

2021 Scallop Survey Short Report

Prepared by:

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1.0 2021 SURVEY BIOMASS ESTIMATES

CFF HabCam Total Biomass							
<u>Note: NLS-South = NLS-South-Deep (same area)</u>							
GB	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density	# Tows/Drops, HabCam images annotated
CL2-Southeast	321.6	5192.6	1661.3	14.2	82.0	0.208129	1624
CL2-Southwest	526.6	15313.9	4830.1	28.8	105.5	0.651751	770
CL2-Ext	1069.1	19945.0	5514.2	18.8	91.0	0.87776	939
SF	703.5	12084.0	3631.7	16.7	91.2	0.203163	1940
NLS-South	1595.9	20347.2	7053.3	13.0	93.0	2.690486	844
MidAtlantic							
Block Island	32.9	813.6	486.4	25.1	103.8	0.036183	368
Long Island	632.9	14100.0	4197.2	21.8	99.5	0.049259	4115
NYB	411.6	6123.8	2231.7	15.7	88.3	0.082291	2047
MAB-Nearshore	31.3	919.1	533.2	31.0	116.1	0.009321	1171
HCS	176.9	3818.3	1122.6	21.8	106.6	0.047775	1796
ET Open	69.1	1243.4	515.0	16.8	92.4	0.035427	1530
ET Flex	30.1	632.7	265.1	21.4	103.3	0.019311	862
DMV	17.5	211.8	185.9	12.3	83.6	0.003638	1510

2.0 FIGURES OF SURVEY COVERAGE

Georges Bank

Coonamessett Farm Foundation (CFF), in collaboration with Arnie's Fisheries, completed three RSA-funded HabCam survey trips during the 2021 annual sea scallop assessment survey season. These trips utilized a systematic zig-zag track and covered areas within:

- **Leg 1:** Closed Area 2 (CA2) Southeast (SE), CA2-Southwest (SW), CA2-Extension (Ext), Southern Flank (SF), and Nantucket Lightship South (NLS-S or NLS-S-D) scallop management areas.
- **Leg 2:** Delmarva (DMV), Elephant Trunk Open (ET-Open) and Flex (ET-Flex), Mid-Atlantic Bight Nearshore (MAB-Nearshore), and the southern portion of the New York Bight (NYB) scallop management areas.
- **Leg 3:** The Mid-Atlantic open areas north of the Hudson Canyon Access Area (HCS), including NYB, Long Island (LI), and Block Island (BI) scallop management areas.

Leg 1 took place from June 17th-25th, 2021 and covered approximately 522 nm of track in CA2-SW, CA2-SE, CA2-Ext, and the SF, and nearly 100 nm in the NLS-S (**Figure 1**). During this track, we collected roughly 4.8 million stereo image pairs, of which 6,117 were annotated, yielding an annotation rate of approximately 1:400 images. Quality control was performed on a minimum of 50% of the annotated images. Small gaps in the track line were most often due to avoidance of obstructions or raising the vehicle for turns.

The track was started at the most northeastern point of CA2-SE. Due to severe weather, operations halted in the SF and the vessel headed towards Nantucket for safety. The HabCam v3 was redeployed 24 hours later in the western portion of the NLS-S track. After completing the nearly 100 nm of track in the NLS-S, the vessel steamed to the western portion of the SF. The HabCam v3 was redeployed in the SF to complete the rest of the track.

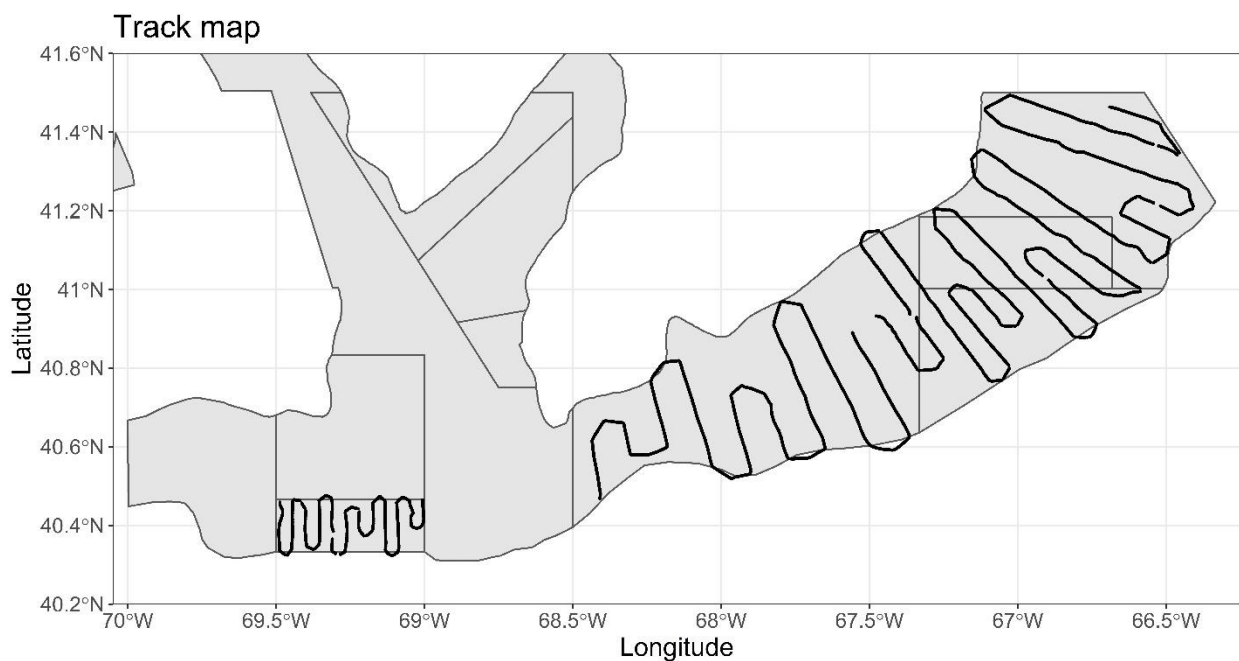


Figure 1: Map of the 2021 CFF HabCam Survey in Georges Bank and NLS-S.

A small quantity of pre-recruit (< 35 mm) scallops was seen in the most northern portion of the CA2 (**Figure 2A**). The sediment in this area was characterized mainly by patches of thick bryozoans and sand. A larger quantity of pre-recruits was noted in the most northeastern portion of the NLS-S track. This was by far the greatest quantity and density observed during the CFF survey, although smaller quantities were observed in small, patchy distributions throughout some of the southern track lines of NLS-S. More information is available in Section 5.0 “Special Comments”.

A strong number of recruit (35 mm – 75 mm) scallops were observed throughout Leg 1, but with patchy distribution in some areas (**Figure 2B**). Within the surveyed areas of Leg 1, the greatest density of scallops > 75 mm was observed in the NLS-S (**Figure 2C**), just as in 2019 and 2020. Overall, the greatest numbers of scallops were found in NLS-S, followed closely by CA2-Ext.

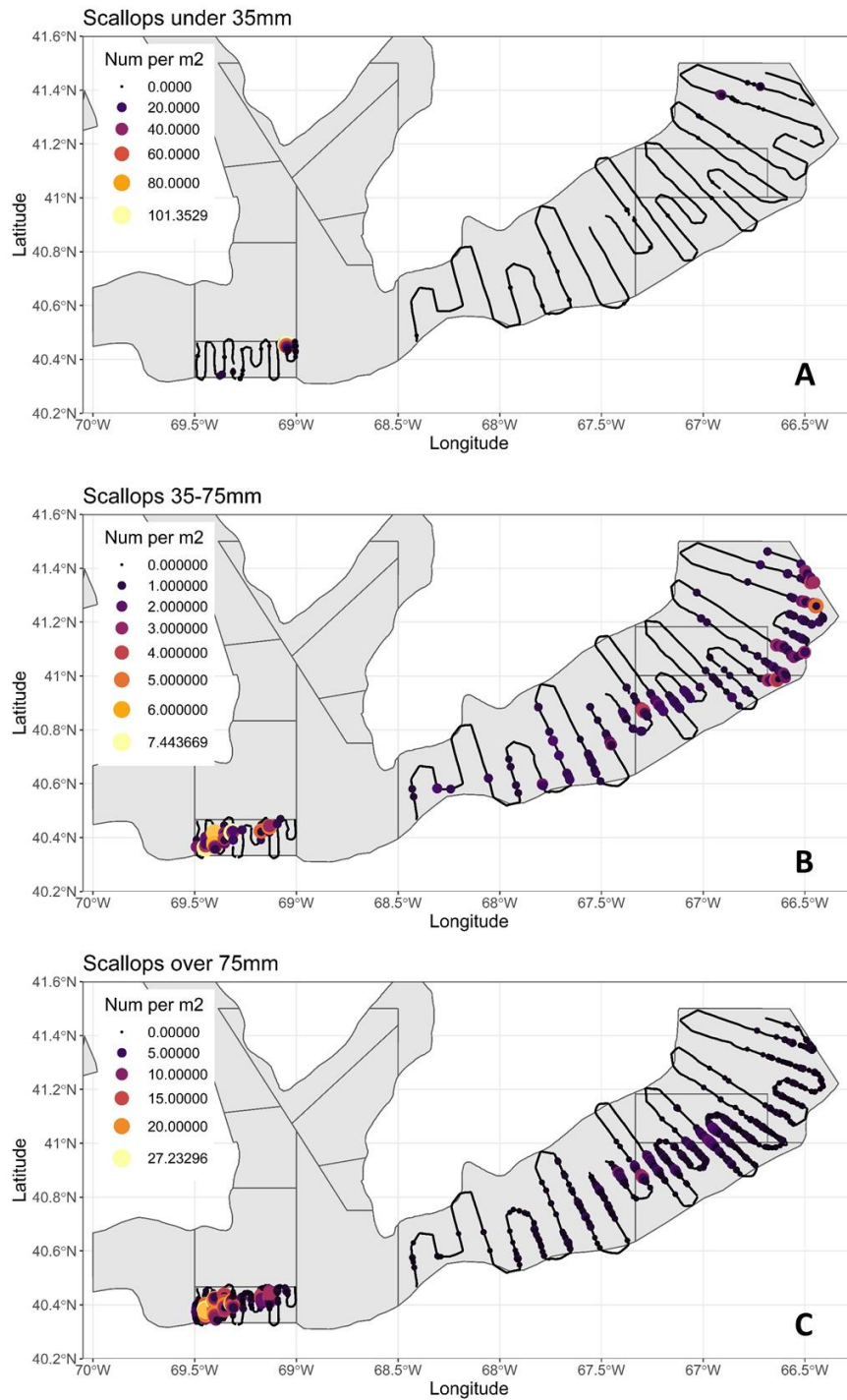


Figure 2: Density and distribution maps for pre-recruit (< 35 mm) (A), recruit (35-75 mm) (B), and large adult (> 75 mm) scallops (C) in Georges Bank and NLS-S.

Mid-Atlantic to Block Island

The second leg of the 2021 survey took place from June 29th – July 8th, 2021 (**Figure 3**, black). This leg covered approximately 807 nm in DMV, ET-Open, ET-Flex, HCS, MAB-Nearshore, and part of NYB. During this leg, CFF collected roughly 6.3 million stereo image pairs, of which 7,892 were annotated, yielding an annotation rate of about ~1:400 images. Quality control was performed on a minimum of 50% of the annotated images.

Leg 3 took place July 13th-19th, 2021 and covered approximately 621 nm in NYB, LI, and BI (**Figure 3**, red). During this survey leg, CFF collected roughly 4.4 million stereo images, of which 5,507 were annotated, yielding a rate of ~1:400. Quality control was performed on a minimum of 50% of the annotated images.

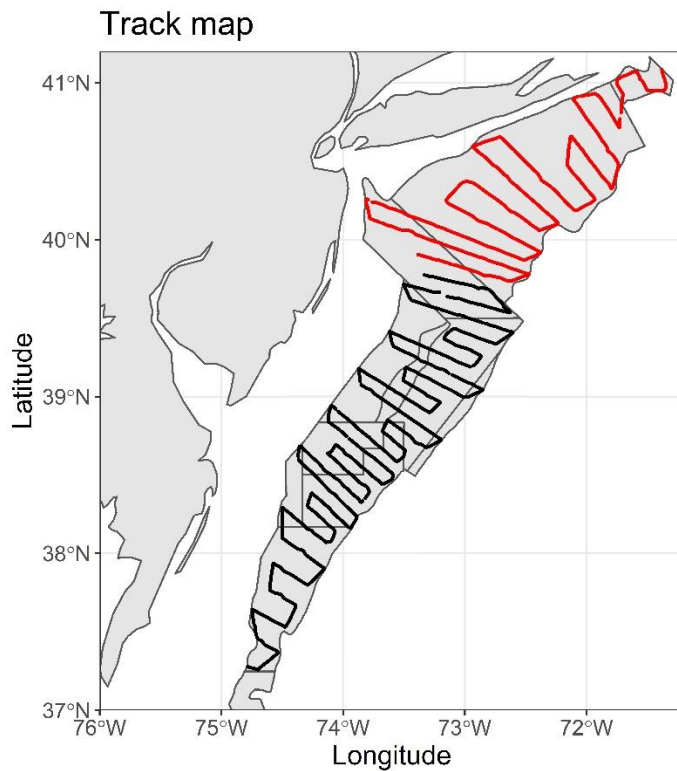


Figure 3: Map of the 2021 CFF HabCam survey in the Mid-Atlantic. Leg 2 tracks are in black and Leg 3 tracks are in red.

Pre-recruit scallops (< 35 mm) were found in patchy distributions throughout Leg 2 and the most southern portion of Leg 3 tracks, the majority of pre-recruit assemblages were observed south of the 40-degree latitude line (**Figure 4A**). Large adult scallops (>75 mm) were found throughout the tracks (**Figure 4C**), with DMV exhibiting the sparsest numbers. Recruit scallops (35-75 mm) were most prevalent in southern LI and NYB (**Figure 4B**), which had notable pre-recruit scallops (< 35 mm) in 2020.

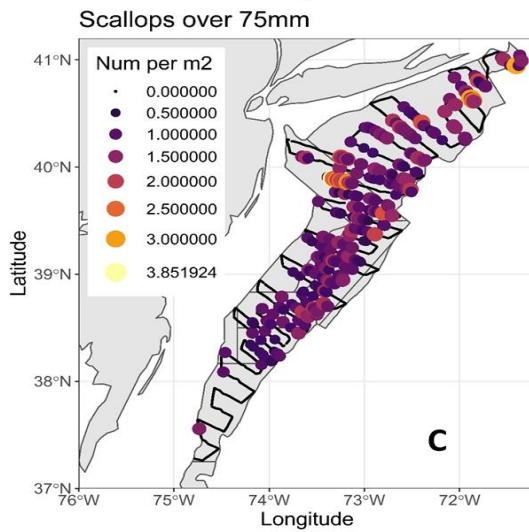
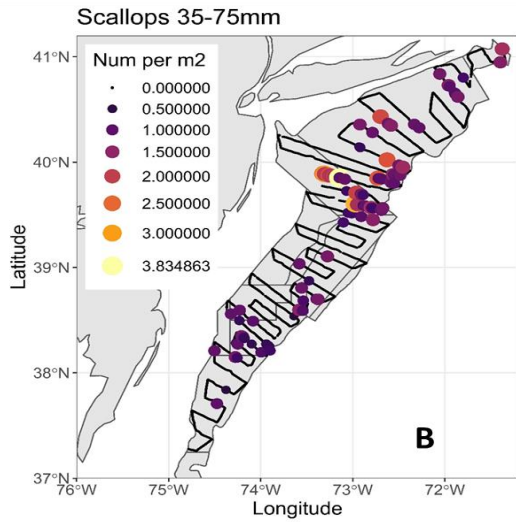
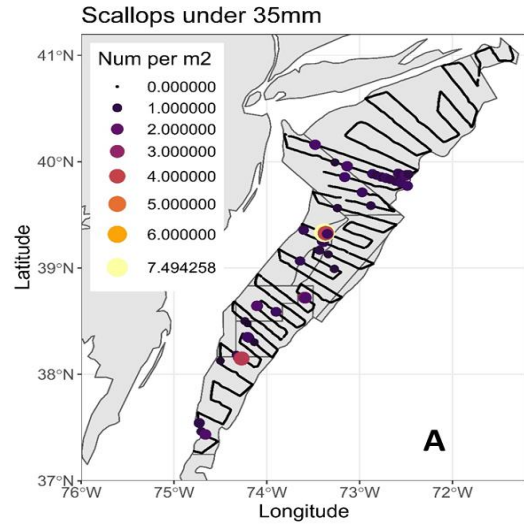


Figure 4: Density and distribution maps for pre-recruit (< 35 mm) (A), recruit (35-75 mm) (B), and large adult (> 75 mm) scallops (C) in the Mid-Atlantic and BI scallop management areas.

3.0 LENGTH FREQUENCY PLOTS BY SAMS AREA

Georges Banks Leg 1

Within Leg 1, all SAMS areas had an average shell height above 75 mm, indicating a notable proportion of large adult scallops. Areas such as CL2-SE (**Figure 5A**), CL2-Ext (**Figure 5C**), NLS-S (**Figure 5D**), and the SF (**Figure 5E**) also exhibited a notable proportion of pre-recruit scallops (35-75 mm).

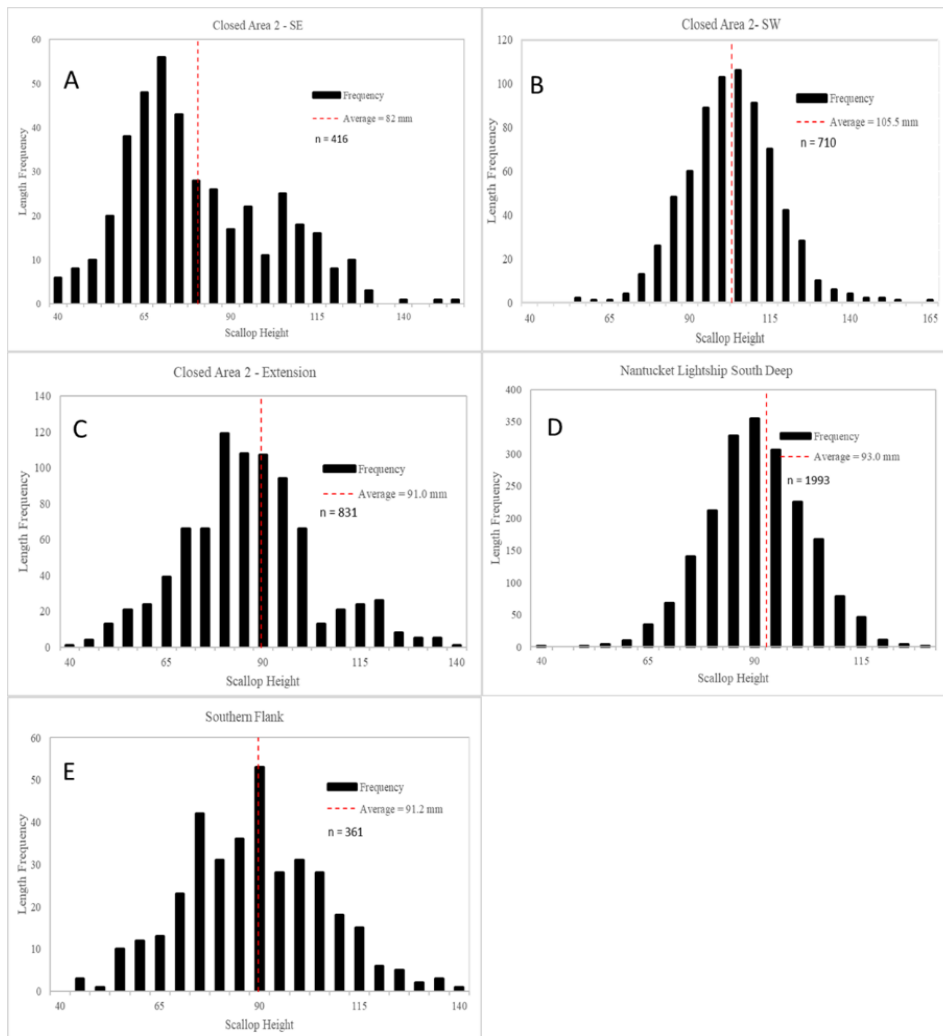


Figure 5: Length frequency plots by SAMS areas in Georges Bank and NLS-S. Only scallops greater than 40 mm height were used in these plots. Average shell heights and numbers of scallops measured are noted.

Mid-Atlantic SAMS Areas

All SAMS areas covered during Legs 2 and 3 in the Mid-Atlantic had a high proportion of large adult scallops with an average shell height above 75 mm. By and large, observed scallop numbers in the Mid-Atlantic were lower than in 2020, and were remarkably low in several SAMS areas, such as BI (**Figure 6A**), DMV (**Figure 6B**), ET-Flex (**Figure 6C**), and MAB-Nearshore (**Figure 6F**), where < 20 scallops (40 mm and greater) were observed and measured. Areas such as the ET-Open (**Figure 6D**), LI (**Figure 6G**), and the NYB (**Figure 6H**) had a strong proportion of recruit (35-75 mm) scallops. This is significant as CFF observed noteworthy numbers of pre-recruit (< 35 mm) scallops in these three areas in 2020.

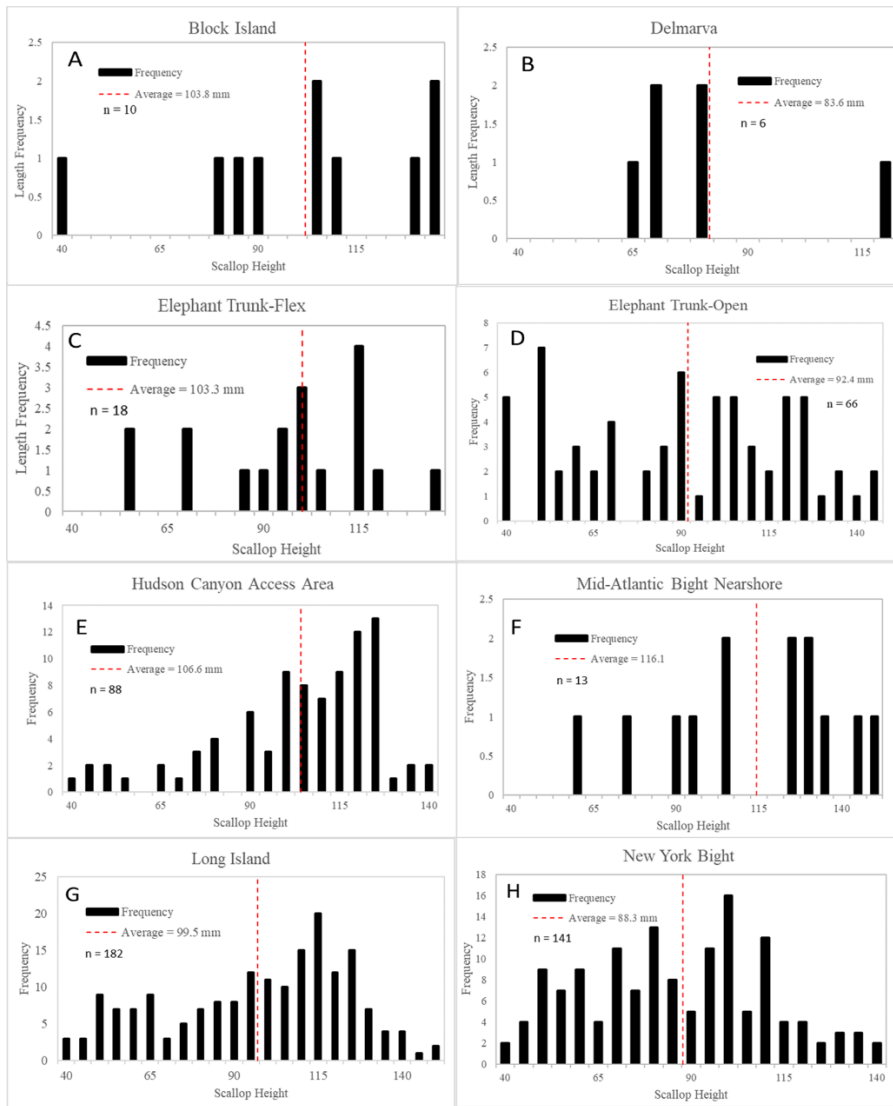


Figure 6: Length frequency plots by SAMS areas in the Mid-Atlantic and BI. Only scallops greater than 40 mm height were used in these plots. Average shell heights and number of scallops measured are noted.

4.0 ADDITIONAL ANALYSES

The NLS-S was the only SAMS area in the NLS surveyed by CFF in 2021.

SAMS AREA	SARC 65 SH/MW (MT)	VIMS SH/MW 2016-2021 (MT)
NLS-South	20,347.2	18,848.8

5.0 SPECIAL COMMENTS

Notable congregations of seed/pre-recruit (< 35 mm) scallops were found in the northern portions of CA2-SE and NLS-S. Substrate in both areas was characterized by dense bryozoan mats and sand. The largest seed congregation was in the NLS-S, which can be seen in the map below (**Figure 7**) The high-density track line on the left in the insert has an average density of ~15/m², which is the highest observed in this area (individual image densities seen in legend).

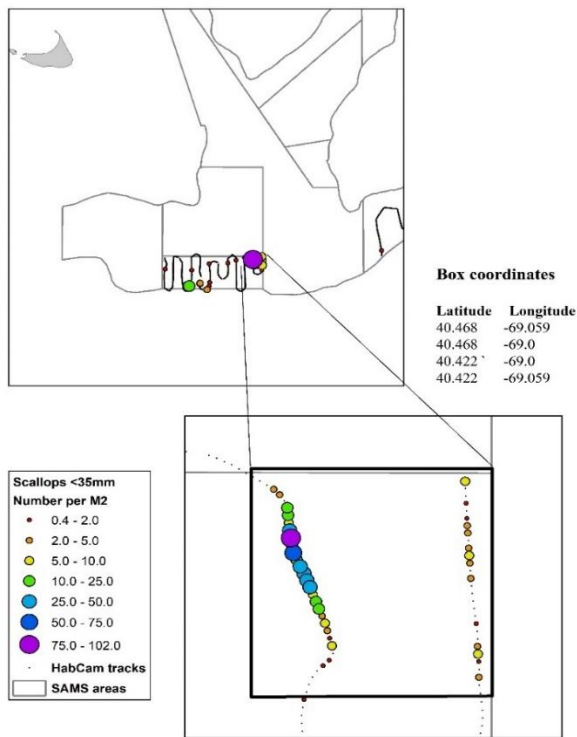


Figure 7: Density and Distribution map of NLS-S with insert of high-density seed area in northeast corner of track.

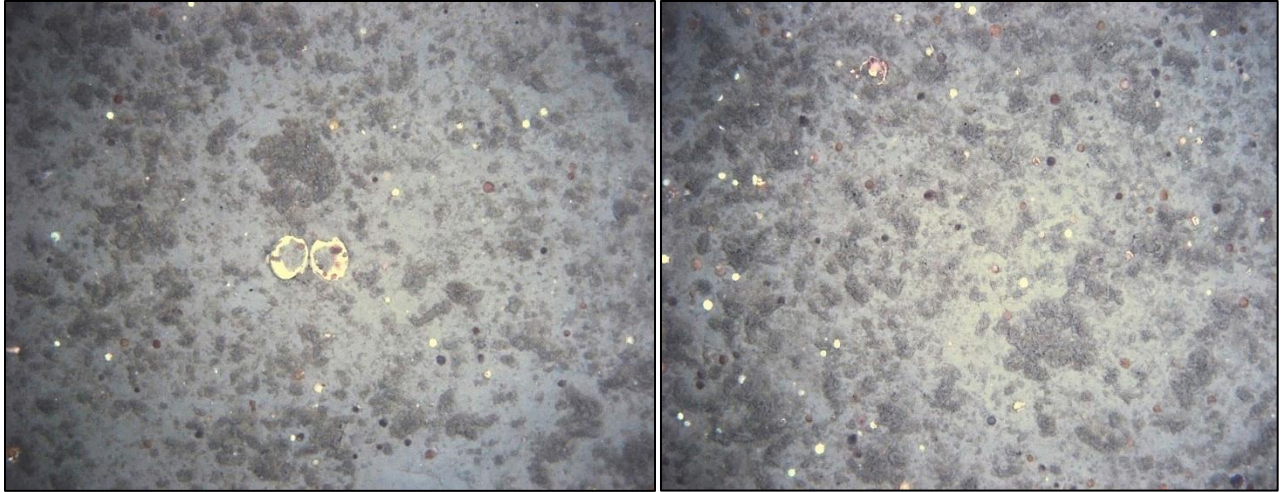


Figure 8: Images of high-density scallop seed within the northeastern portion of NLS-S track.

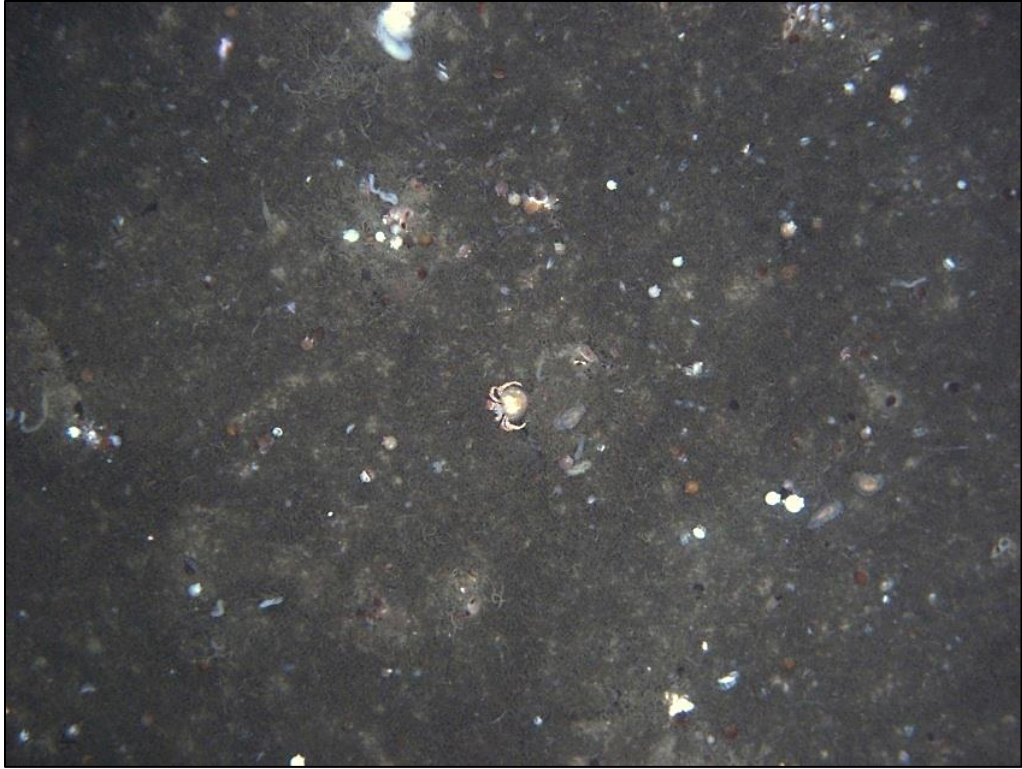


Figure 9: Image of high-density scallop seed within the northern portion of the CA2-SE track.

6.0 EXPLOITABLE BIOMASS ESTIMATES FOR 2021 (CURRENT FY)

CFF HabCam Exploitable Biomass				
Georges Bank	NumMill	Exploitable BmsMT	SE	MeanWt
CL2-Southeast	123.2	3407.0	1094.4	24.7
CL2-Southwest	360.9	11547.5	3642.5	31.8
CL2-Ext	448.1	11085.8	3165.7	25.0
SF	306.2	7266.3	2519.4	22.9
NLS-South	702.2	10709.3	3640.7	15.5
MidAtlantic				
Block Island	20.4	664.5	435.8	32.7
Long Island	373.8	11190.3	3482.9	29.7
NYB	157.6	3666.2	1495.2	24.1
MAB-Nearshore	22.0	804.2	491.7	37.2
HCS	120.8	3115.8	1004.7	26.1
ET Open	36.1	968.2	435.2	26.3
ET Flex	18.8	498.4	234.2	26.5
DMV	4.5	91.0	88.8	21.5

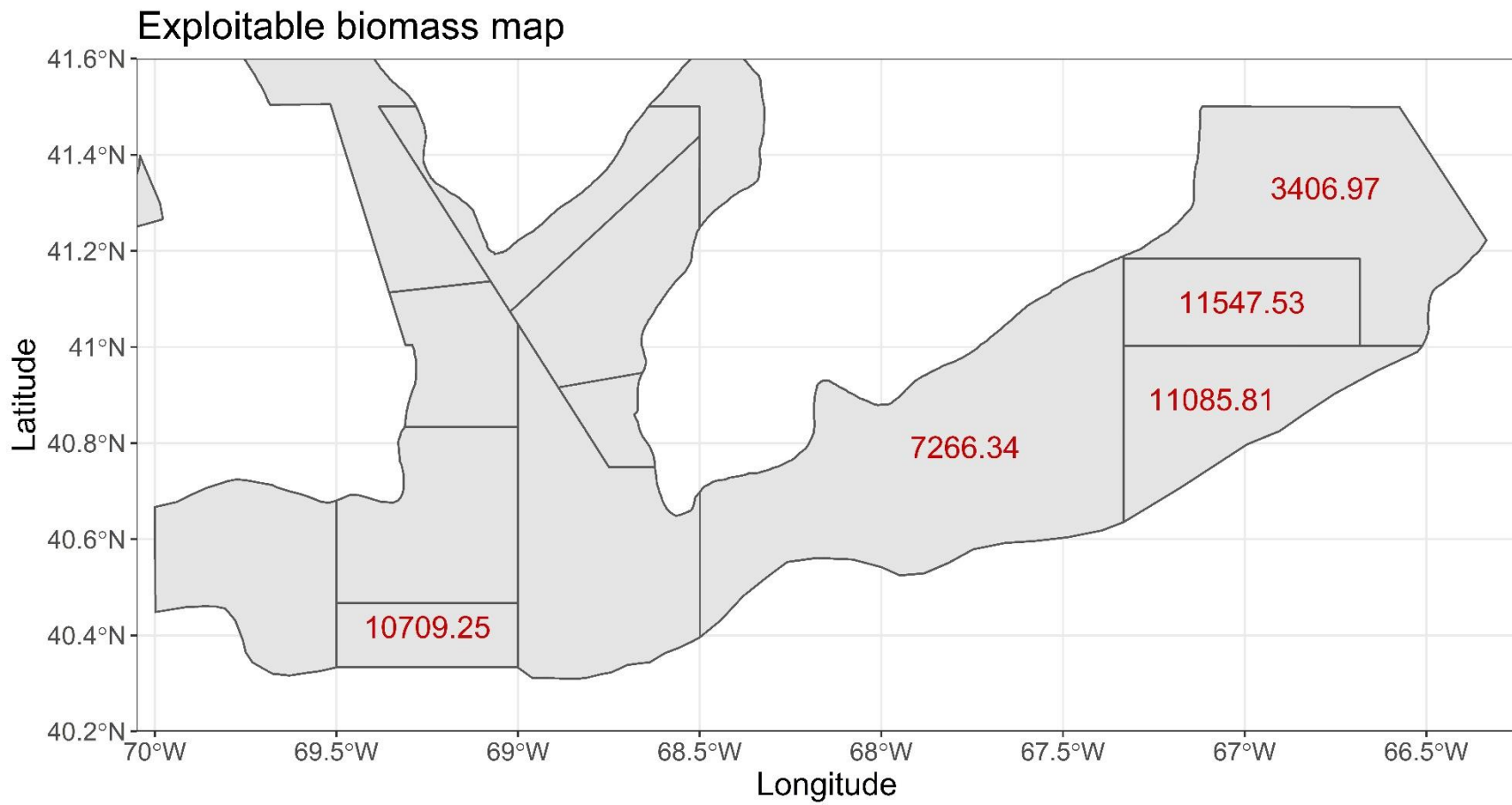


Figure 10: Estimated exploitable biomass map for Georges Bank and NLS-S SAMS areas. Numbers are expressed in MT.

Exploitable biomass map

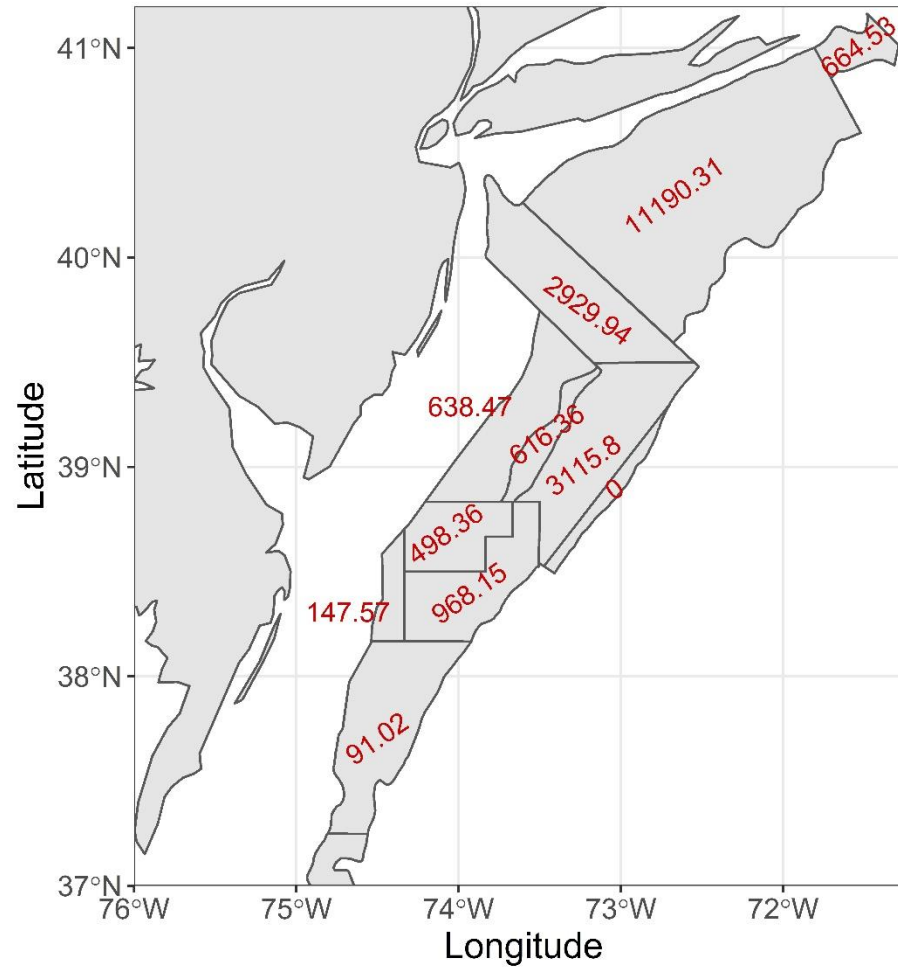


Figure 11: Estimated exploitable biomass numbers for the Mid-Atlantic and BI SAMS areas. Numbers are expressed in MT.