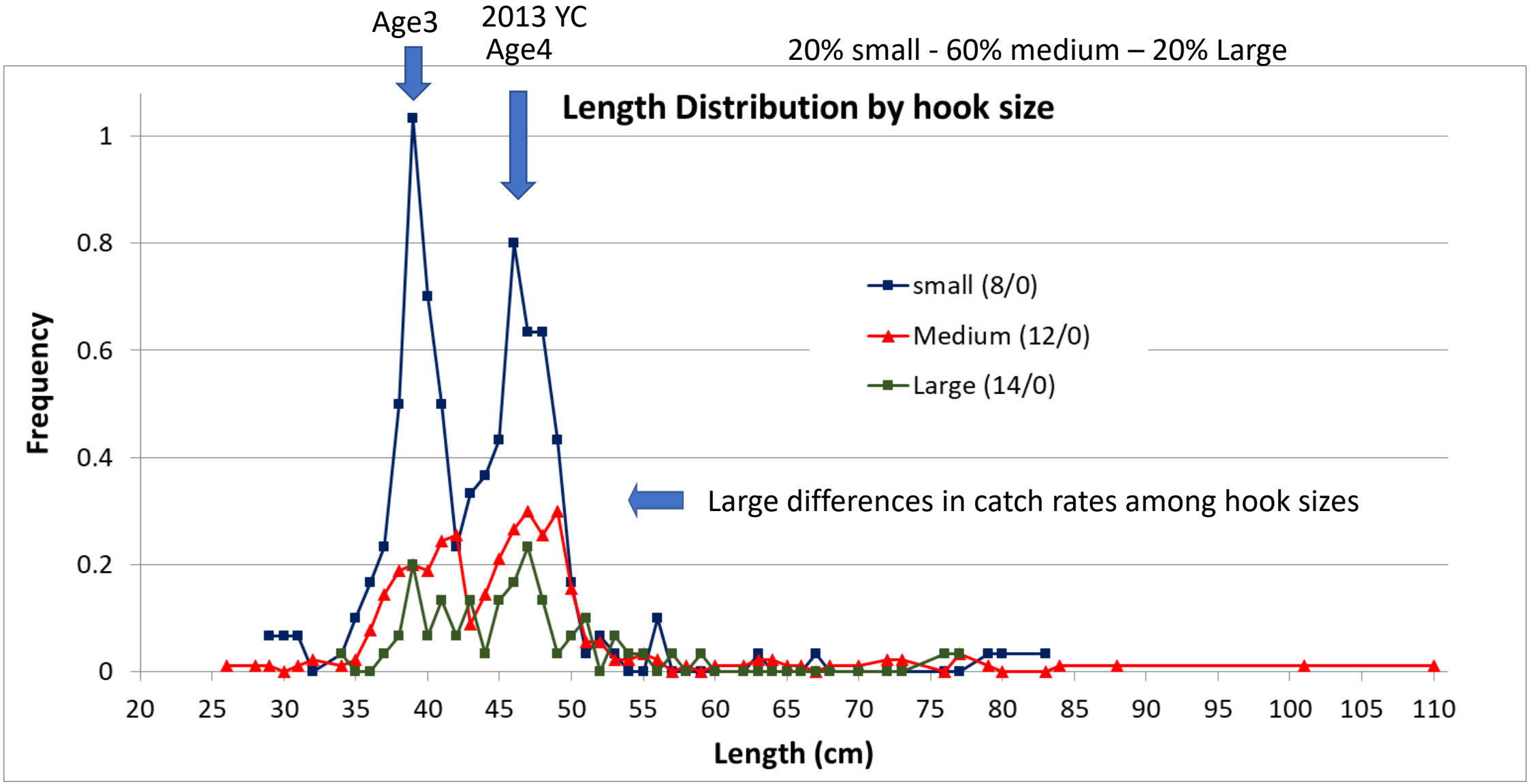
- 2017 Pilot

59% small - 27% medium – 14% Large
Small hooks caught 2.2 times more fish (#s) than medium hooks.
Small hooks caught 4.2 times more fish (#s) than large hooks.

- 2020 survey

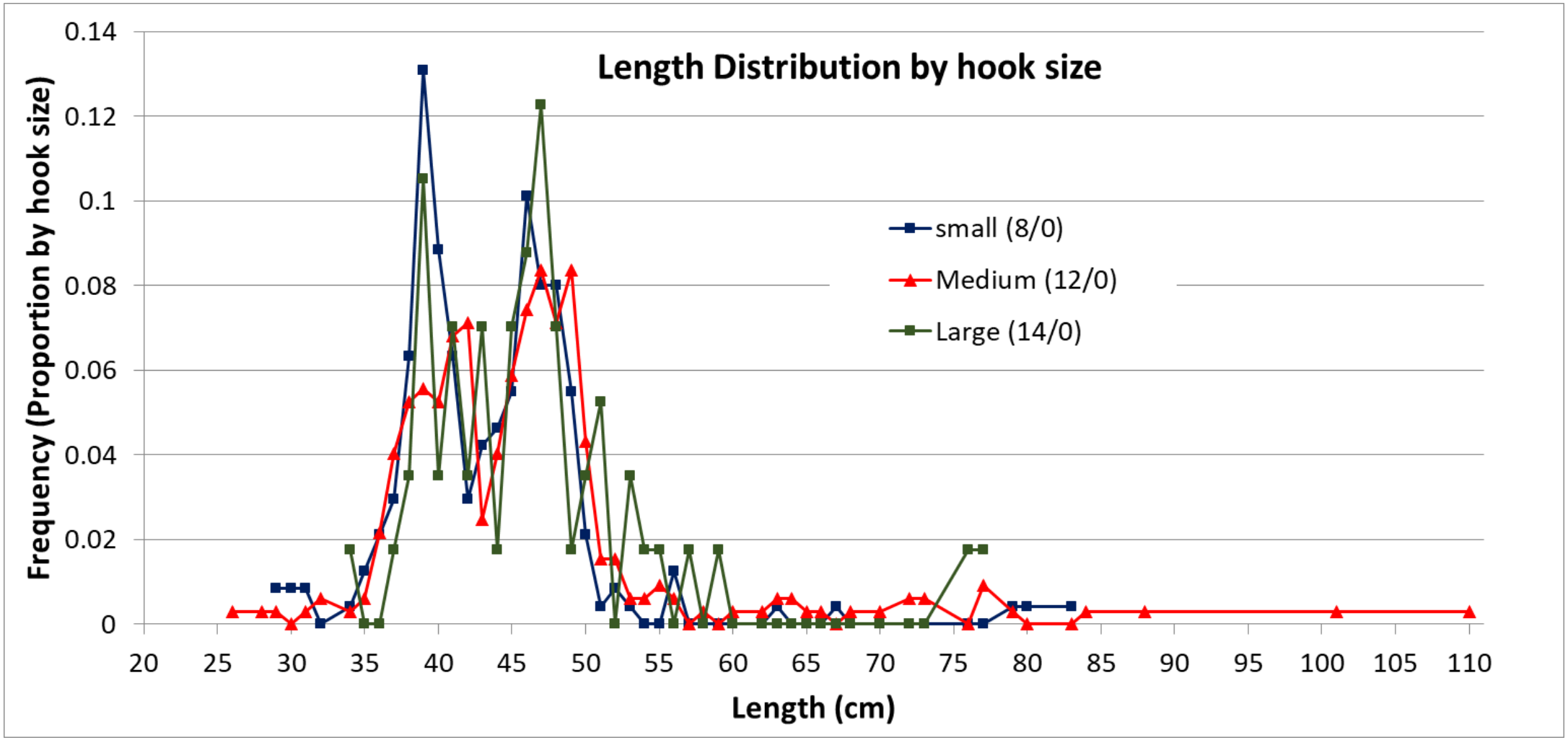
70% small - 30% medium
Small hooks caught 2.4 times more fish (#s) than medium hooks.

2017 Tilefish Longline Pilot Survey

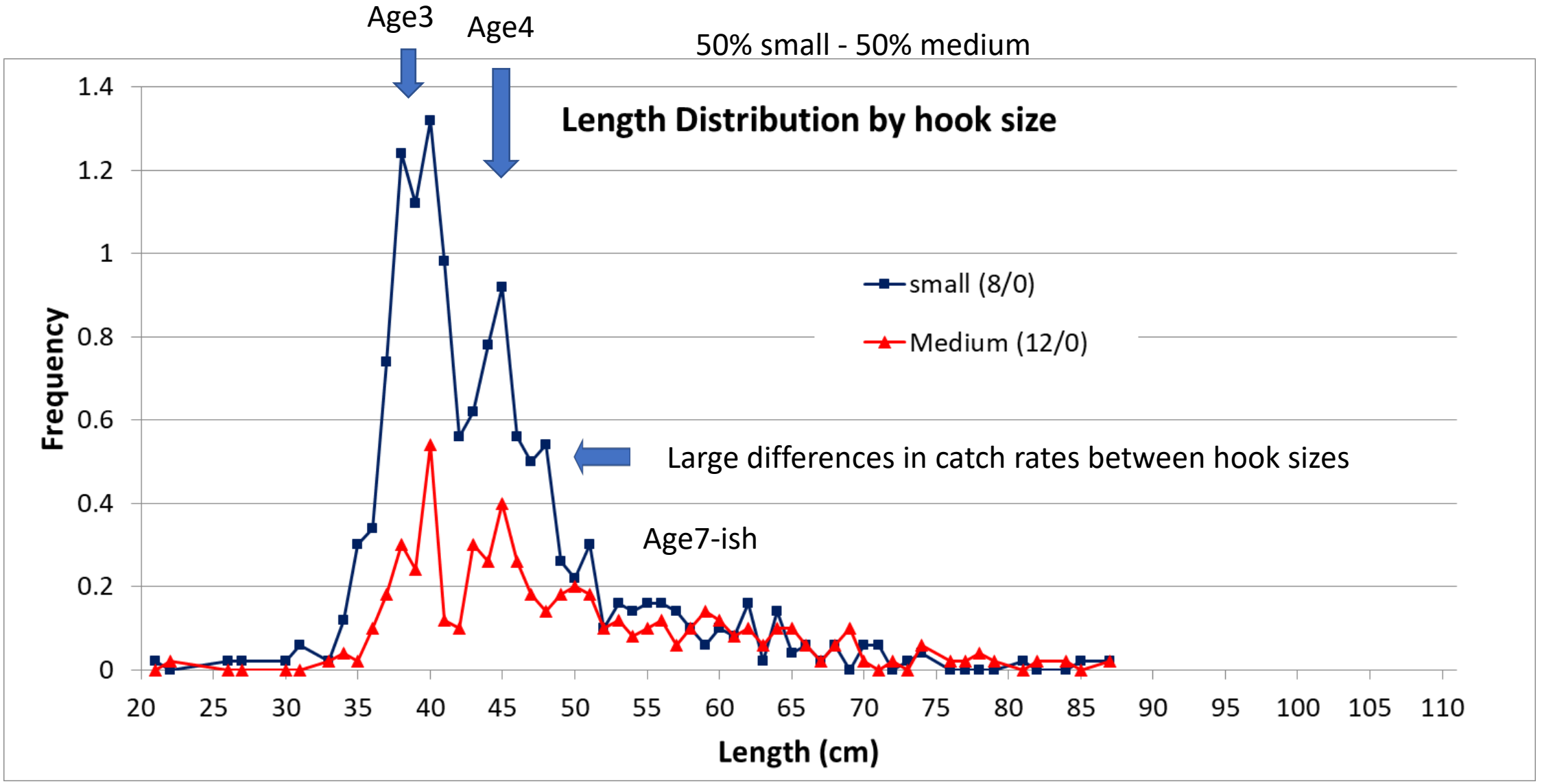


2017 Tilefish Longline Pilot Survey

Proportions by hook size

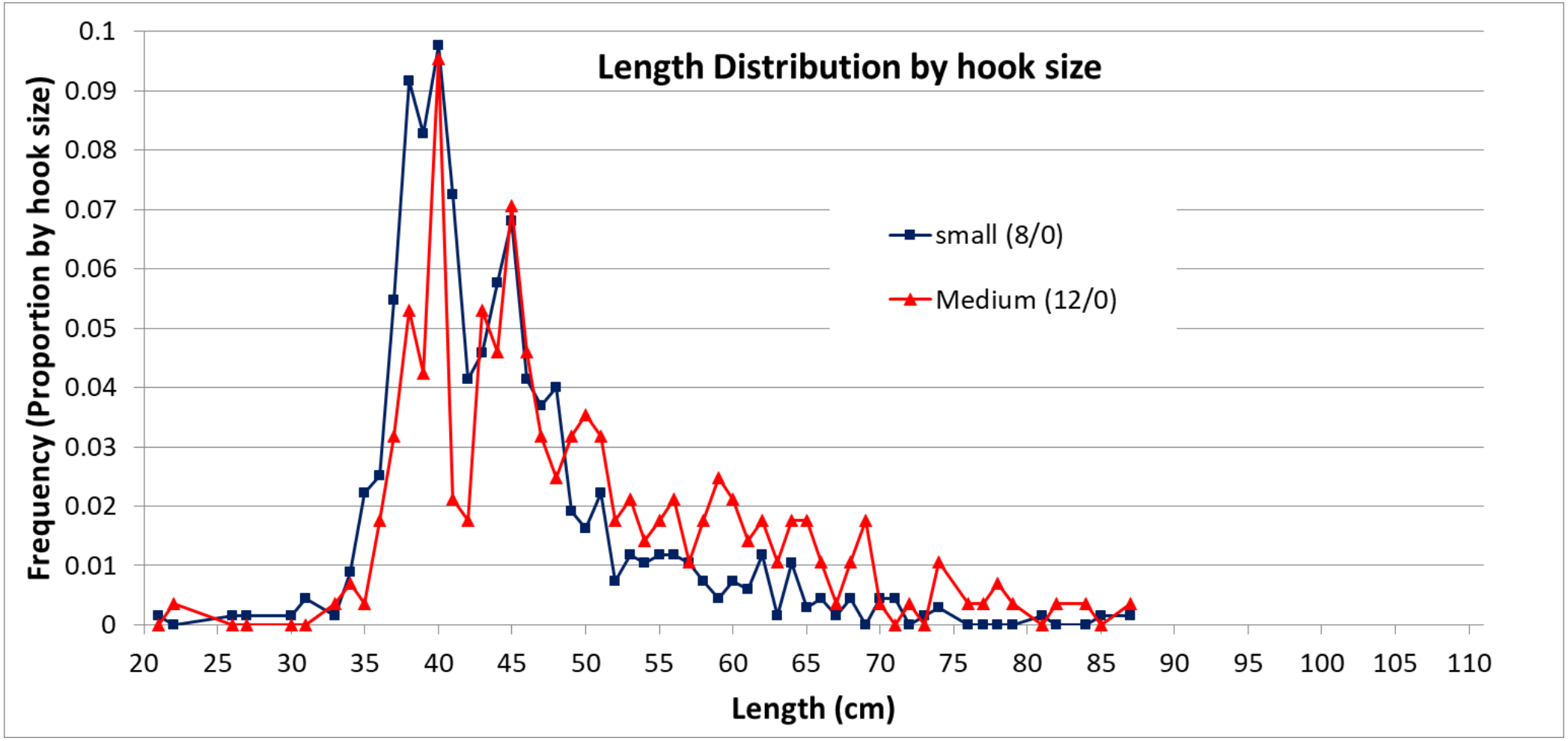


2020 Tilefish Longline Survey

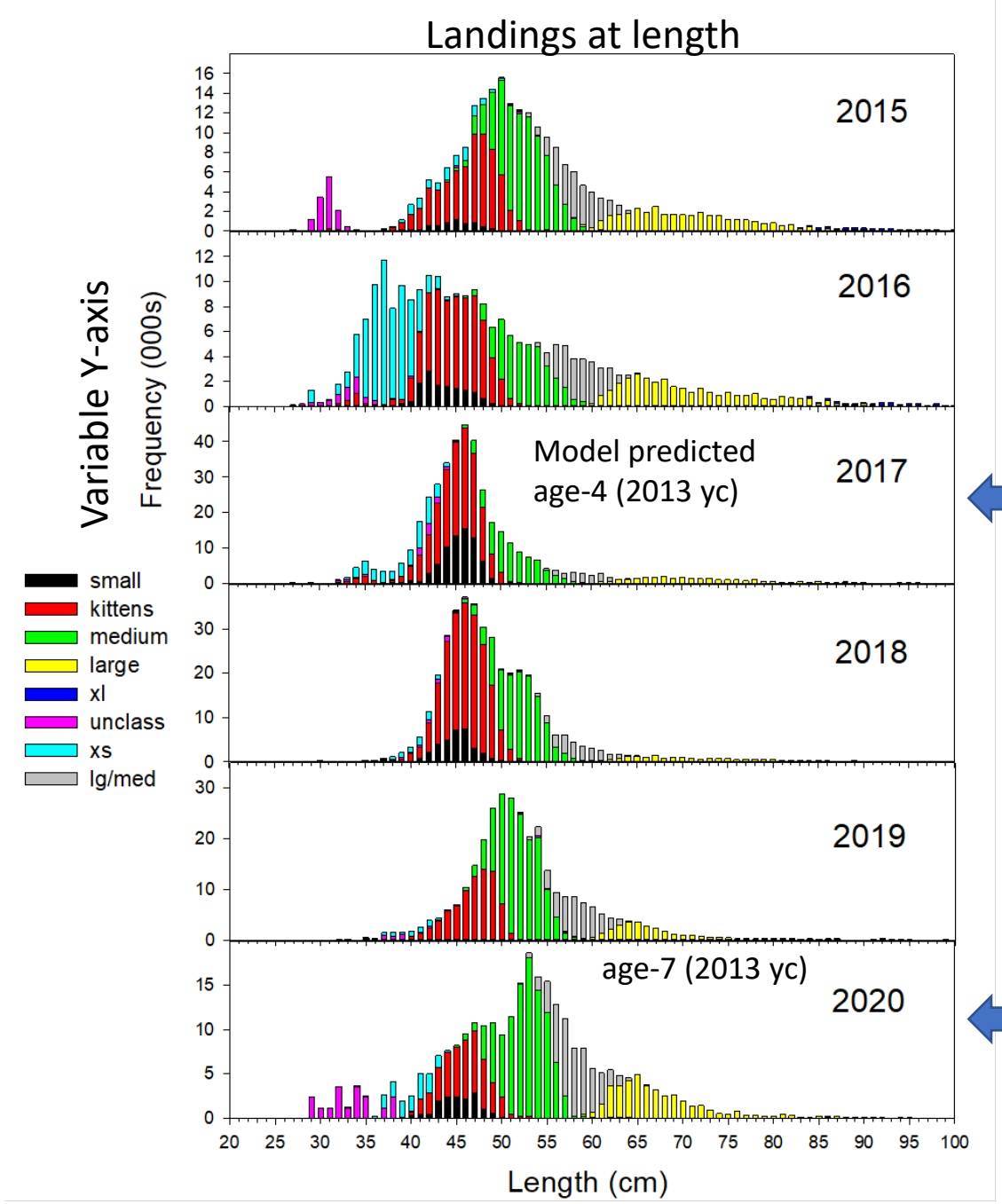


2020 Tilefish Longline Survey

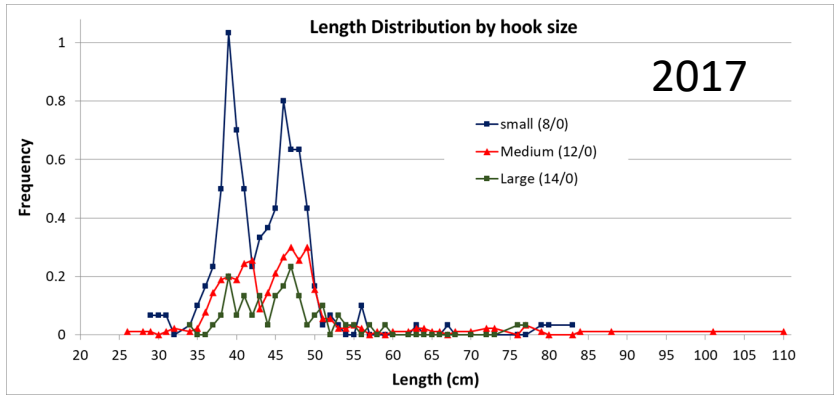
Proportions by hook size

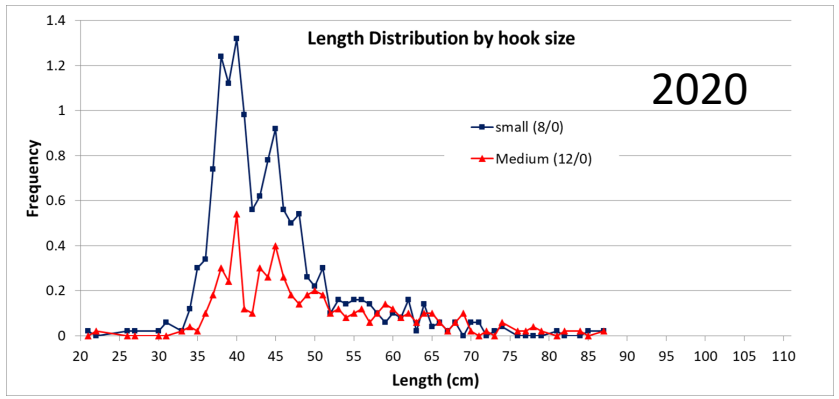


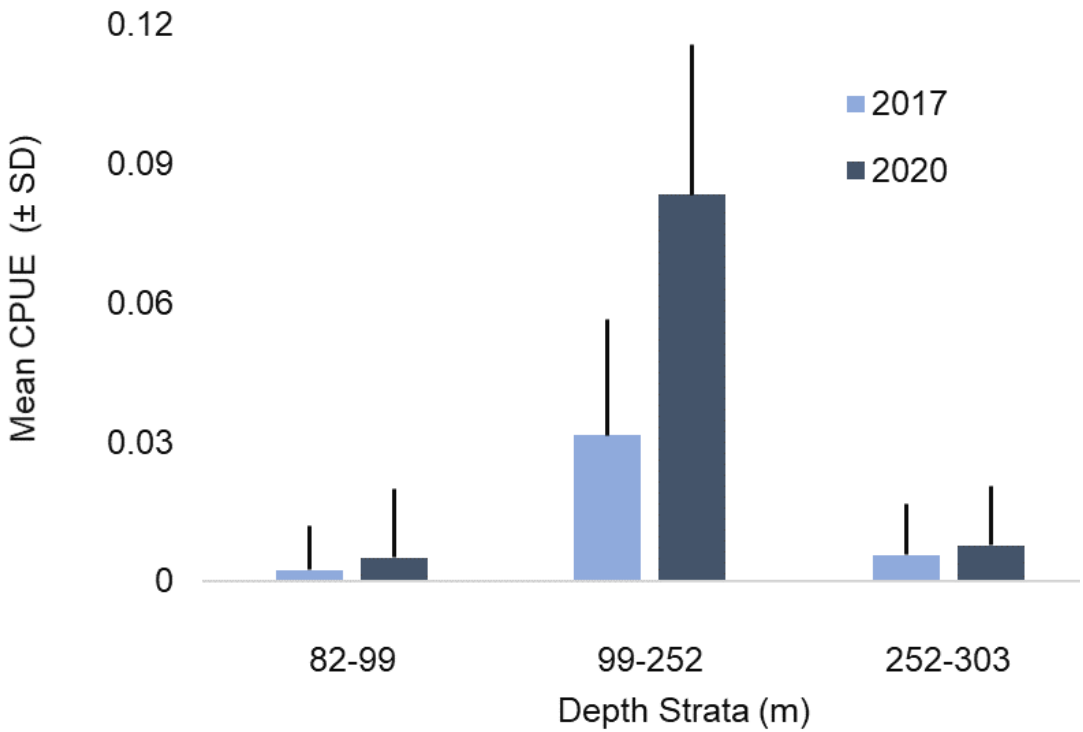
Small shift in the proportion at length but there is a large difference in Q between the hook sizes.

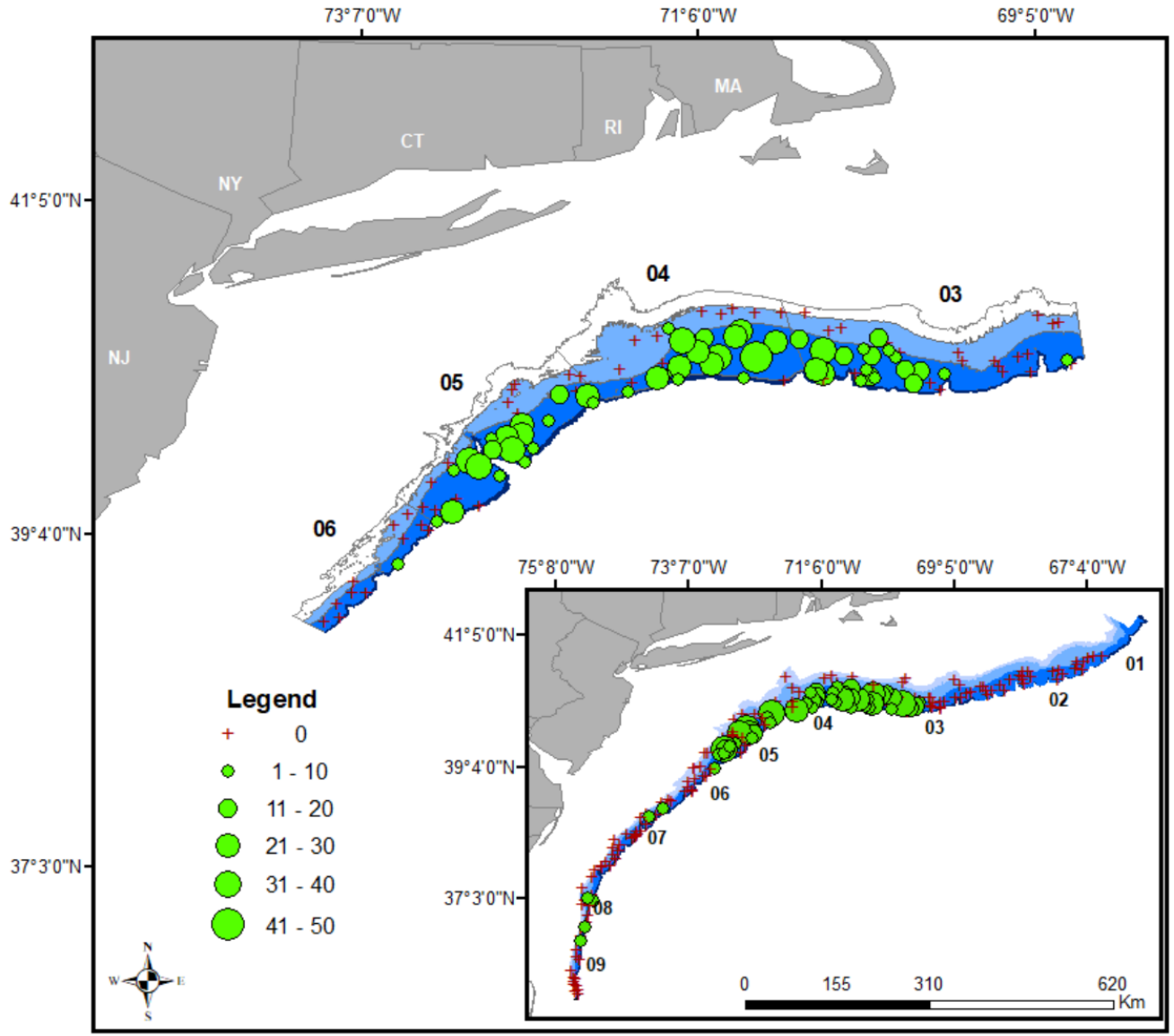


Survey Length Distribution



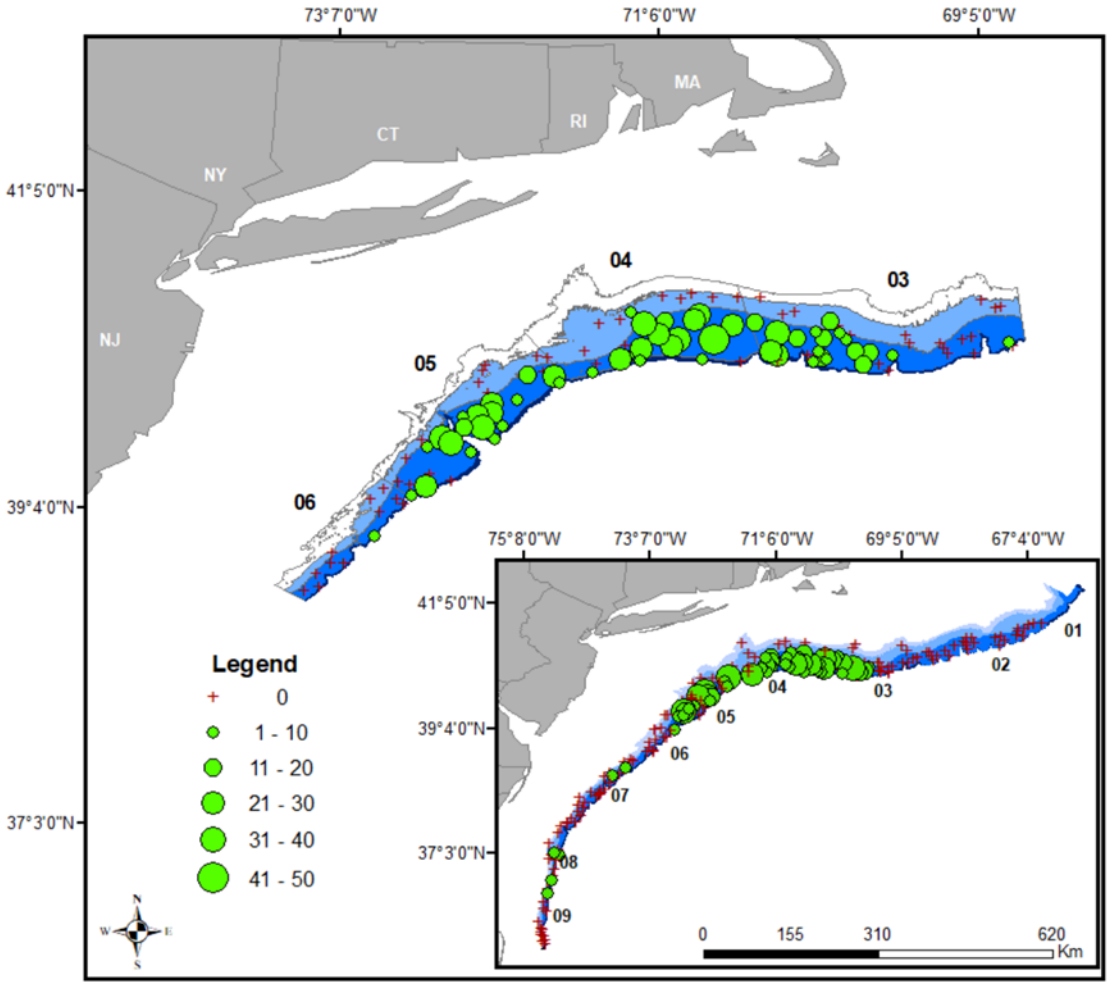



Mean CPUE (± SD)
0.12
0.09
0.06
0.03
0
2017
2020
82-99
99-252
252-303
Depth Strata (m)


73°7'0"W
71°6'0"W
69°5'0"W
41°5'0"N
39°4'0"N
37°3'0"N
NY
CT
RI
MA
NJ
01
02
03
04
05
06
07
08
09
Legend
0
1 - 10
11 - 20
21 - 30
31 - 40
41 - 50
75°8'0"W
73°7'0"W
71°6'0"W
69°5'0"W
67°4'0"W
0
155
310
620
Km

2017 Pilot survey			
depth strata	2	3	4
Meters	82.3-98.6	98.8-252.2	252.4-303.6
sample size	12	588	17
0-55 cm	100%	95%	59%
56-max cm	0%	5%	41%

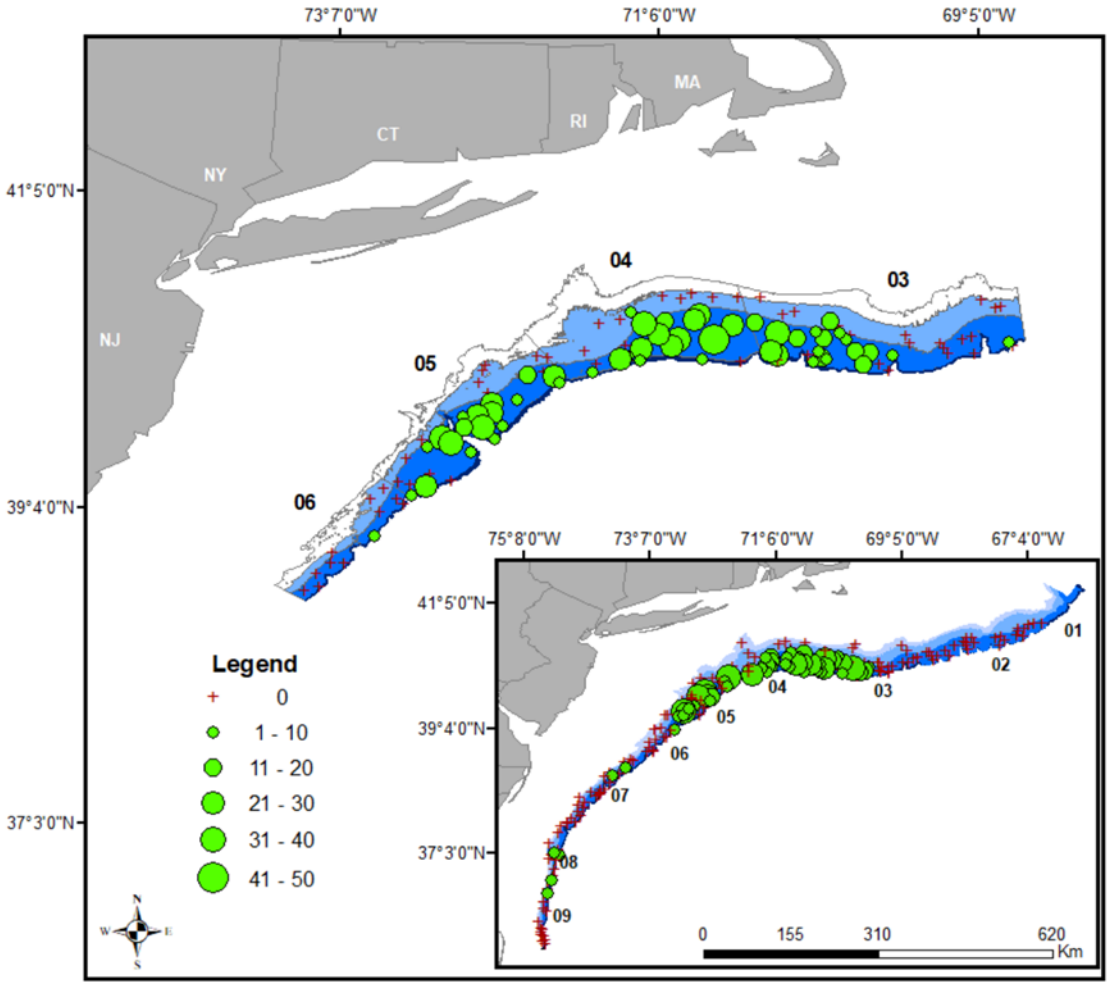
2020 Survey			
depth strata	2	3	4
Meters	82.3-98.6	98.8-252.2	252.4-303.6
sample size	2	937	22
0-55 cm	100%	86%	55%
56-max cm	0%	14%	45%



2017 Pilot survey (limited to depth strata 3-5)		
core strata (3-5)	Inside	outside
sample size	587	18
0-55 cm	95%	56%
56-max cm	5%	44%

Catch rates and sample size are much lower outside of the main 3 tilefish fishing ground strata (3-3, 4-3, 5-3).

Size distribution suggests a slight shift to larger fish with greater depth and outside of the core fishing grounds.



Conclusions

- Results of the hook size selectivity comparison and to a lesser extent the spatial & depth refuge effects are consistent with a dome shaped selectivity pattern.
- The degree of doming (descending right side) remains more elusive since a flat topped selectivity assumption may not be justified in the survey.

Survey Design Question

Longer-term, perhaps a survey designed with 2 hook sizes (smalls and mediums) could inform fishery selectivity through the modeling of the survey with separate estimates of Q and dome shaped selectivity for each hook size? Cost-benefit trade-off?

What is the optimal fishery independent tilefish longline survey for the Buck?
What are the trade-offs?
If we assume 300k is available for a survey in a two year period.
Example: 150k annual survey or 300k every two years or 600k every 6 years.

- Pre-recruit index annually (limited spatial extent core, only small hooks to increase Q with less stations, better information on age 3 and 4 relative to commercial fishery, frequent assessments).
- Every two years (limited spatial extent core, two hook sizes, less useful as a pre-recruit index, perhaps better information to inform selectivity in the assessment, estimate Q and selectivity by hook size, less frequent assessment-about 3 years).
- Every 6 years (spatially extent outside of core, two hook sizes, not useful as a pre-recruit index, could perhaps inform selectivity, could inform general longer-term stock range expansion and contraction, could provide better information on blueline, could help support a longer term constant ABC decision).

Questions