

# 2020 Scallop Survey Short Report for *NA20NMF4540030*

Prepared by:

**Coonamessett Farm Foundation**

Tasha O'Hara; Liese Siemann, PhD; Stephen Davies



**277 Hatchville Road**  
**East Falmouth, Massachusetts, USA 02536**  
**508-356-3601 FAX 508-356-3603**  
**contact@cfarm.org**  
[www.coonamessettfarmfoundation.org](http://www.coonamessettfarmfoundation.org)

October 8, 2020

*Intentionally Blank*

## 1.0 2020 SURVEY BIOMASS ESTIMATES

**Table 1:** Total biomass estimates from CFF's 2020 HabCam v3 scallop survey. A 40 mm cutoff size is used to calculate total biomass.

CFF HabCam v3							
GB	NumMil	BmsMT	SE	MeanWt	Avg. Size mm	Scallop density	HC images annotated
CL2-Southeast	731.69	12607.00	3951.40	16.13	78.54	0.38	1134
CL2-Southwest	1028.23	21861.82	6687.15	21.17	93.49	0.88	723
CL2-Ext	876.91	11033.66	2271.93	12.73	74.19	0.7	1077
NLS-South-Deep	3054.63	41971.40	10693.01	14.11	95.31	5.35	858
SF	1063.00	14815.33	4031.50	13.56	79.98	0.29	2457
MidAtlantic							
LI	493.35	11469.75	6016.32	22.95	101.23	0.04	3834
NYB	474.54	8369.05	4333.63	19.75	95.79	0.1	1916
HCS	259.17	6337.05	2537.46	25.38	114.37	0.07	2007
ET Open	351.66	10031.41	3543.14	28.22	116.66	0.14	1456
ET Flex	240.31	6130.30	2746.84	27.00	113.25	0.13	1086

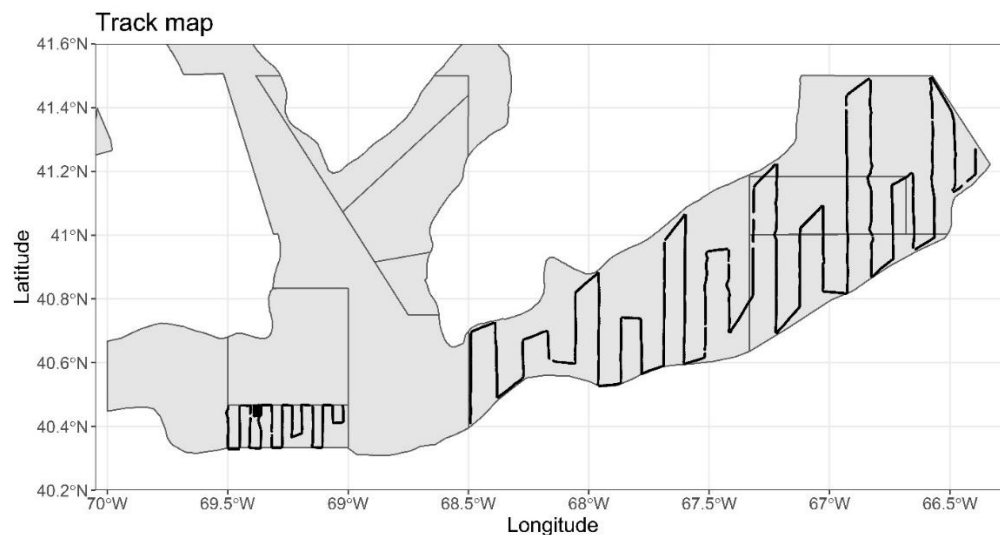
## 2.0 FIGURES OF SURVEY COVERAGE

Coonamessett Farm Foundation, in collaboration with Arnie's Fisheries, Inc. / FV *Kathy Marie* undertook three RSA sea scallop HabCam surveys in 2020 in the following areas:

- **Leg 1:** Closed Area II Access area (CAII-Access) Southeast (SE) and Southwest (SW), CAII Extension (CAII-Ext) and the Southern Flank (SF) scallop management areas. The Nantucket Lightship South Deep (NLS-S-D) scallop management area was also included.
- **Leg 2:** Elephant Trunk Open (ET-Open), Flex (ET-Flex), and Hudson Canyon (HCS) scallop management areas
- **Leg 3:** Mid-Atlantic open areas north of HCS including Block Island (BI), Long Island (LI), and the New York Bight (NYB) scallop management areas.

### Leg 1: Georges Banks including the Nantucket Lightship-South-Deep

Leg 1 took place from July 6<sup>th</sup> – 13<sup>th</sup>, 2020 and covered approximately 546 nm of track in CAII-Access Southwest, CAII-Access Southeast, CAII-Extension, and the Southern Flank, and 117.6 nm in the Nantucket Lightship South (Figure 1). During this track, we collected roughly 5.6 million stereo image pairs, of which about 7,050 were annotated, yielding an annotation rate of ~1:400 images. Quality control was performed on a minimum of 50% of the annotated images (QC rate was increased in areas of high scallop density). Small gaps in the track line were most often due to avoidance of obstructions or raising the vehicle for turns.

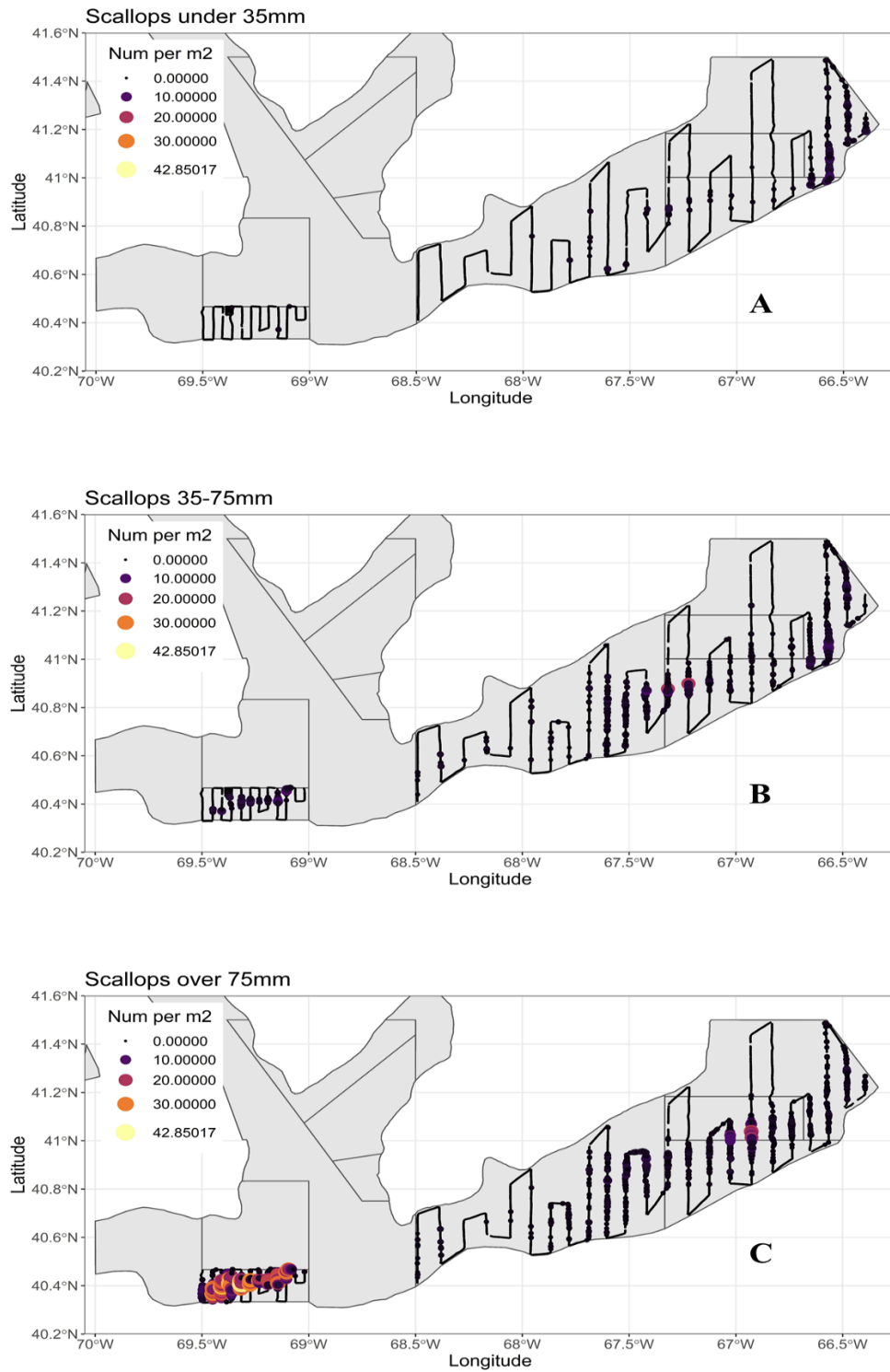


**Figure 1:** Map of Leg 1 on the CFF 2020 HabCam Survey. Following the large track covering CAII-Access SE and SW, -Ext, and SF, the HabCam v3 was brought on board and redeployed at the most Northeastern portion of the NLS track.

The Nantucket Lightship-South-Deep opened to fishing in this past year. We noted signs of fishing pressure, such as increased dead scallop shells. We also experienced small gaps in usable imagery due to higher than normal turbidity from nearby scallop vessel dredging.

A relatively large quantity of pre-recruit ( $< 35$  mm) scallops was seen in the most eastern portion of the Closed Area II, including the CAII-Access Southeast and CAII-Extension (**Figure 2A**). This was by far the greatest quantity observed in Georges Banks on the CFF Survey, although smaller quantities were observed in small, patchy distributions throughout much of the track.

A strong number of recruits (35 mm – 75 mm) scallops were observed throughout Leg 1, but with patchy distribution in some areas (**Figure 2B**). Notably, this included an area in the eastern portion of the SF where pre-recruit scallops were observed in 2019. Within the surveyed areas of Leg 1, the greatest density of scallops  $> 75$  mm was observed in the Nantucket Lightship South (**Figure 2C**), just as in 2019.

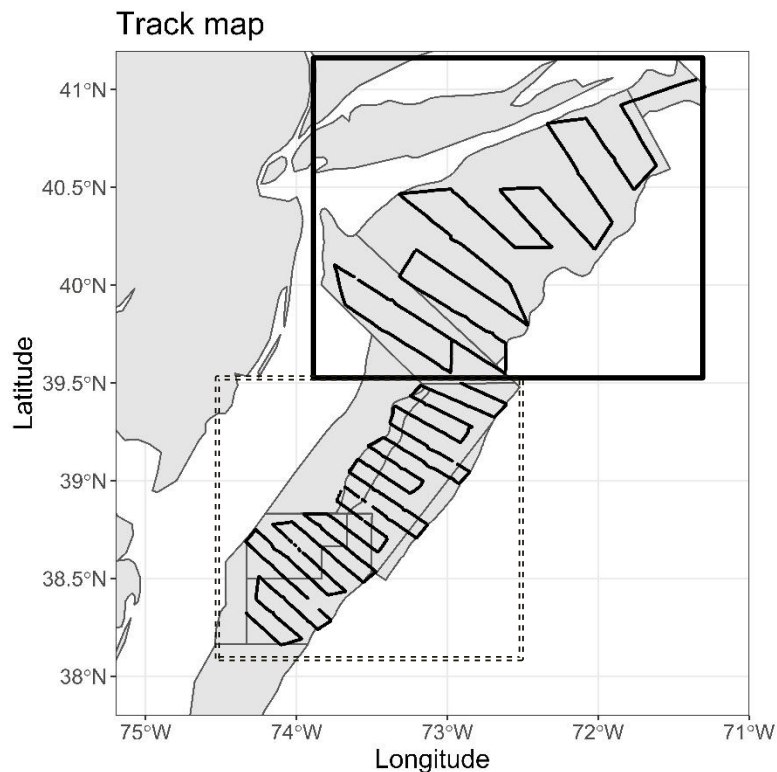


**Figure 2:** Maps A-C show the size distribution of (A) pre-recruit < 35 mm scallops, (B) recruit scallops 35 mm- 75 mm, and (C) exploitable > 75 mm scallops along the CFF 2020 Leg 1 tracks.

### Legs 2 & 3: Mid-Atlantic

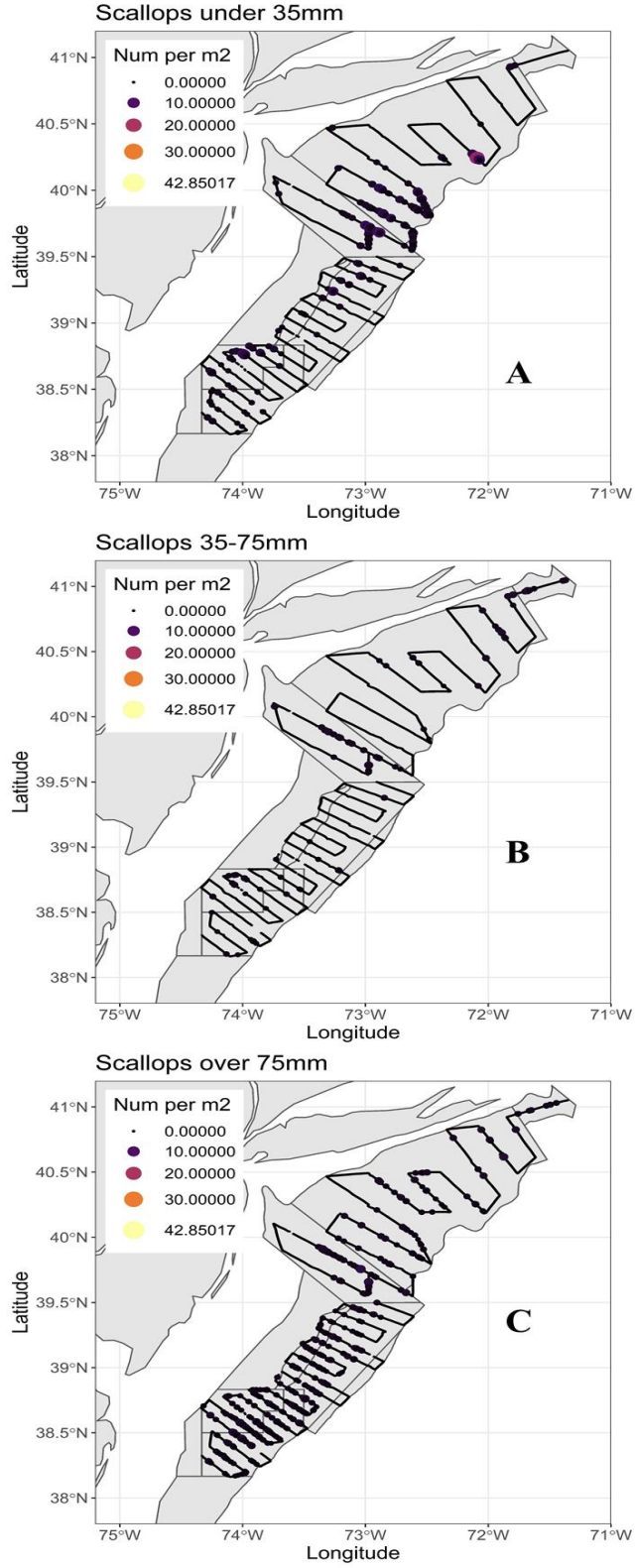
The second leg of the 2020 survey took place from July 17<sup>th</sup> – 24<sup>th</sup>, 2020 (**Figure 3**). This leg covered approximately 598 nm in the ET-Open, ET-Flex, and Hudson Canyon (HCS), during which we collected roughly 5.4 million stereo image pairs, of which 6,793 were annotated, yielding an annotation rate of ~1:400 images. Quality control was performed on a minimum of 50% of the annotated images (QC rate was increased in areas of high scallop density).

A third leg was added in late August of 2020 to cover additional ground in the Mid-Atlantic (**Figure 3**). This survey took place from August 31<sup>st</sup> – September 5<sup>th</sup> and covered approximately 525 nm south of Block Island Sound (BI) and Long Island (LI), and the New York Bight (NYB). During this survey leg, we collected roughly 4.4 million stereo images, of which around 5,463 were annotated, a rate of ~1:400. Quality control was performed on a minimum of 50% of the annotated images (QC rate was increased in areas of high scallop density).



**Figure 3:** Map of Leg 2 and Leg 3 HabCam tracks in the Mid-Atlantic. Leg 2 is enclosed by a dotted line box and Leg 3 is enclosed by the thick, solid line box, for reference.

A relatively large quantity of pre-recruit scallops was observed through the southeastern portion of Long Island and the adjoining eastern portion of NYB (**Figure 4A**). Large adult > 75 mm scallops comprised the vast majority of scallops found throughout all surveyed SAMS areas in the Mid-Atlantic (**Figure 4C**) and recruit scallops (35 mm-75 mm) scallops were sparse throughout SAMS areas surveyed in the Mid-Atlantic (**Figure 4B**).



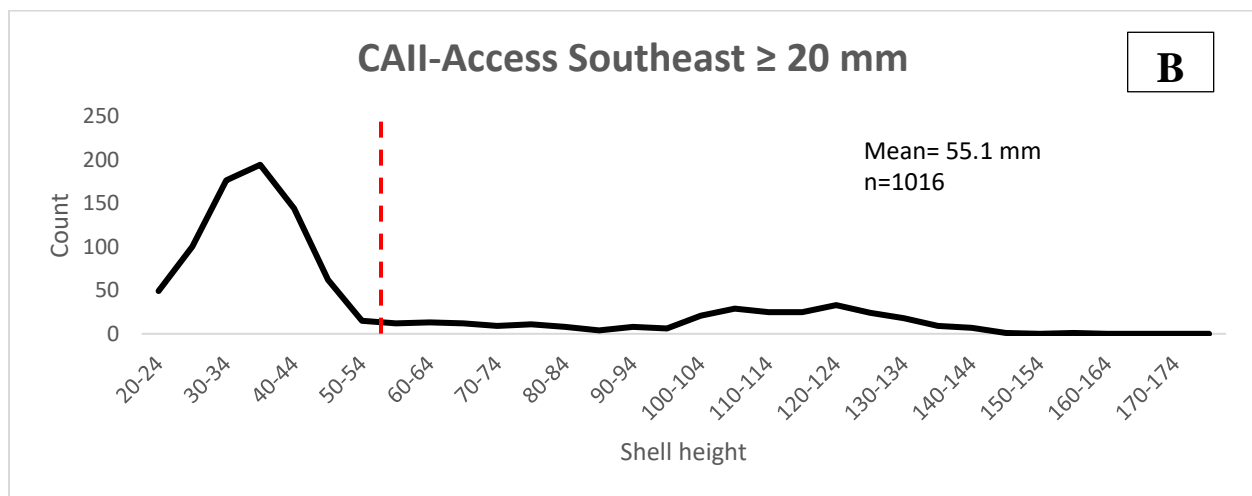
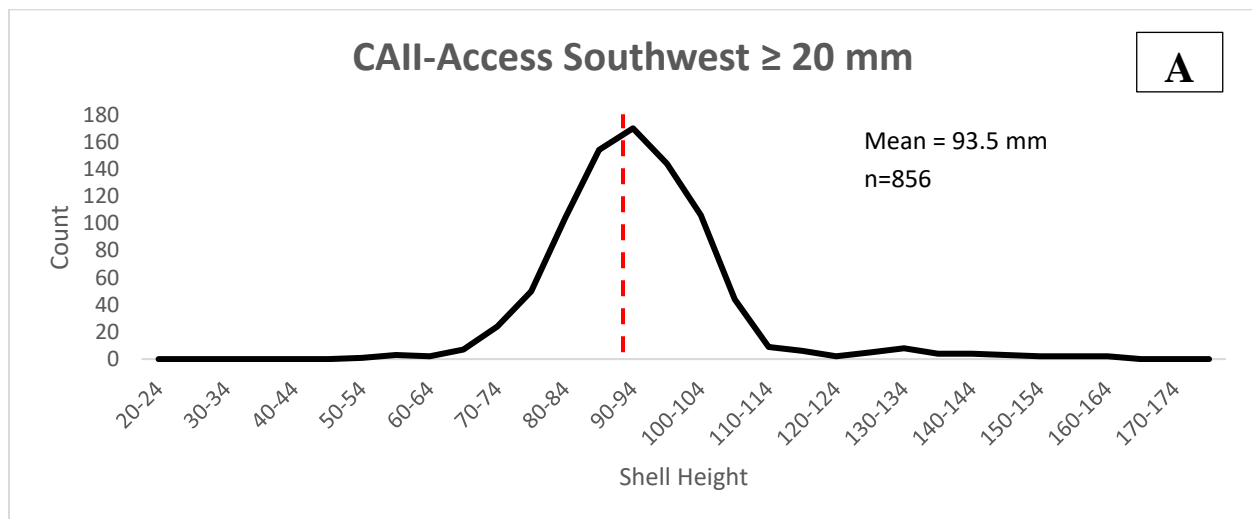
**Figure 4:** Maps A-C show the size distribution of (A) pre-recruit < 35 mm scallops, (B) recruit scallops 35 mm-75 mm, and (C) exploitable > 75 mm scallops along the CFF 2020 tracks for Legs 2 and 3

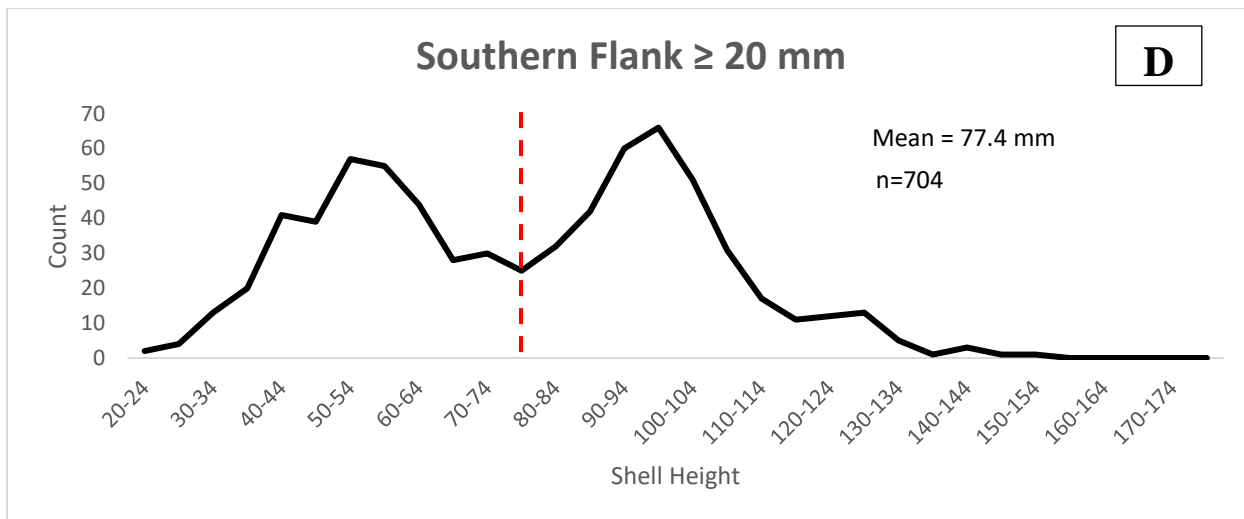
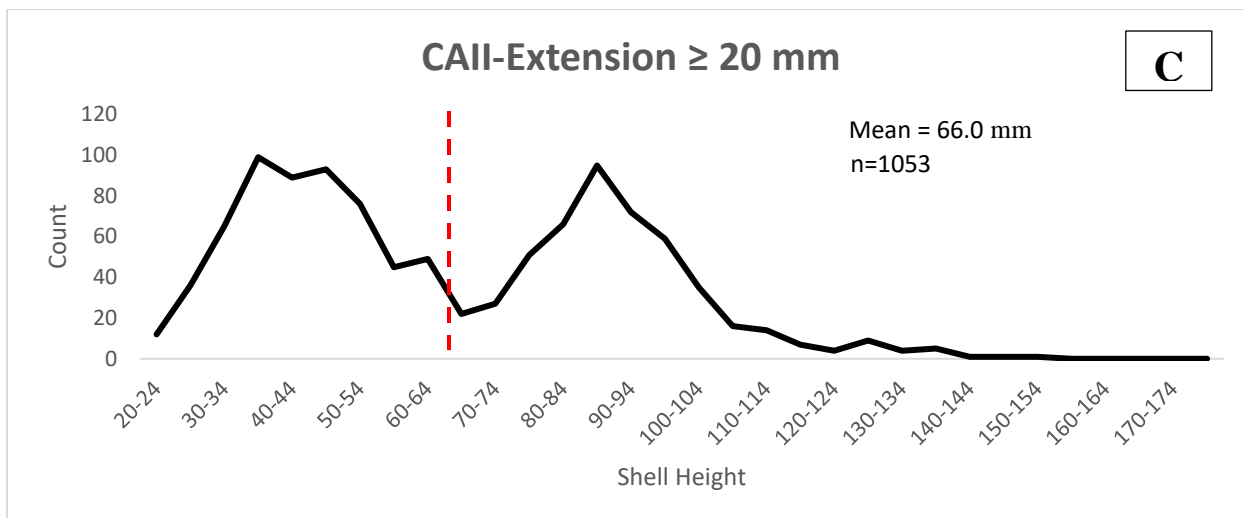
### 3.0 LENGTH FREQUENCY PLOTS BY SAMS AREA

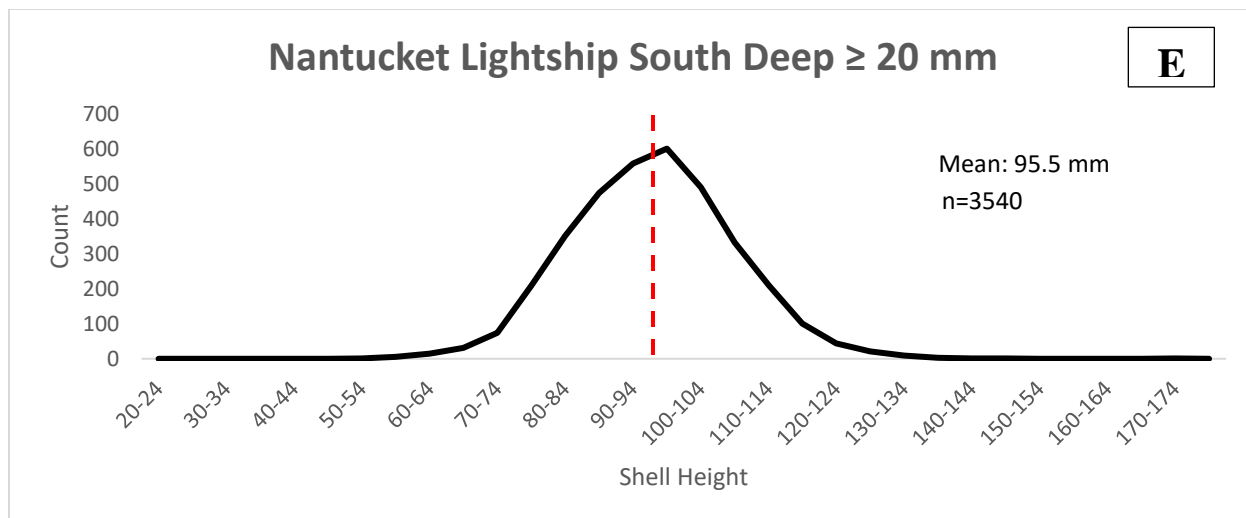
Length-frequency (L-F) plots are presented below. Due to variation in image quality and altitude impacting our ability to accurately quantify scallops < 20 mm, scallops < 20 mm were excluded from L-F plots.

#### Georges Banks Leg 1

The scallop populations observed in CAII-Access SW and NLS-S-D (**Figures 5E & A**) were mainly composed of adult (> 75 mm) scallops, while CAII-Access-SE had the highest proportion of pre-recruit (< 35 mm) scallops (**Figure 5B**) of all the Leg 2 SAMS areas surveyed. Both CAII-Ext and the SF were comprised of relatively high numbers of recruit (35 mm-75 mm) and large adult scallops (> 75 mm) (**Figures 5C & D**); some of these high recruit scallop areas coincided with pre-recruit scallop observations in 2019. CAII-Ext also contained a large number of pre-recruit scallops (**Figure 5C**), spilling over from the CAII-Access-SE.



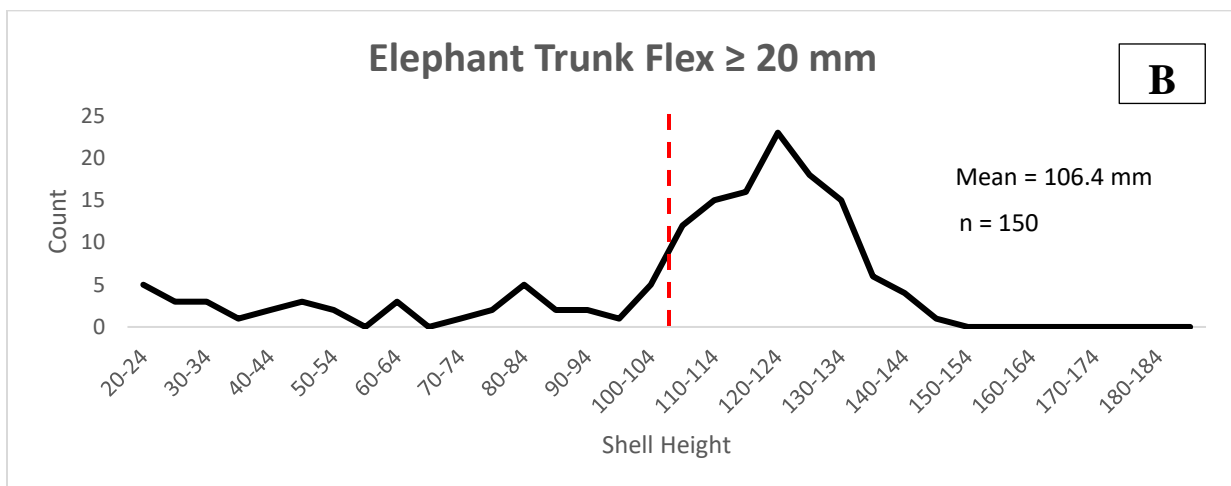
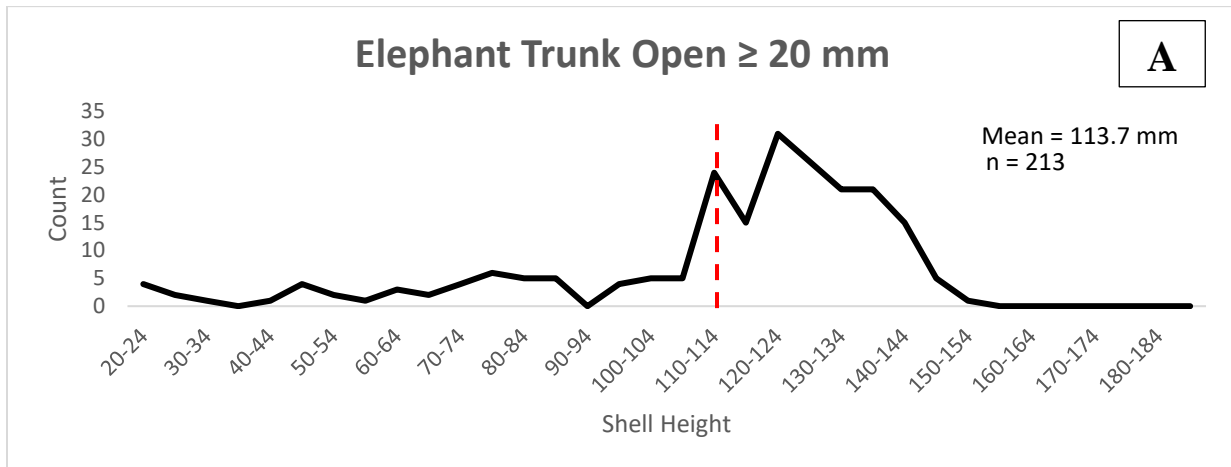


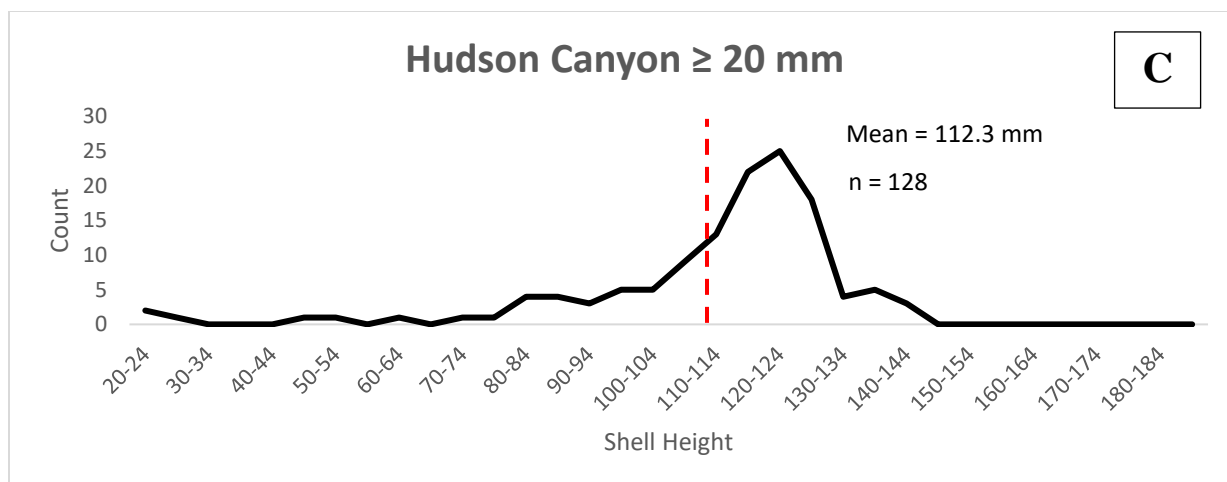


**Figure 5:** Length frequency plots by SAMS areas (A-E) for Leg 1 of the CFF 2020 Scallop Survey. The red dotted line indicates the mean shell height for each SAMS area. All length frequency plots are for scallops 20 mm and greater due to difficulty accurately measuring seed scallops. n= number of scallops counted.

## Mid-Atlantic Leg 2

Scallops observed from Leg 2 in the Mid-Atlantic mainly consisted of adult scallops  $> 75$  mm (**Figures 8A-C**), with the mean shell height of all three SAMS areas  $> 100$  mm, and significantly fewer pre-recruit ( $< 35$  mm) and recruit scallops (35 mm-75 mm).



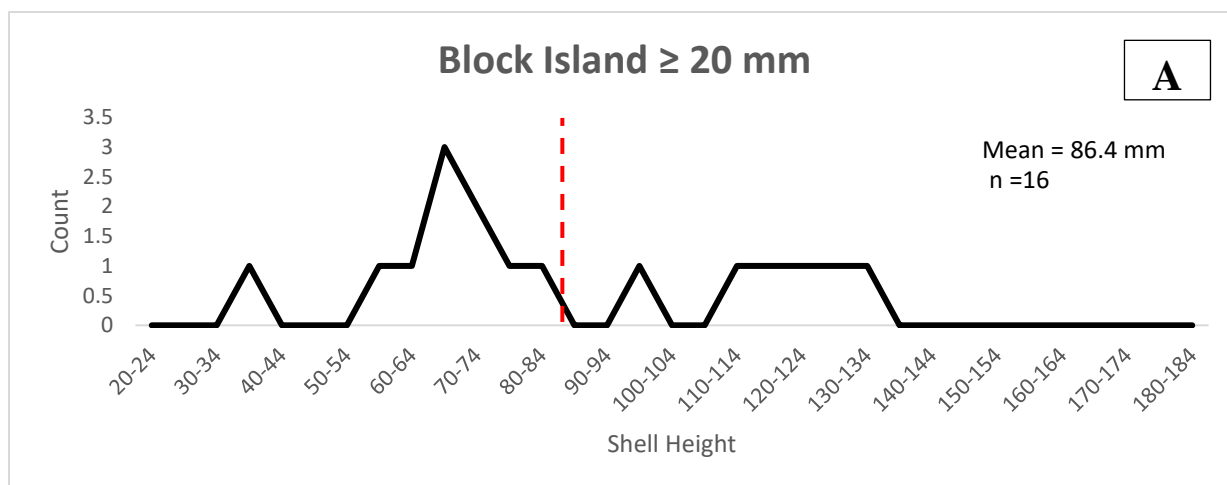


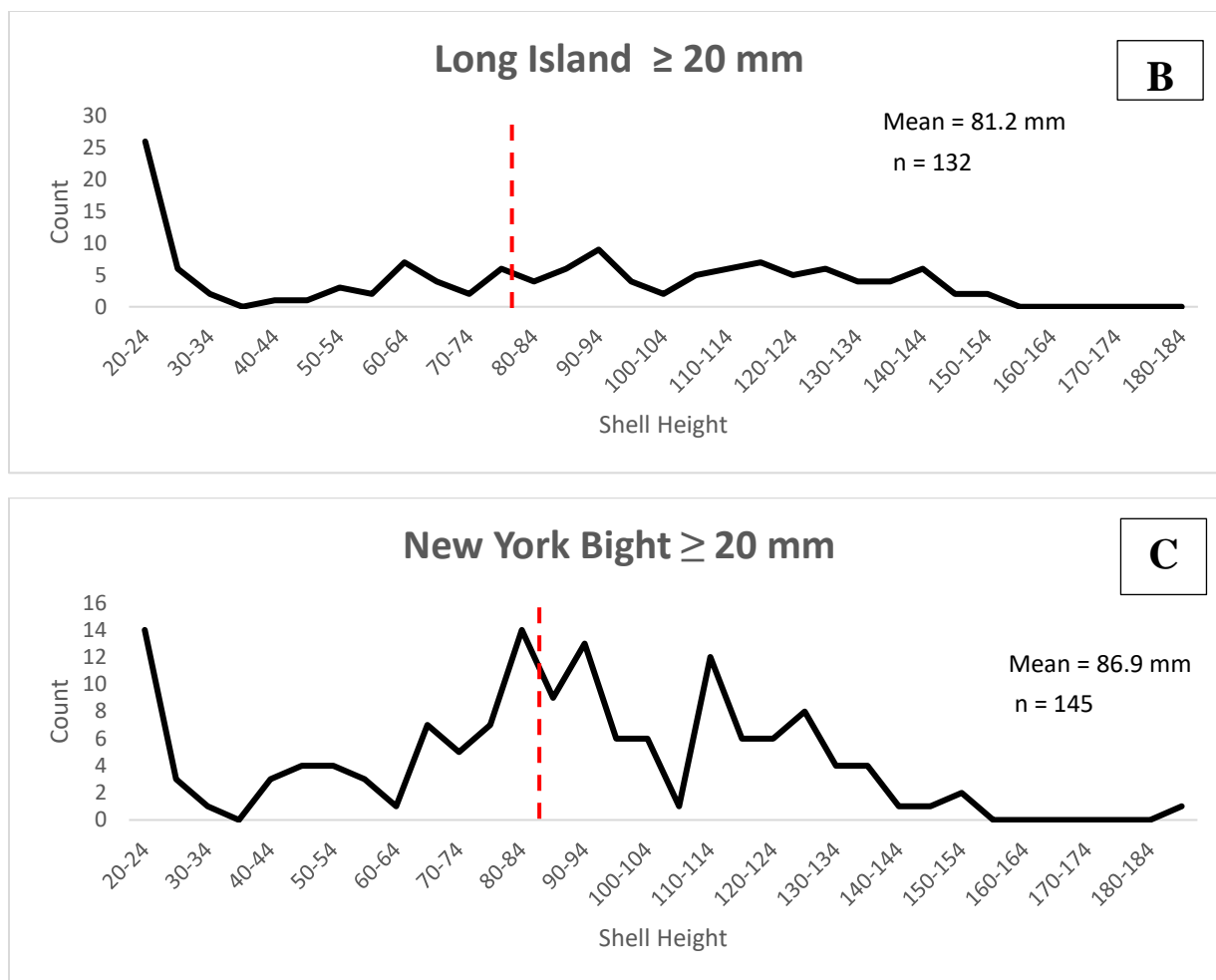
**Figure 6:** Length frequency plots for Leg 2 of CFF's 2020 scallop survey in the Mid-Atlantic (A-C). The red dotted line indicates the mean shell height for all measured scallops 20 mm and greater. All length frequency plots are for scallops 20 mm and greater due to difficulty accurately measuring seed scallops. n= number of scallops counted.

### Mid-Atlantic Leg 3

The Block Island transect was relatively short, and only one transect long. Due to this, biomass was not calculated for this SAMS area due to insufficient data. Only 16 scallops were annotated in the BI SAMS area, and the average shell height was calculated to be 86.4 mm (**Figure 7A**).

Both LI and NYB had high numbers of pre-recruit ( $< 35$  mm) scallops. In the LI, these pre-recruit scallops were far more prevalent than recruit (35 mm-75 mm) or larger adult scallops ( $> 75$  mm) (**Figure 7B**).





**Figure 7:** Length frequency plots for Leg 3 of CFF's 2020 scallop survey in the Mid-Atlantic (A-C). The red dotted line indicates the mean shell height for all measured scallops 20 mm and greater in each SAMS area. All length frequency plots are for scallops 20 mm and greater due to difficulty accurately measuring seed scallops. n= number of scallops counted.

## 4.0 ADDITIONAL SENSITIVITY ANALYSES

**Table 2:** A comparison of estimated total biomass in the NLS-South-Deep using SH-MW equations from SARC 65 and VIMS 2016-2020. The NLS-South-Deep was the only SAMS area in the NLS surveyed by CFF in 2020.

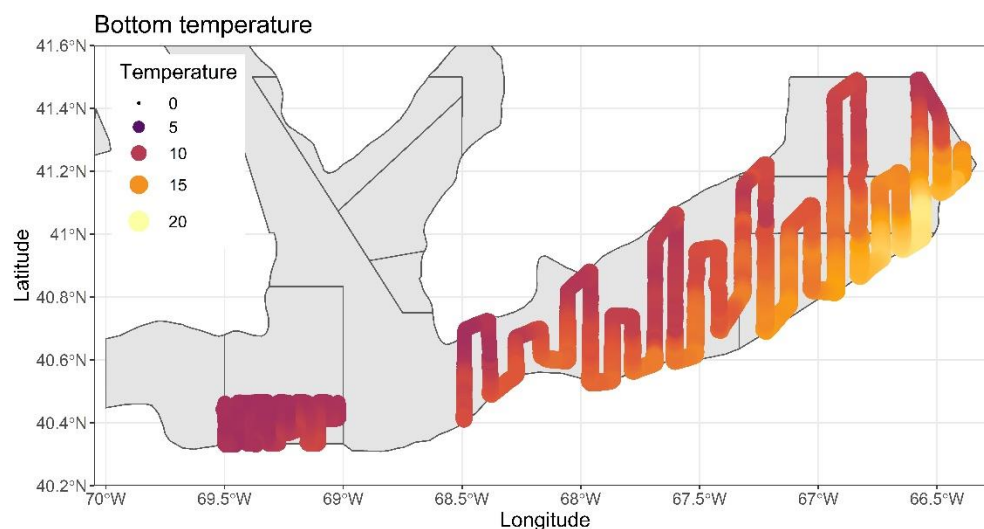
SAMS Area	BIOMASS		
	SARC 65	VIMS 2016-2020	% Difference
NLS-South-Deep	41971.4	43596.8	3.73%

## 5.0 SPECIAL COMMENTS

A notable quantity of seed (< 20 mm) and pre-recruit (< 35 mm) scallops was observed in several areas in 2020. The southeastern portion of Closed Area II Southeast, and the eastern portion of CAII-Ext, showed an abundance of seed and pre-recruit scallops (**Figure 2**).

Additionally, a notable abundance of pre-recruit scallops was observed in the most southern portions of NYB and LI, near Hudson Canyon (**Figure 4**).

Evidence of a warm core ring was noticed in the most southeast portions CAII-Access-SE and CAII-Ext (**Figure 8**). At times, the temperature exceeded 17°C (62.6°F). Interestingly, this warm ring is in the same area as the high seed density in CAII-Access-SE and CAII-Ext (**Figure 8** and **Figure 2**).

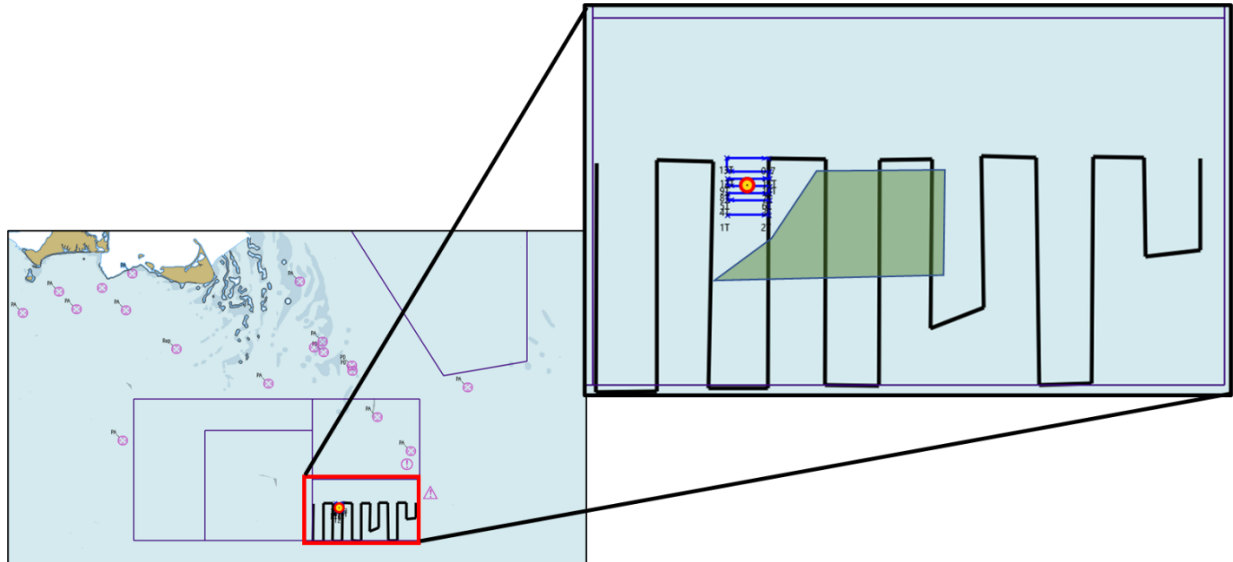


**Figure 8:** Bottom temperatures on Georges Banks and NLS-S-D. Note the warm pocket in the eastern portion of the CAII track.

A number of the survey tracks in the CAII-Ext, HCS, and LI scallop management areas ended before scallop densities decreased (**Figure 2** and **Figure 4**). These tracks continued to the edges

of the management areas, suggesting that high scallop densities could still be found outside of these SAMS areas in deeper waters.

A small, additional track of 12.6 nm was added in the NLS-S-D (included in the 117.6 nm mentioned above). Earlier this year, a scallop transplant project took place which transported ~550,000 scallops from densely populated areas in the NLS-S-D to the most northwestern portion of NLS-S-D, where scallops are scarcer (**Figure 9** for locations). This extra track was added to survey the area transplanted, but data from this small track are not included in the biomass estimates or shell height calculations.

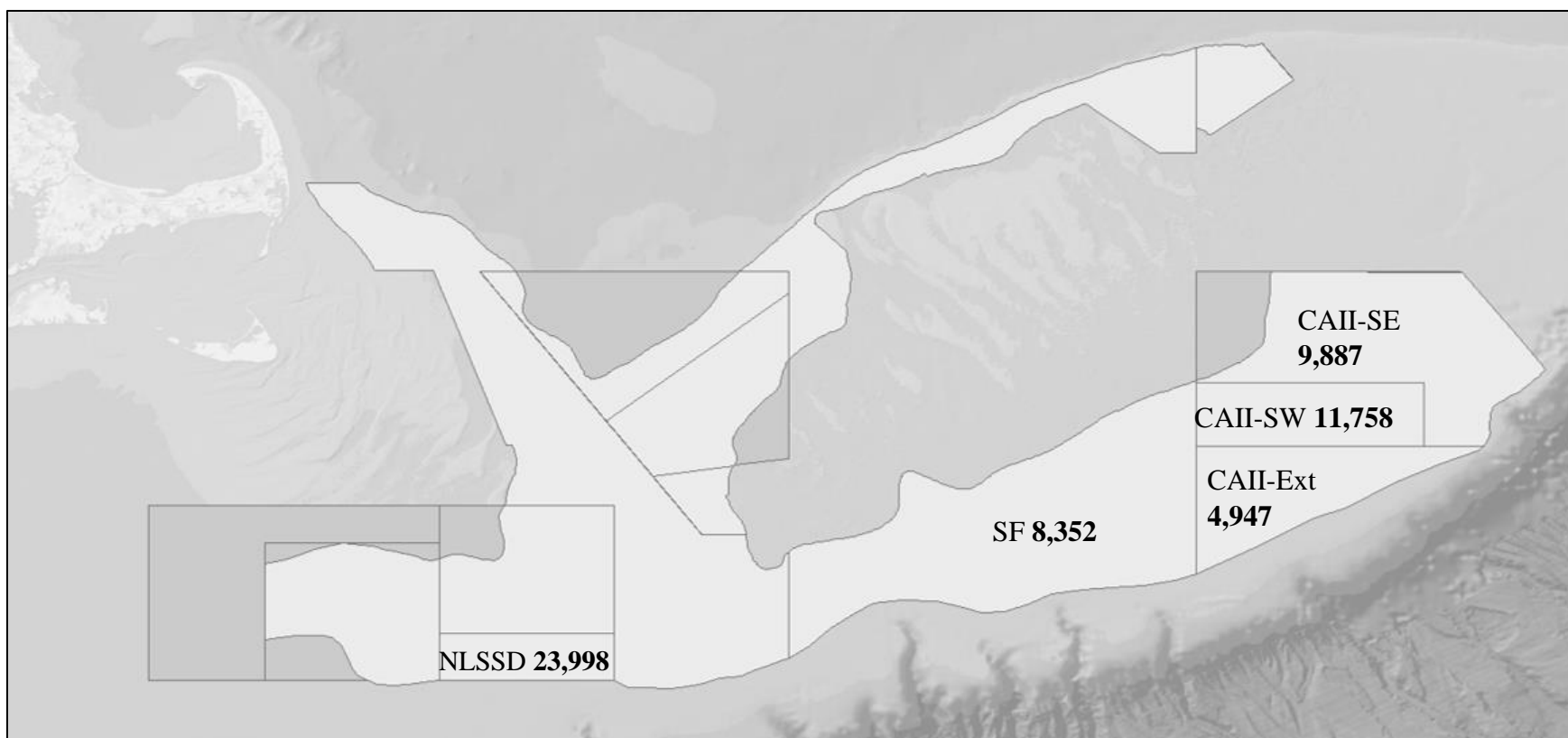


**Figure 9:** Above map is a magnification of the 2020 CFF NLS-S-D track. The green cutout shows the relative area of the main tows where scallops were transplanted from. The bullseye mark is the primary site where the scallops were transplanted to.

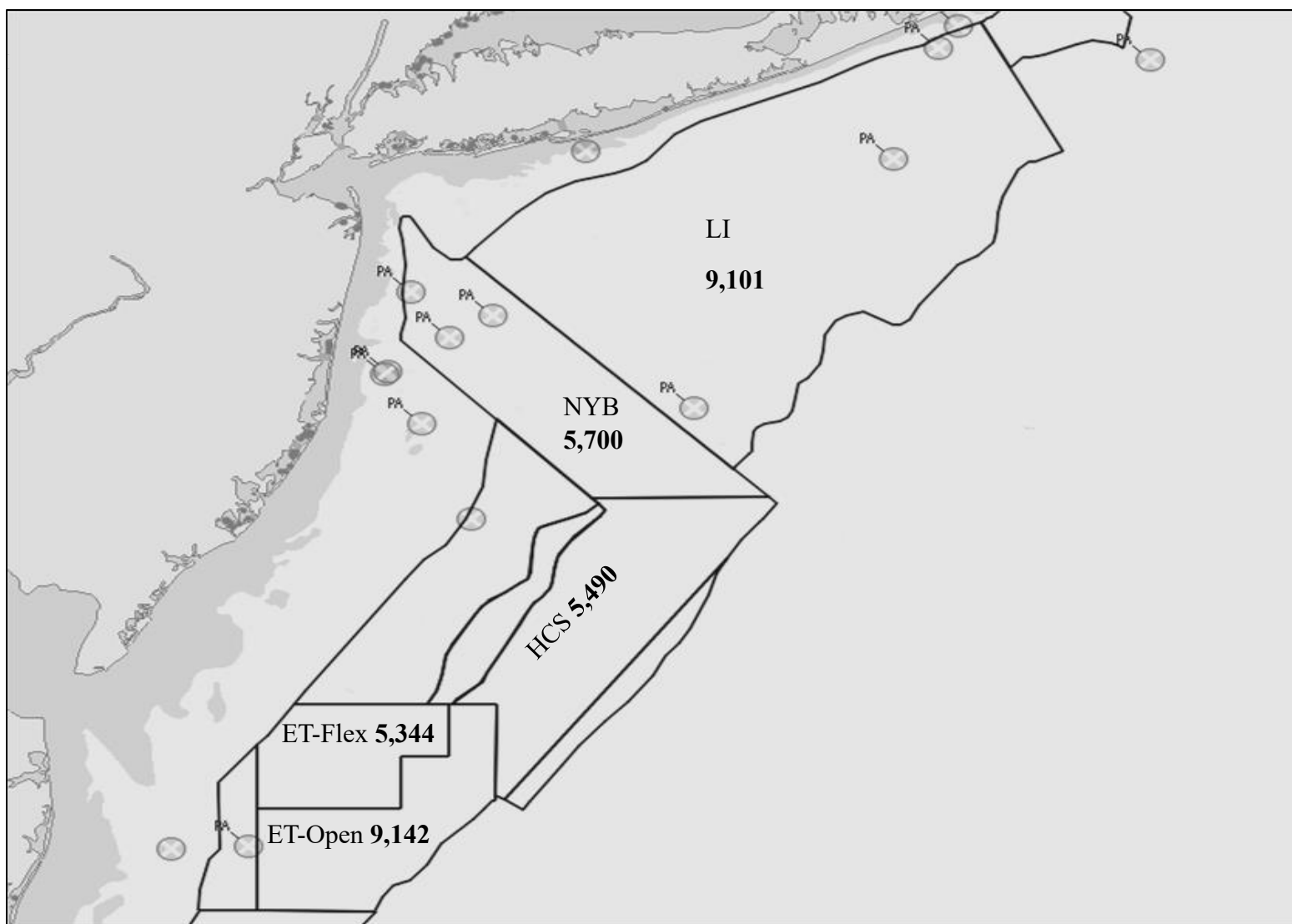
## 6.0 EXPLOITABLE BIOMASS ESTIMATES FOR 2020 (CURRENT FY)

**Table 3:** Exploitable biomass estimates from CFF's 2020 HabCam v3 scallop survey.

<b>CFF HabCam v3</b>				
<b>GB</b>	<b>NumMil</b>	<b>Exploitable BmsMT</b>	<b>SE</b>	<b>MeanWt</b>
CL2-Southeast	296.55	9886.74	3132.65	33.31
CL2-Southwest	460.46	11758.35	3546.49	25.18
CL2-Ext	209.77	4946.54	1113.68	23.69
NLS-South-Deep	1460.92	23998.39	6074.11	16.73
SF	346.54	8351.55	2426.87	24.21
<b>Mid-Atlantic</b>				
Long Island	279.52	9101.04	4916.83	17.77
NYB	204.02	5700.41	2937.84	23.24
HCSAA	202.25	5489.84	2209.78	26.20
ET Open	283.57	9141.53	3265.05	32.44
ET Flex	176.85	5343.82	2440.00	31.23



**Figure 10:** Map of 2020 CFF exploitable biomass estimates (MT) in Georges Banks by SAMS areas (green). SARC65 SHMW calculations were used for all SAMS areas in Georges Banks. VIMS 2016-202 SHMW calculations for the NLS are available in Section 1, 4, and 6.



**Figure 11:** Map of CFF 2020 estimated exploitable biomass (MT) in the Mid-Atlantic by SAMS areas. SARC65 SHMW calculations were used for all SAMS areas in the Mid-Atlantic.