2026 Scallop Survey Short Report

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1.0 METHODS

In 2026, 1,597 stations were targeted for sampling across Georges Bank on a mix of 1.5 and 3 nautical mile (nmi) sampling grids, including adding stations to the NLS-West SAMS area and western extension to this and replacing some 3 nmi stations in the Southern Flank with a 1.5 nmi grid (Figure 1).

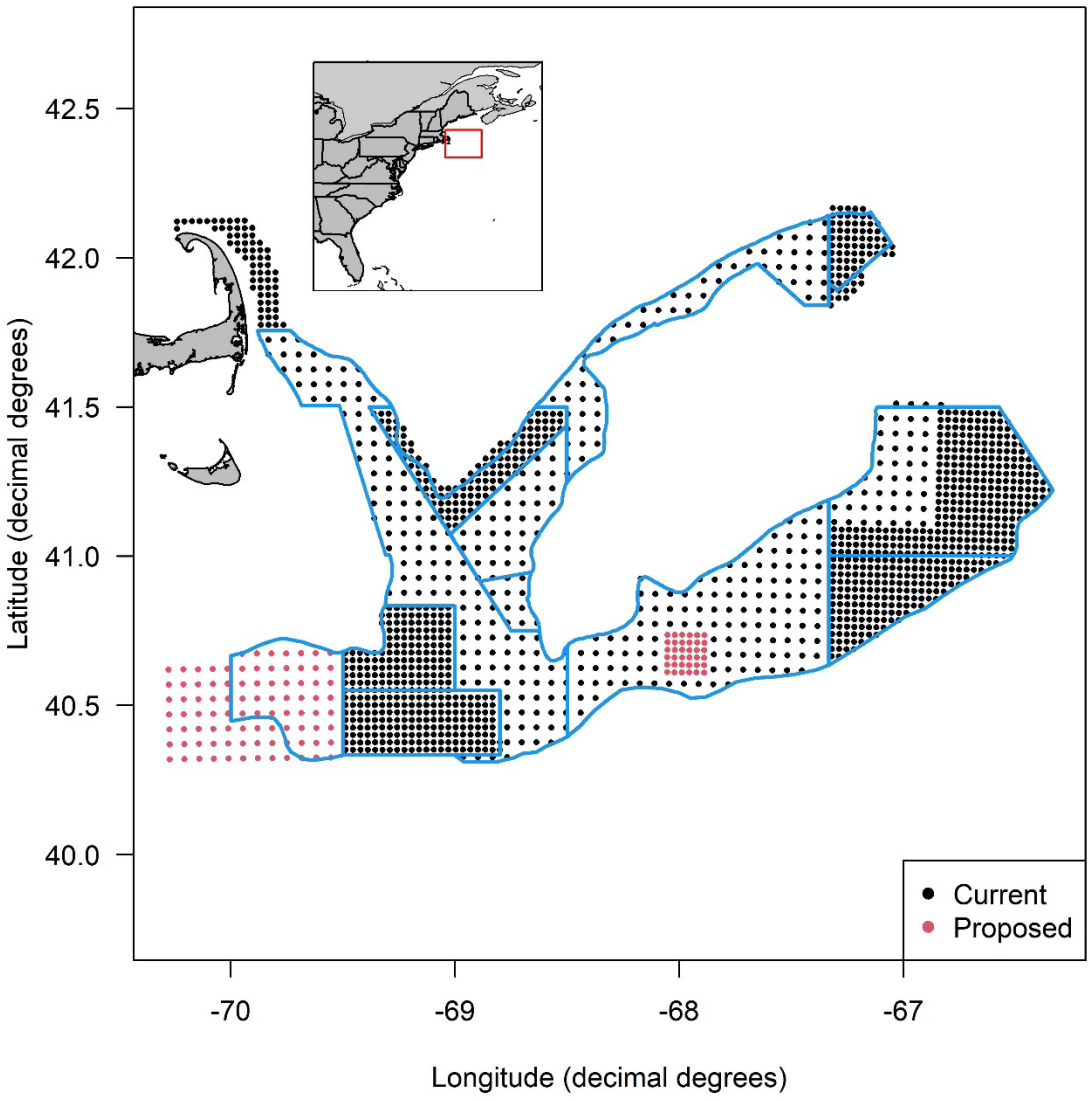

Figure 1. Proposed drop camera survey stations on Georges Bank in 2026. Red points are to distinguish extensions made to the originally funded design. Blue polygons are the current Scallop Area Management Simulation (SAMS) areas.

At each station a steel pyramid comprised of lights and cameras (Figure 2) was dropped to the seafloor. Once a high-resolution image was taken with the digital still camera (DSC), the pyramid was lifted off the seafloor and allowed to drift approximately 50 m, before landing on the seafloor for the next image. In total, four separate quadrats were photographed, and continuous video was

recorded per station (Bethoney and Stokesbury 2018). For each image the latitude and longitude coordinates and depth (fathoms) were recorded. After the survey, the 2.3 m^2 high resolution digital still images were used as the primary data source. Within each quadrat were counted and shell heights were measured (Stokesbury 2002, Stokesbury et al. 2004, Bethoney and Stokesbury 2018). After the images were digitized, a quality assurance check was performed on each image for accuracy of counted and identified scallops.

Analysis for abundance estimates included increasing the camera view area to account for scallops that lie on the edge of the image. This expansion was reviewed and accepted in the 50th SAW and is based on the average shell height of scallops in the area (O'Keefe et al. 2010). The length and width of each image were increased by the mean shell height of measured scallops within the survey area using the equation:

(1) $$Expanded\ View\ Area = (l + \overline{SH}) \times (w + \overline{SH})$$

Where l and w are quadrat length and width and $\overline{SH}$ is mean shell height (O'Keefe et al. 2010).

Mean scallop densities and standard errors (SE) were calculated using equations for a two-stage sampling design where the mean of the total sample is (Cochran 1977):

(2) $$\bar{\bar{X}} = \sum_{i=1}^{n} (\frac{\bar{X}_i}{n})$$

Where n is the number of stations and $\bar{X}_i$ is the mean of the four quadrats at station i. Variance around mean density estimates in an area or year were calculated via an estimator designed for systematic sampling. The ST4 method is a post-stratification method that divides the systematic sampling grid into non-overlapping cells of four nearest neighbor sampling positions, which serve as k strata (Aune-Lundberg and Strand 2014; Strand 2017). The variance was estimated based on the number of stations sampled in each cell (q_c), the total number of stations sampled across each bank (n), the variance of the stations within a cell (σ_c^2) and the number of non-overlapping station locations possible within a cell (N_c) (Equation 3) (Aune-Lundberg and Strand 2014; Strand 2017). This method also permits partial cells, i.e., those where not all four points in a cell fall within the survey area, which occurs around the edges of the survey areas. The number of possible non-overlapping sampling locations in a cell (N_c) was obtained by dividing the cell area by the station field of view and then dividing by the number of stations sampled within a cell (typically four unless at the edge). The within cell variance (σ_c^2) was calculated using the mean station densities sample values ($\bar{x}_i$) and arithmetic mean of the stations within each cell ($\bar{\bar{x}}$) (Equation 4) (Strand 2017).

(3) $$\sigma_{sy}^2 = \sum_{c=1}^{k} (\frac{q_c}{n})^2 \frac{\sigma_c^2}{q_c} \frac{N_c - q_c}{N_c - 1}$$

(4) $$\sigma_c^2 = \frac{1}{q_c} \sum_{i=1}^{q_c} (\bar{x}_i - \bar{\bar{x}})^2$$

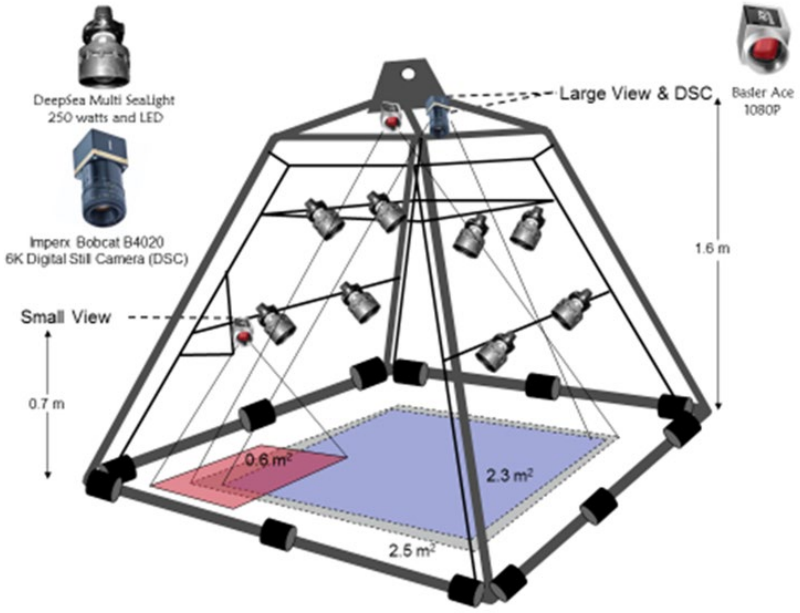

Figure 2. The SMAST drop camera survey pyramid, including cameras and lights used for data collection.

This method has performed well compared to other recently developed methods striving towards the development of an unbiased variance estimator for systematic sampling designs (Strand 2017). All density calculations use the number of scallops per square meter.

The number of scallops in the survey area was calculated by multiplying the mean scallop density by the total area surveyed (Stokesbury 2002). Estimates of scallop meat weight in grams were derived from shell height (mm) frequencies collected during sampling and shell height to meat weight regressions as agreed with the New England Fishery Management Council (NEFMC) Scallop Plan Development Team (PDT). The mean meat weight for each 5 mm size bin was multiplied by the total number of scallops in the survey area to estimate the total biomass of scallop meats. Exploitable biomass was calculated using the commercial scallop dredge selectivity equation by Roman and Rudders (2019).

To obtain the biomass estimates the mean size-specific scallop meat weight in grams (W) was calculated using a Georges Bank area-specific equation developed by the Scallop PDT in 2025 (Equation 5).

(5) $$W = \exp(-4.4662+2.8935 * \ln(SH) - 0.007067 * D - 0.1325 * L + area)$$

Equation 5 used the scallop shell height (SH, mm), depth (D, meters), latitude (L, decimal degrees), and an area specific effect (Table 1).

Table 1. Area specific effects for the 2025 Georges Bank shell height to meat weight relationship.

SAMS area	Area effect
CL1-Access	0.121458158
CL1-Sliver	0.046931192
CL1-South	0.121458158
CL2-North	0.081885499
CL2-South	0.085550466
CL2-Ext	-0.068389355
NLS-North	0.047471179
NLS-West	-0.049308796
NF	0.136347178
GSC	-0.024325556
SF	0.028214974

The shell height to meat weight equation for the Nantucket Lightship (NLS) South Deep area was different from the rest of Georges Bank because of known differences in growth rates for the scallops in this area. An equation derived from Virginia Institute for Marine Science (VIMS) dredge sampling was used that combined shell height and meat weight samples from 2025, as advised by the Scallop PDT (Equation 6). A sensitivity test of a new VIMS equation combining 2025 and 2026 samples was also conducted for the NLS-South area (Equation 7).

(6) $$W = \exp(-11.5736 + 3.10913 * \ln(SH))$$

(7) $$W = \exp(-11.67316 + 3.12674 * \ln(SH))$$

2.0 2026 SURVEY BIOMASS ESTIMATES

Size cutoff for estimates is 40mm. Refer to 2026 SHMW relationship worksheet for area-specific equations.

Region	Area	Abundance (mil.)	Biomass (mt)	SE	Avg. Weight (g)	Avg. Size (mm)	Avg. Density (#/m^2)	# Stations and grid size (nmi)
Georges Bank	CL1-Access	58.7	1131	434	19.28	89.7	0.053	36 (3 nmi)
	CL1-Sliver	137.1	1634	213	11.91	87.7	0.165	108 (1.5 nmi)
	CL1-South	0.0	0	0	-	-	0.000	10 (3 nmi)
	CL2-North	164.9	4217	656	25.57	103.2	0.362	59 (1.5 nmi)
	CL2-South (Access)	359.8	1525	108	8.68	51.3	0.098	341 (1.5 and 3 nmi)
	CL2-Extension	114.9	1337	114	11.64	82.8	0.084	177 (1.5 nmi)
	NLS-North	58.3	1210	129	20.75	88.5	0.057	133 (1.5 nmi)
	NLS-South	4805.9	32550	5774	6.77	74.6	3.177	196 (1.5 nmi)
	NLS-West	9.5	32	9	3.38	52.7	0.007	46 (3 nmi)
	GSC	340.1	3070	502	9.03	69.1	0.082	135 (3 nmi)
	NF	80.6	958	187	11.89	75.3	0.044	60 (3 nmi)
	SF	724.1	7512	669	9.55	79.1	0.176	160 (1.5 and 3 nmi)
	GB Total	**6853.9**	**54045**	**8795**	**-**	**-**	**-**	**1461**
Non-SAMS	NLS West Ext	0.0	0	0	NA	-	0.000	45 (3 nmi)
	North CC	7.2	137	20	19.13	95.0	0.033	28 (1.5 nmi)
	Sliver Ext	8.8	177	40	20.10	118.7	0.047	24 (1.5 nmi)
	South CC	12.9	88	11	6.81	61.0	0.044	38 (1.5 nmi)
	Non-SAMS Total	**28.9**	**402**	**71**	**-**	**-**	**-**	**135**

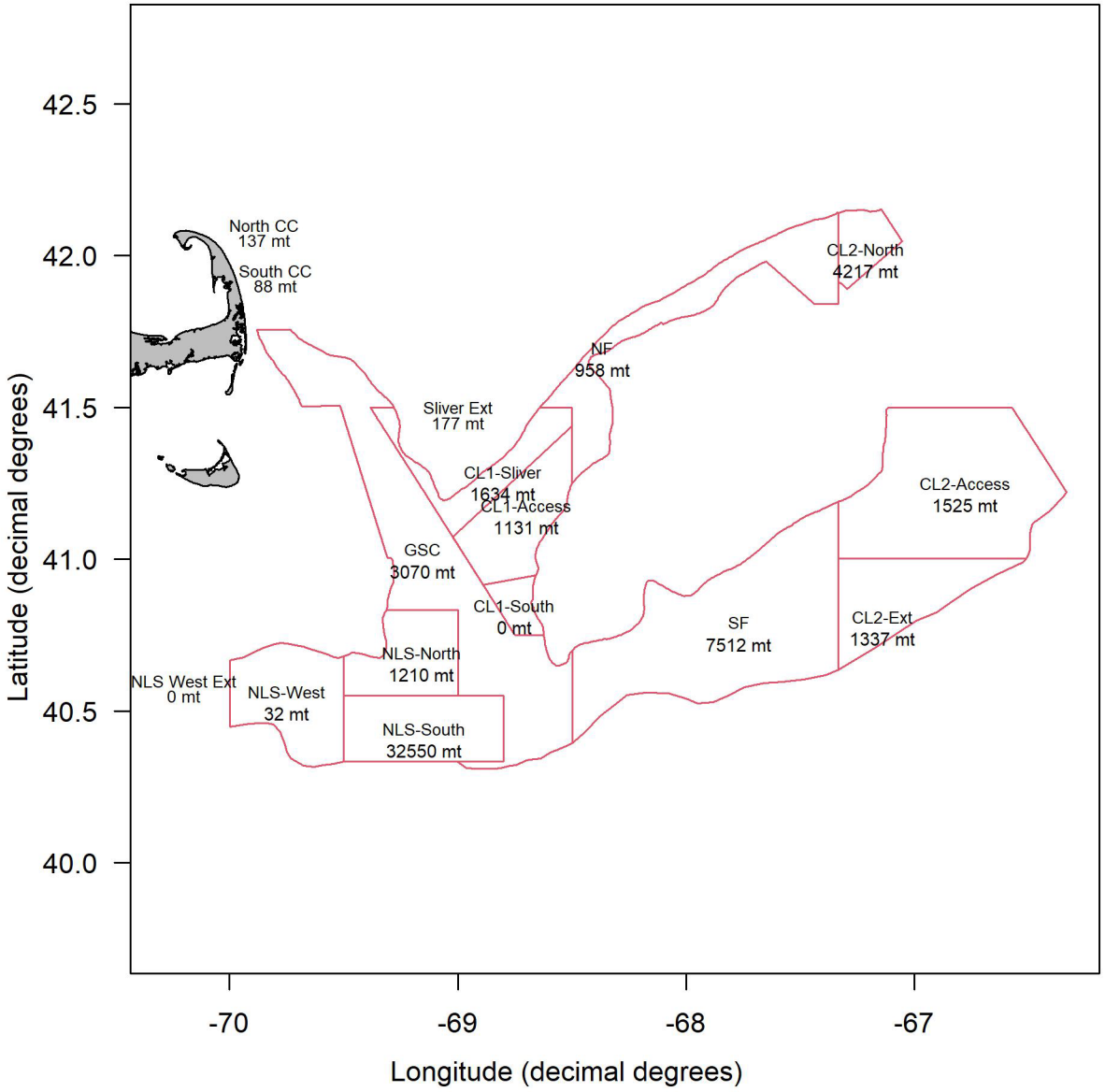

Figure 3. School for Marine Science and Technology Drop Camera Survey biomass estimates from 2026 for scallops ≥ 40 mm shell height, in metric tons, on Georges Bank by Scallop Area Management Simulator (SAMS) zones (red polygons) and surveyed non-SAMS areas. The grey land is the eastern portion of Cape Cod.

3.0 FIGURES OF SURVEY COVERAGE

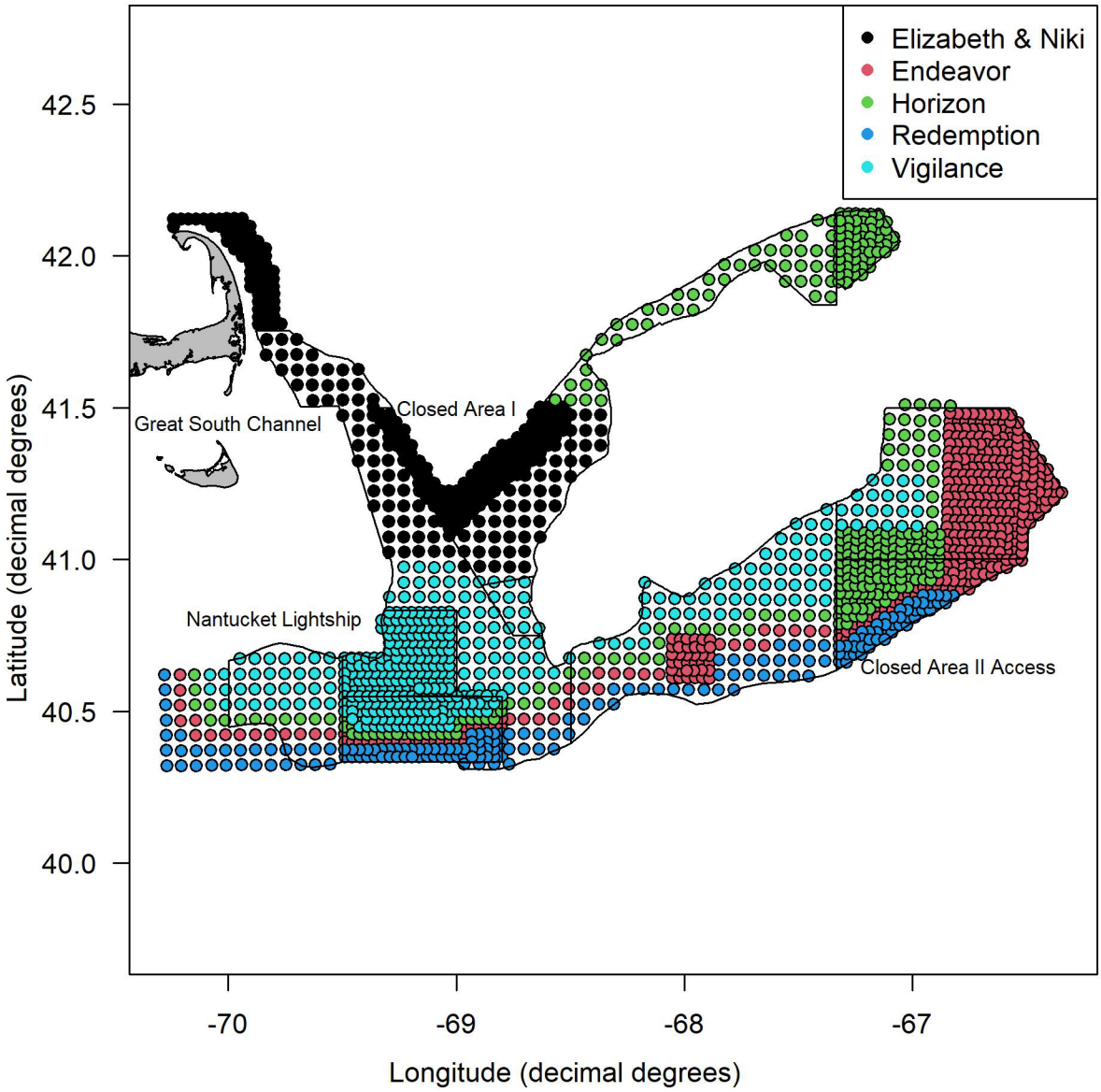

Figure 4. School for Marine Science and Technology Drop Camera Survey station locations by sampling vessel on Georges Bank in 2026. Stations were attempted to be 5.6 km apart with the exceptions of the Scallop Area Management Simulator (SAMS) areas CL1-Sliver, CL2-North, CL2-Ext, NLS-North, NLS-South, and part of CL2-Access, and the North Cape Cod, South Cape Cod, and Sliver Extension, which had stations 2.8 km apart. Please refer to other figures in this report for specific area locations.

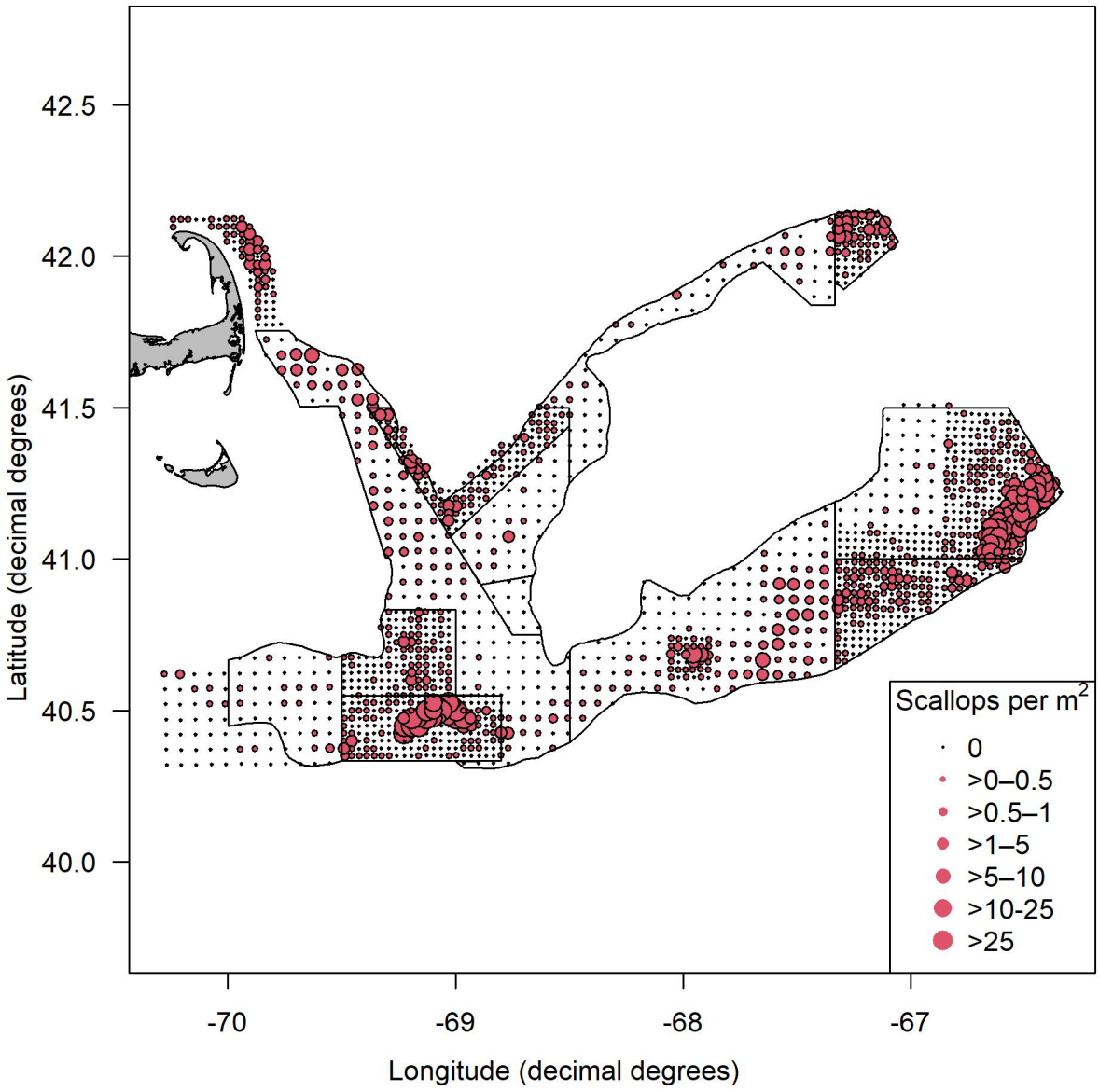

Figure 5. Mean scallop density (number of scallops of all sizes per m^2, including less than 40 mm shell height) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey on Georges Bank.

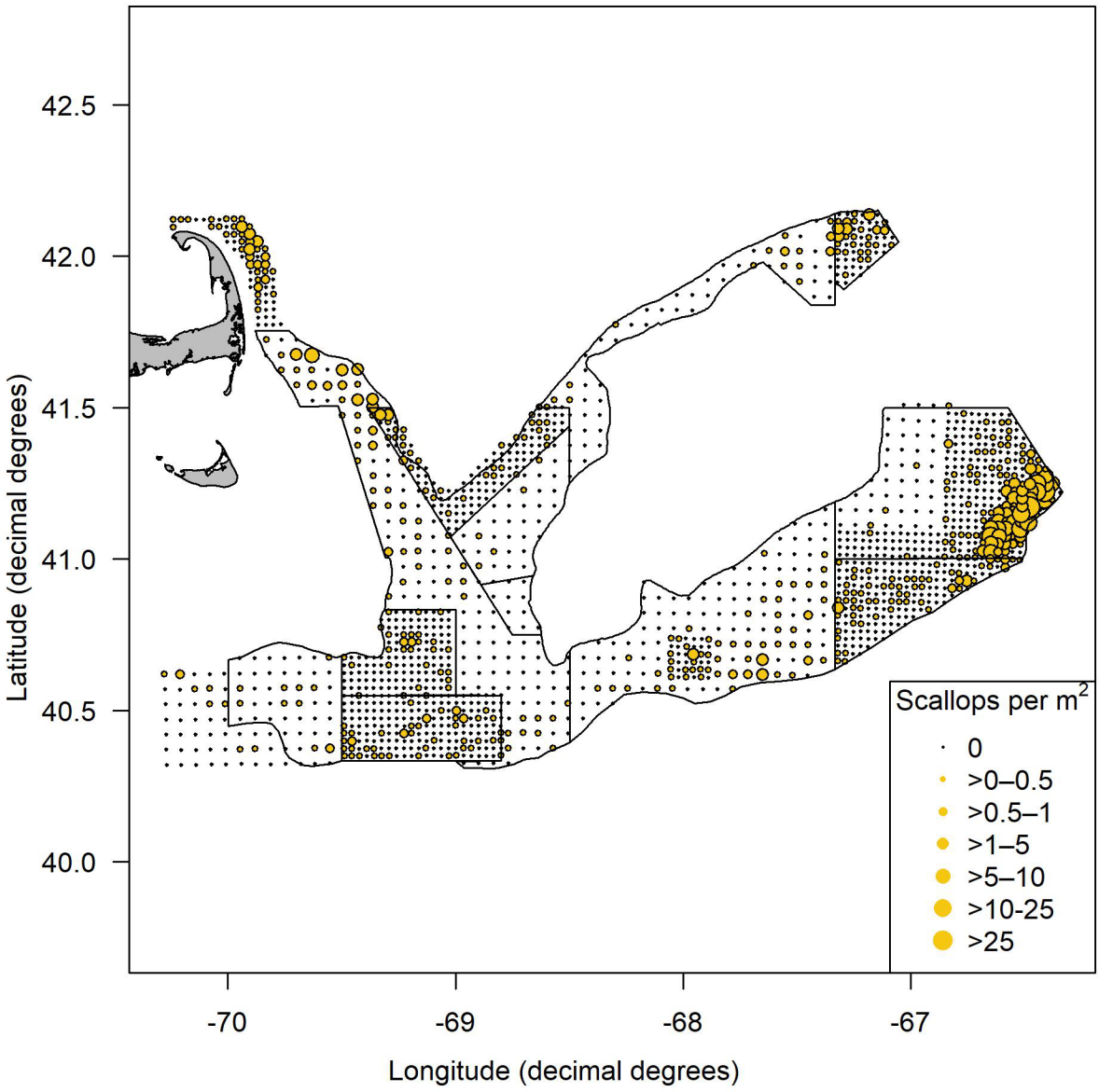

Figure 6. Mean pre-recruit scallop density (scallops less than 35 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey on Georges Bank.

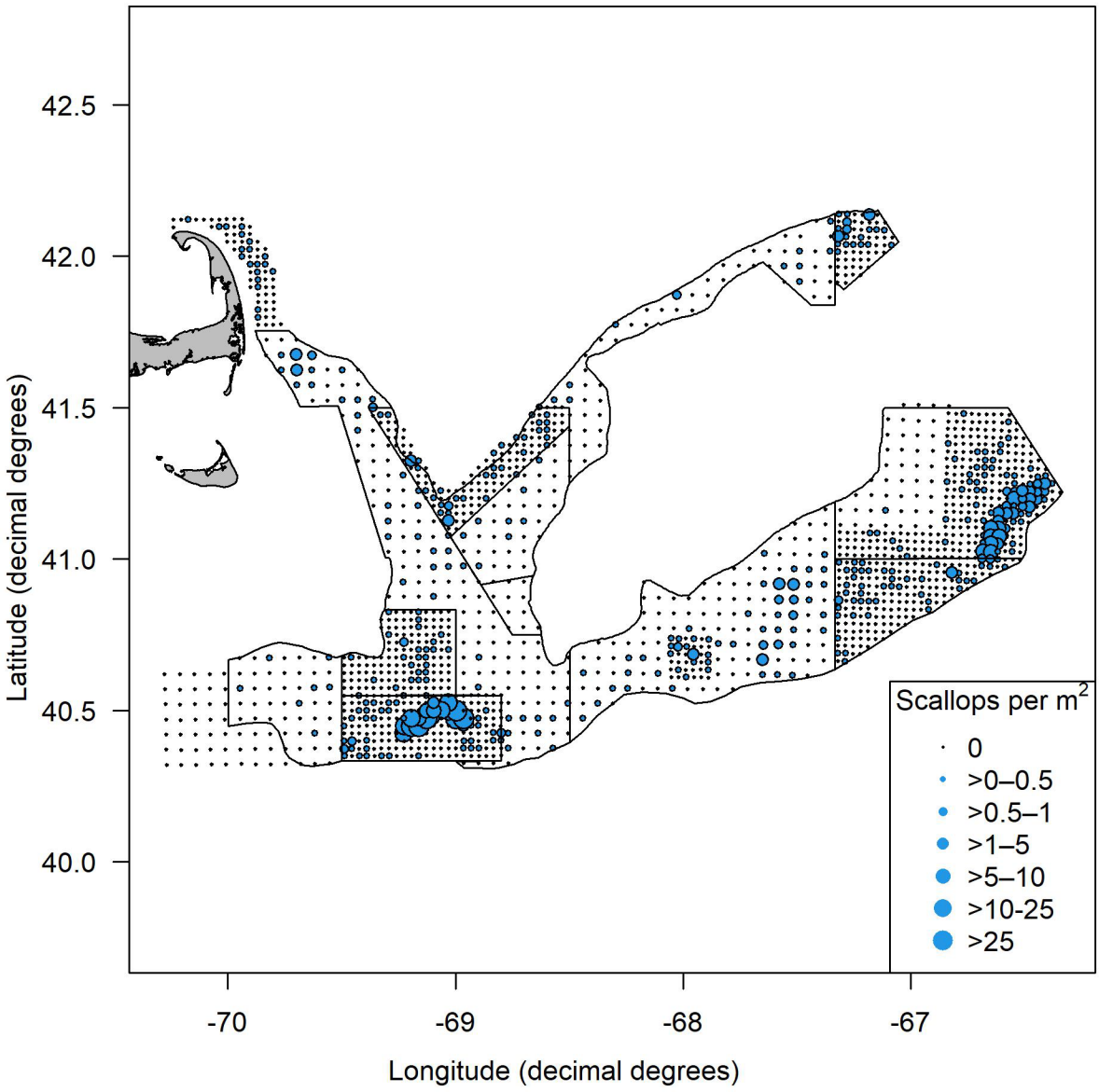

Figure 7. Mean recruit scallop density (scallops 35 to 75 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey on Georges Bank.

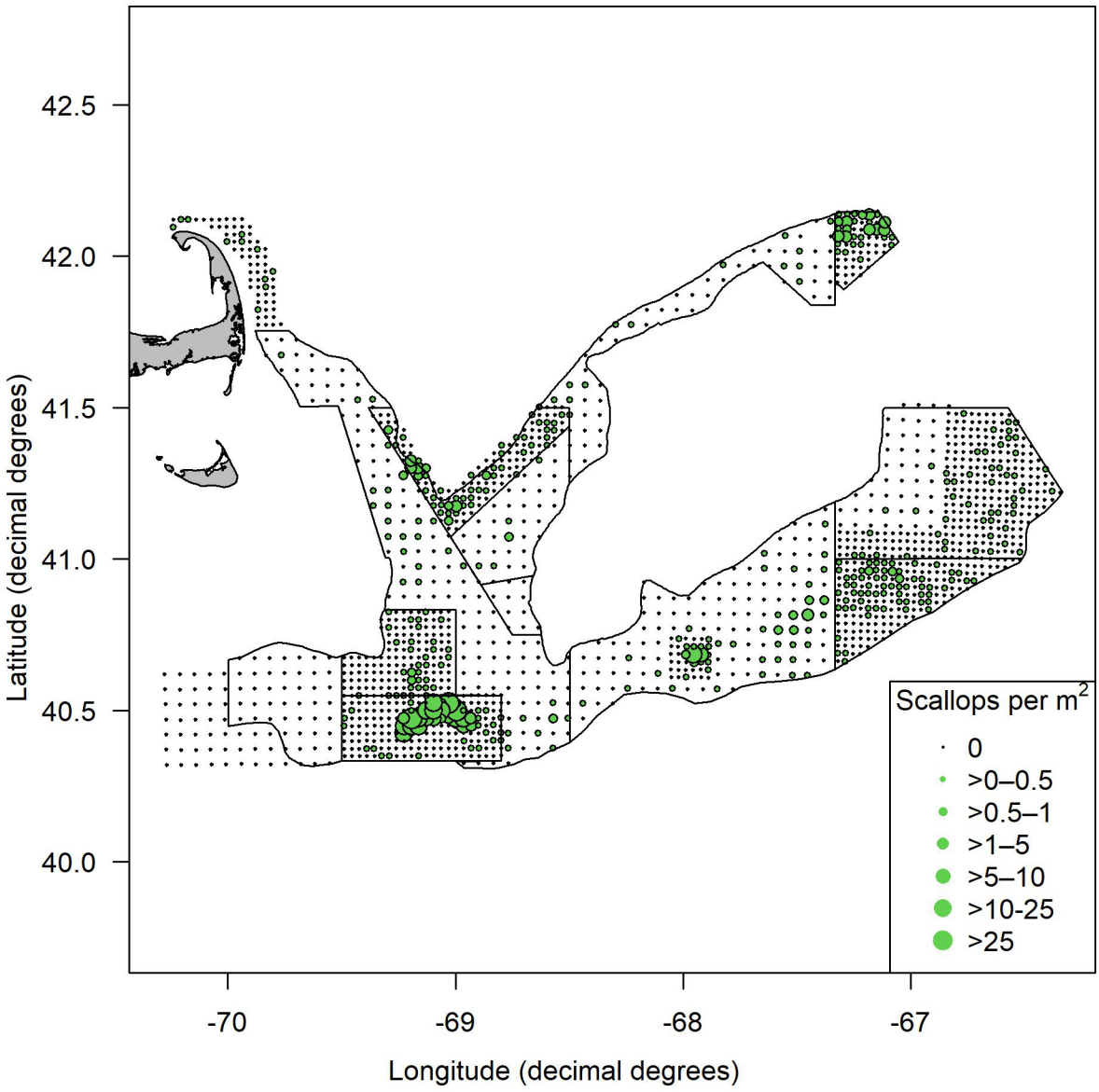

Figure 8. Mean recruited scallop density (scallops greater than 75 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey on Georges Bank.

4.0 LENGTH FREQUENCY PLOTS BY SAMS AREA

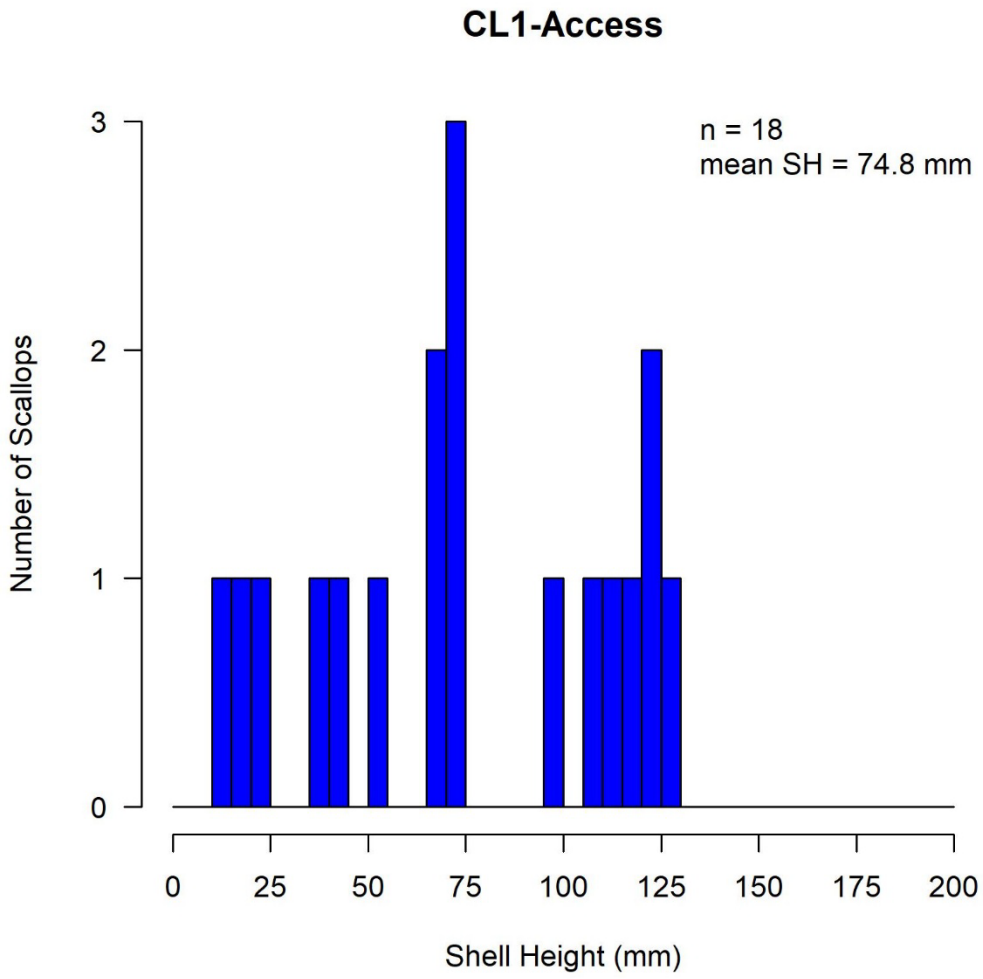

Figure 9. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the CL1-Access Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

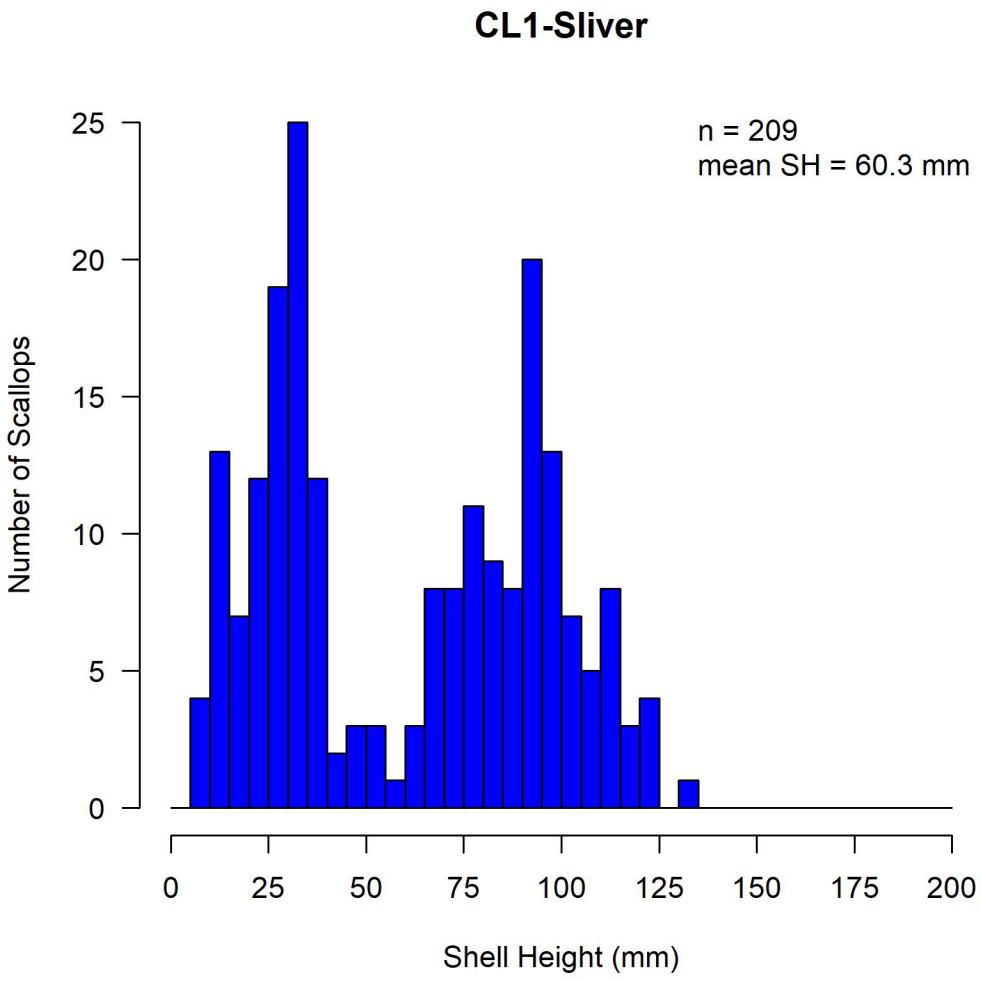

Figure 10. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the CL1-Sliver Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

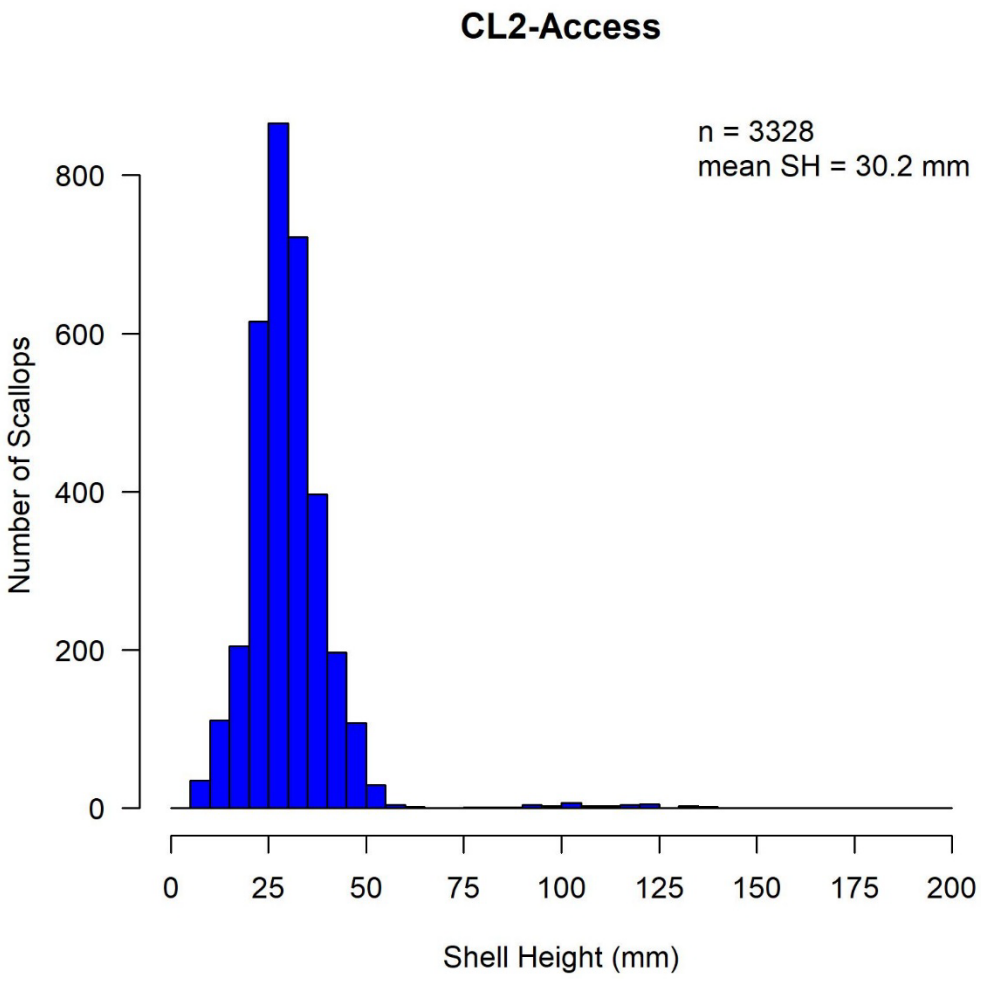

Figure 11. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the CL2-Access Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

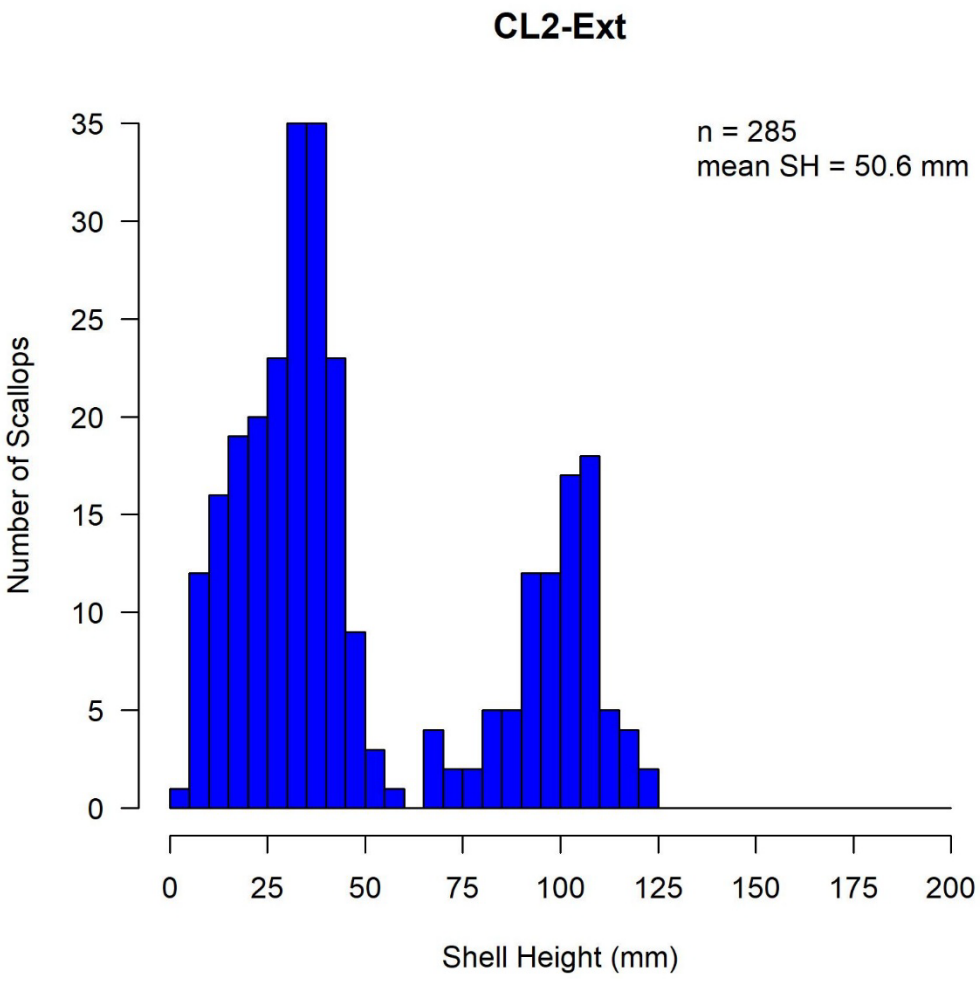

Figure 12. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the CL2-Ext Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

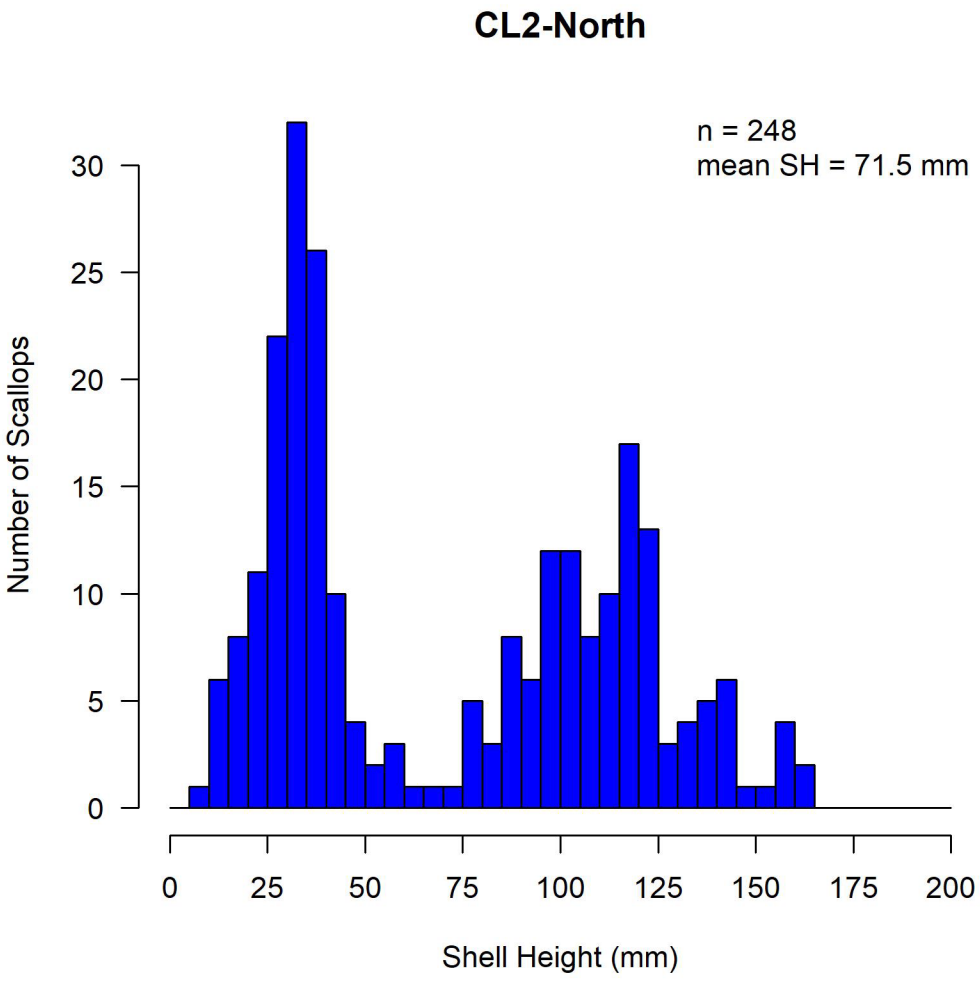

Figure 13. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the CL2-North Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

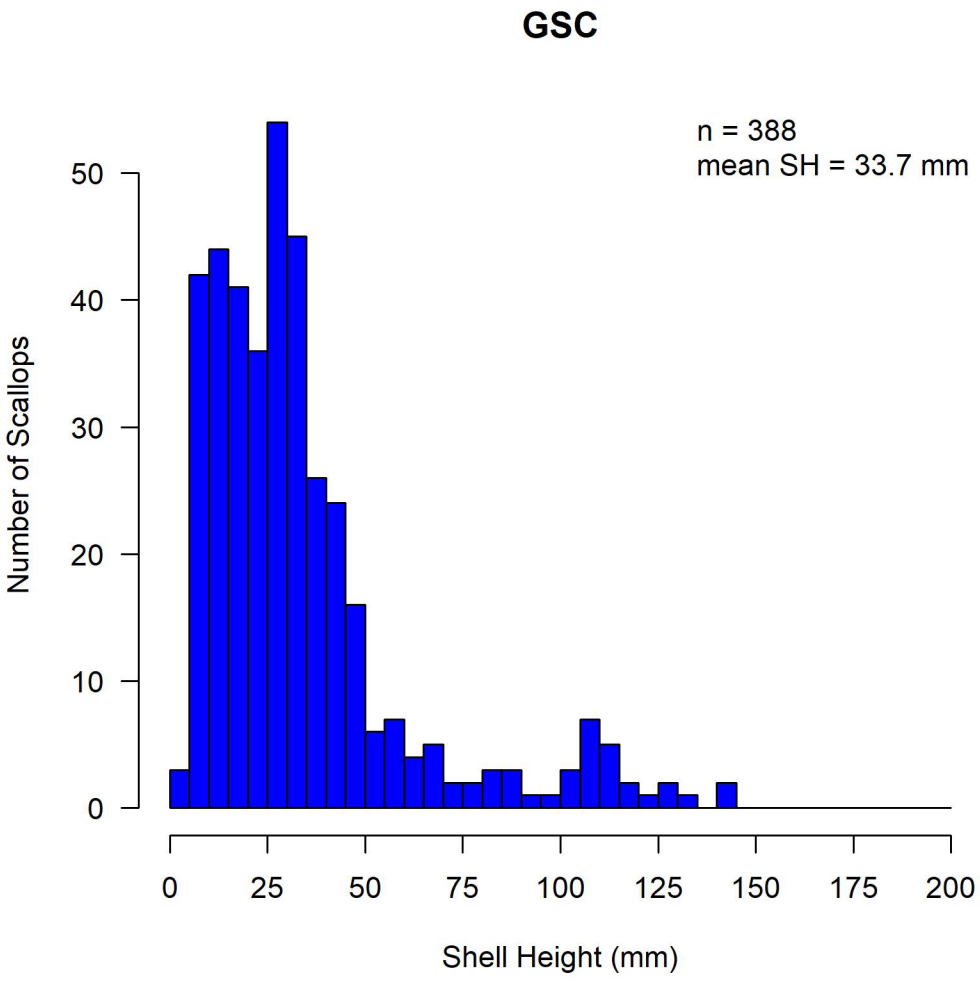

Figure 14. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the GSC Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

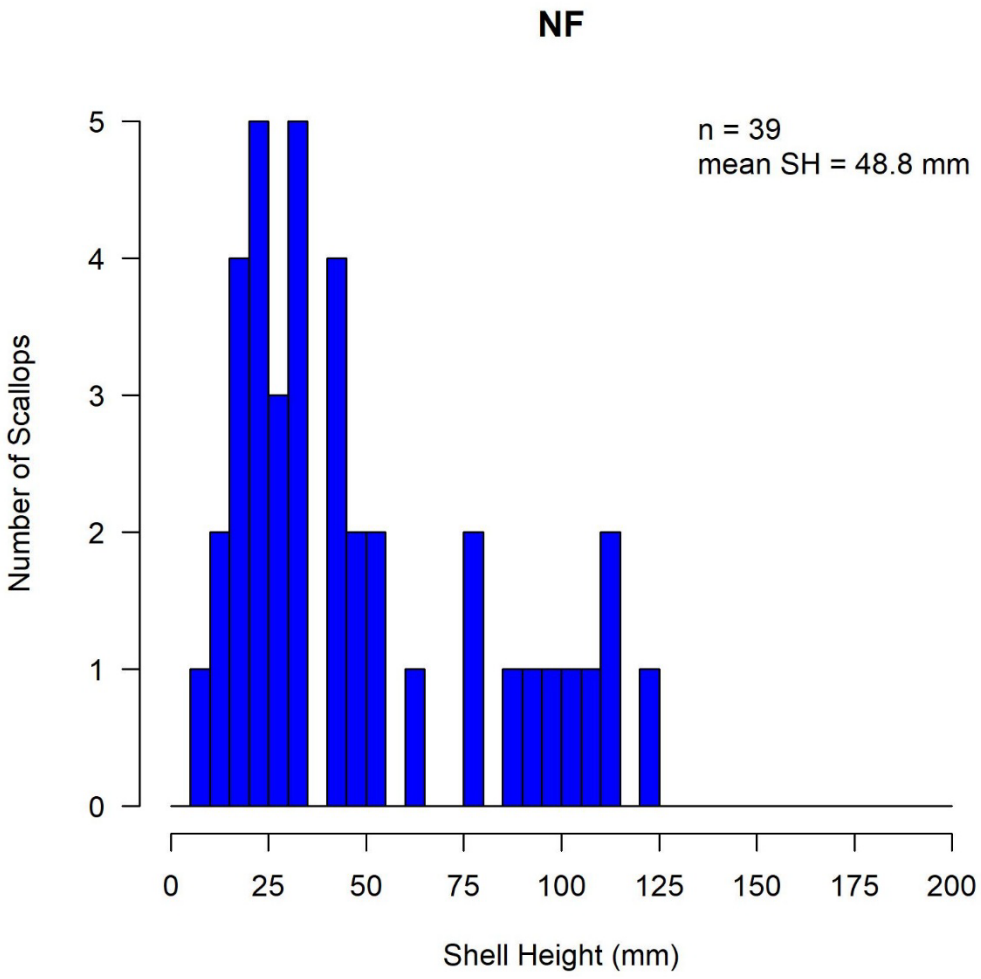

Figure 15. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the Northern Flank Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

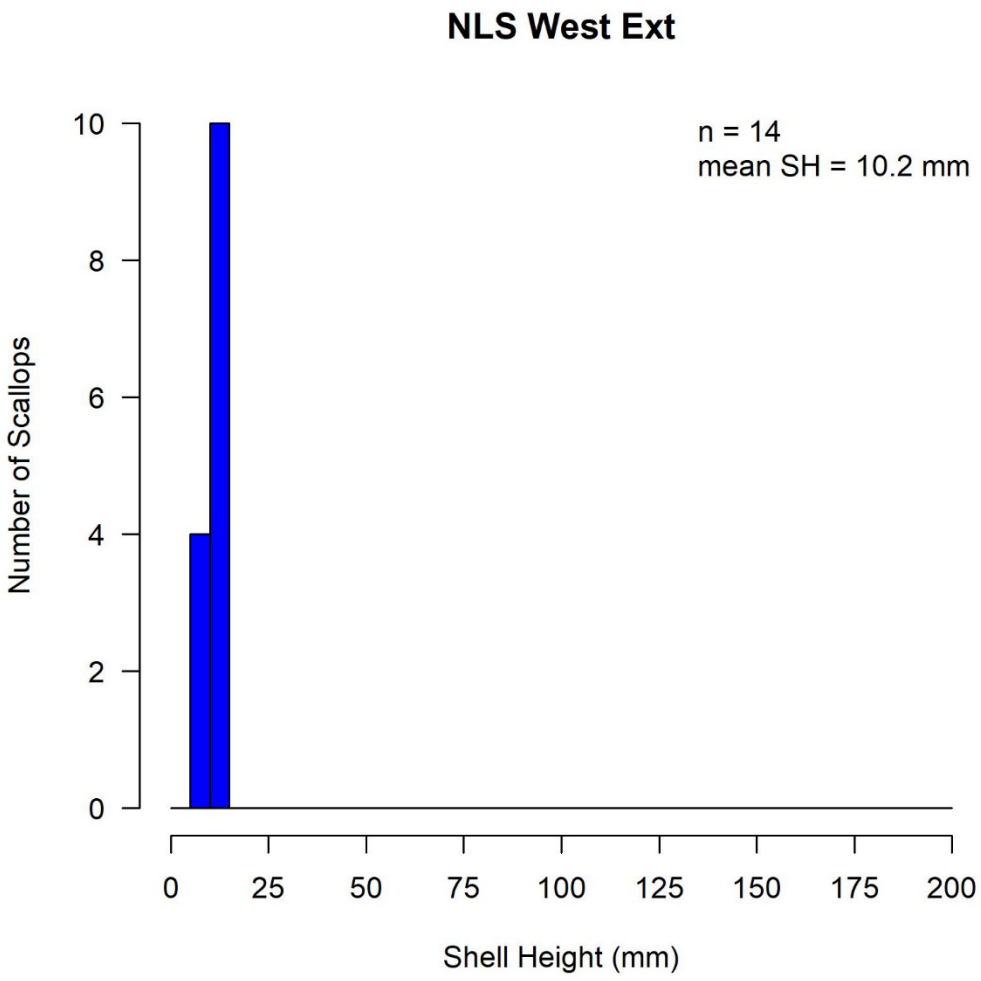

Figure 16. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the non-Scallop Area Management Simulator (SAMS) NLS West Extension area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

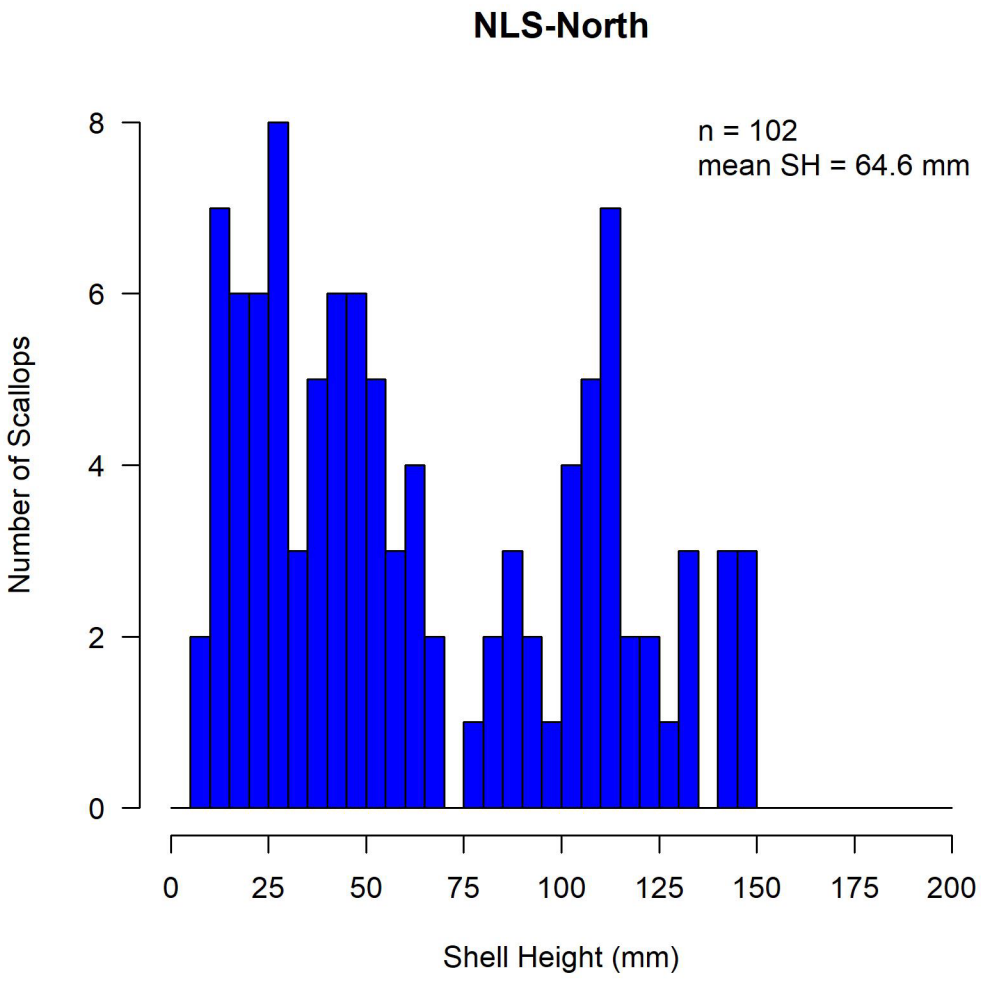

Figure 17. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the NLS-North Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

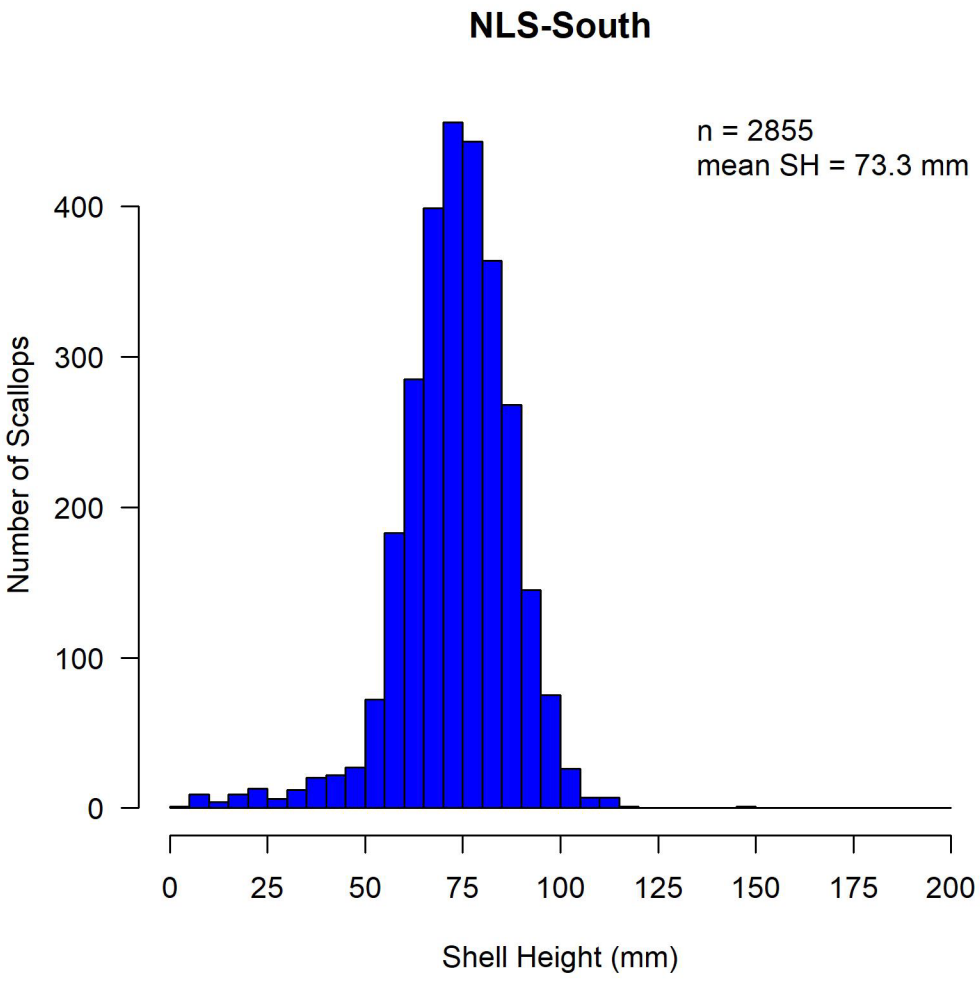

Figure 18. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the NLS-South Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

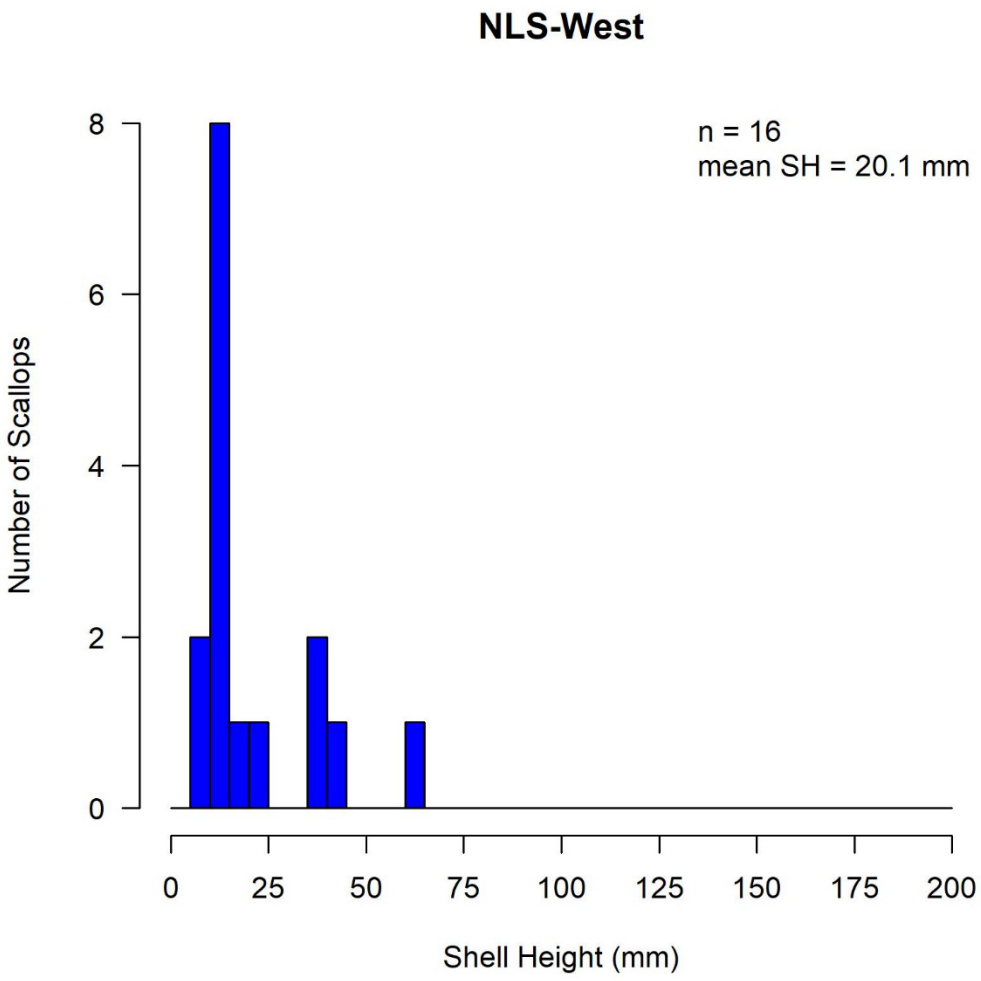

Figure 19. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the NLS-West Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

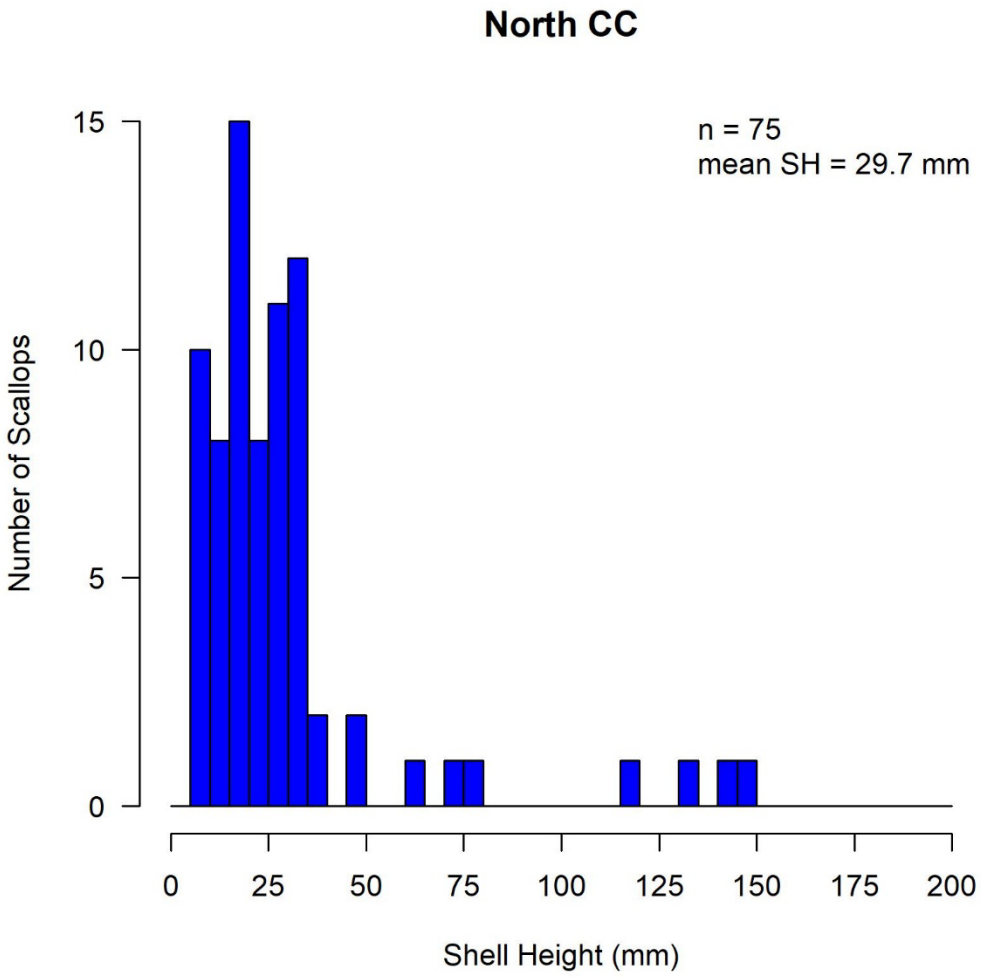

Figure 20. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the non-Scallop Area Management Simulator (SAMS) North Outer Cape Cod area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

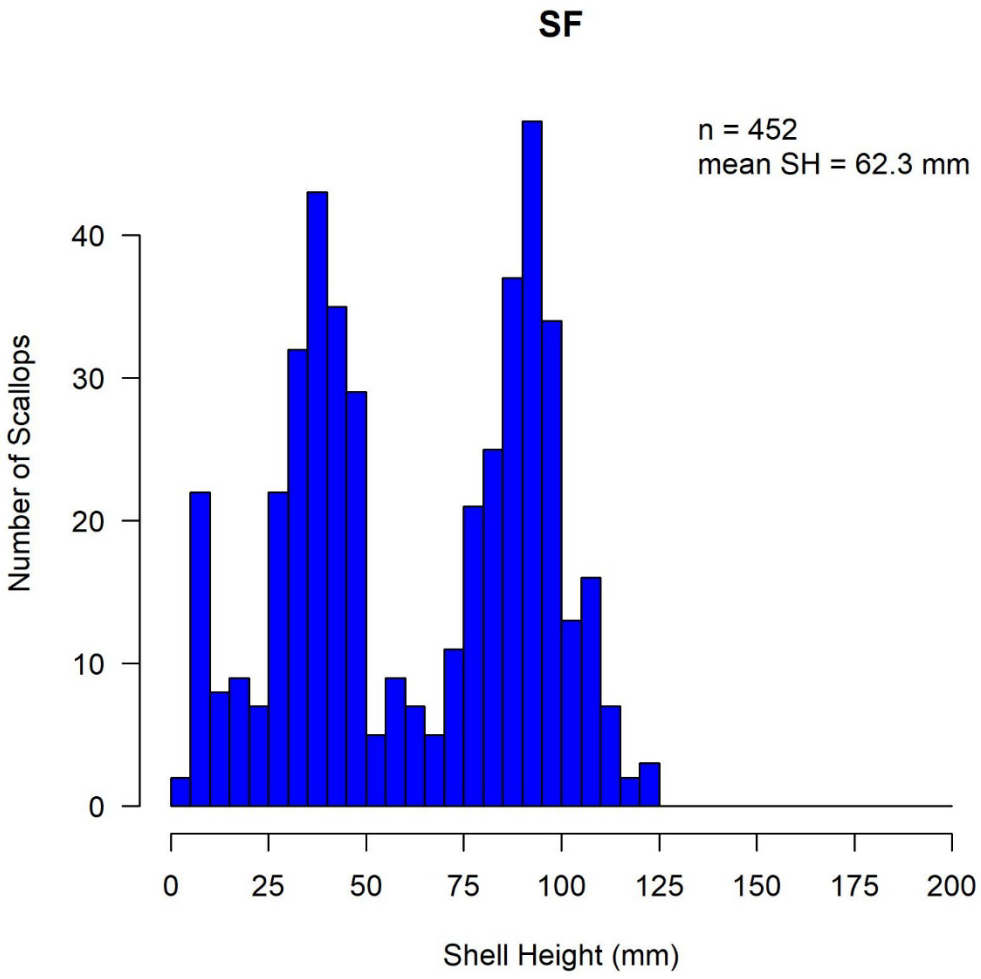

Figure 21. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the Southern Flank Scallop Area Management Simulator (SAMS) area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

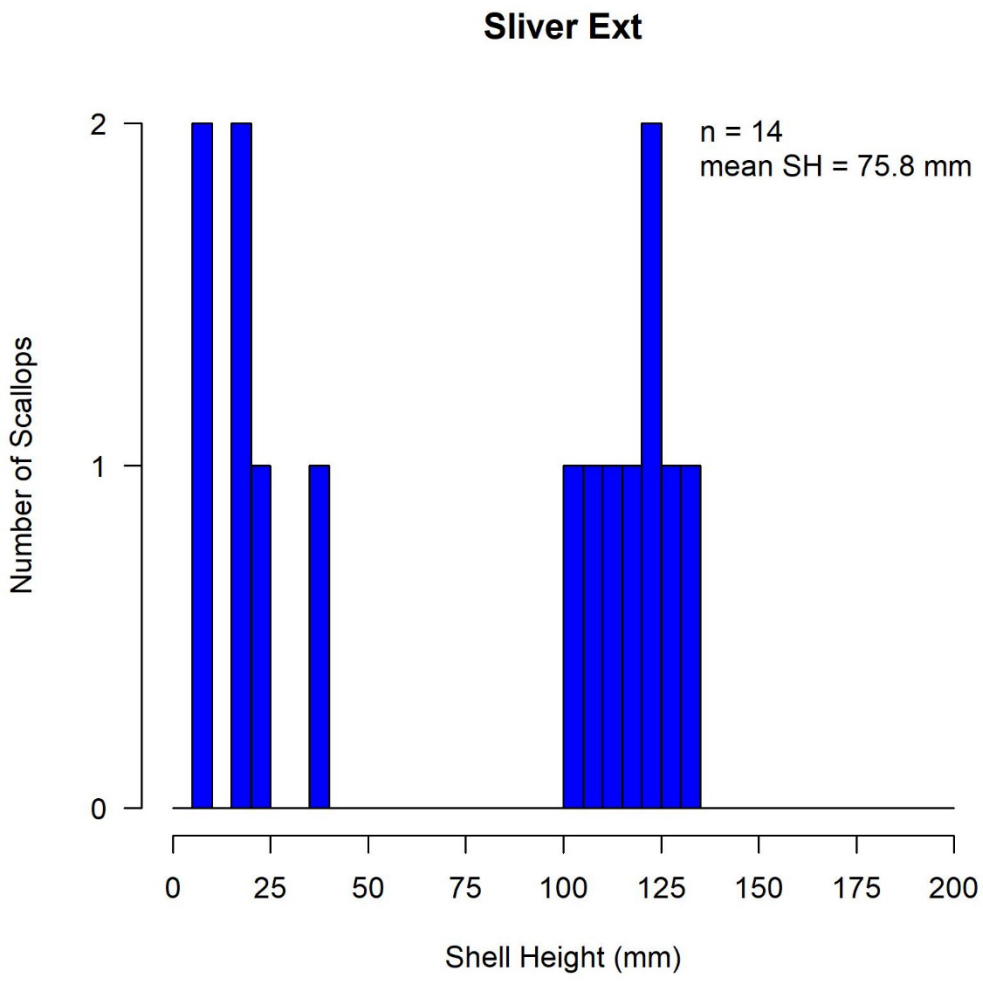

Figure 22. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the non-Scallop Area Management Simulator (SAMS) Sliver Extension area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

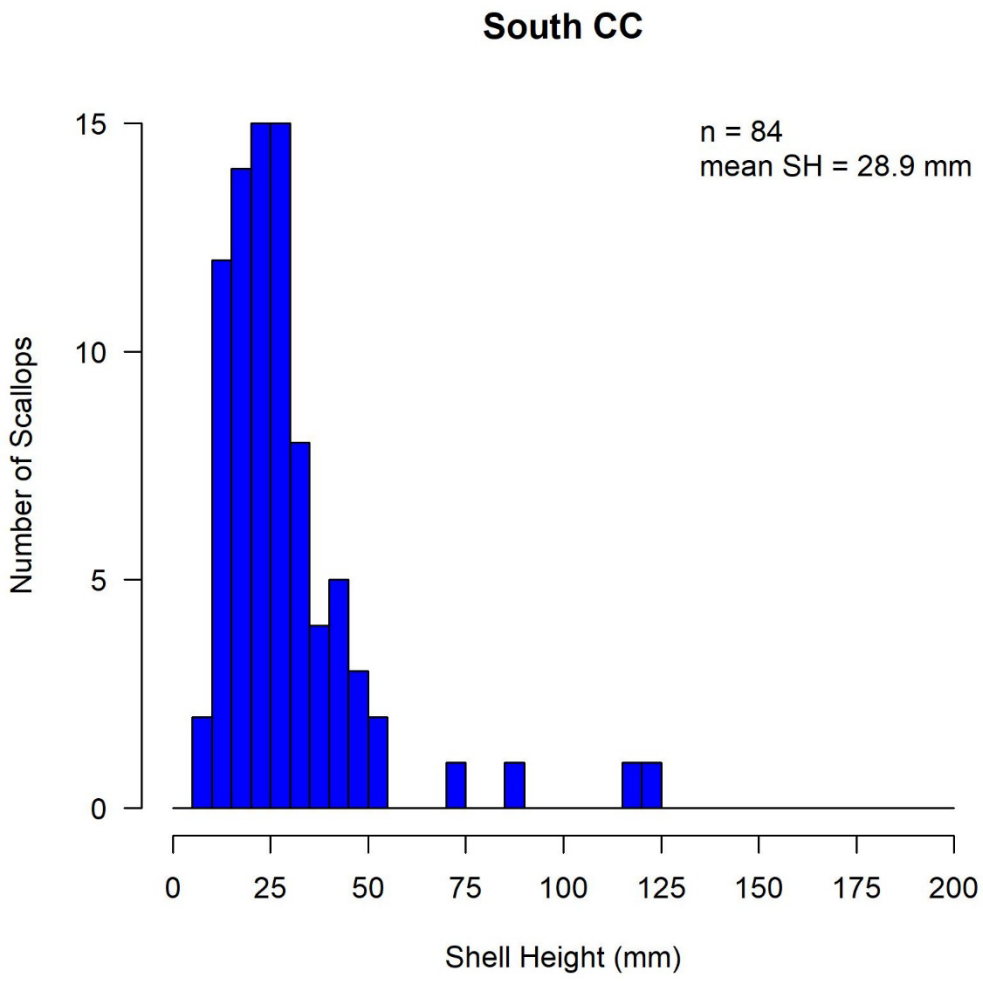

Figure 23. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the non-Scallop Area Management Simulator (SAMS) South Outer Cape Cod area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

5.0 EXPLOITABLE BIOMASS ESTIMATES FOR 2026 (CURRENT FISHING YEAR)

Region	Area	Exp. Abundance (mil.)	Exp. Biomass (mt)	SE	Avg. Weight (g)
Georges Bank	CL1-North (Sliver)	38.7	586	77	15.16
	CL1-Access	18.7	531	204	28,45
	CL1-South	0.0	0	0	-
	CL2-North (HAPC)	69.8	2405	374	34.46
	CL2-South	37.0	496	35	14.73
	CL2-Extension	30.9	503	43	16.28
	NLS-North	18.9	650	70	34.49
	NLS-South	864.3	7000	1242	8.10
	NLS-West	0.8	3	1	3.98
	GSC	66.6	1298	212	19.48
	NF	18.0	364	71	20.25
	SF	152.7	2457	224	16,77
Non-SAMS	NLS West Extension	0.0	0	0	-
	North OCC	2.7	88	13	33.07
	Sliver Extension	4.7	99	22	20.88
	South OCC	2.0	35	4	17.63

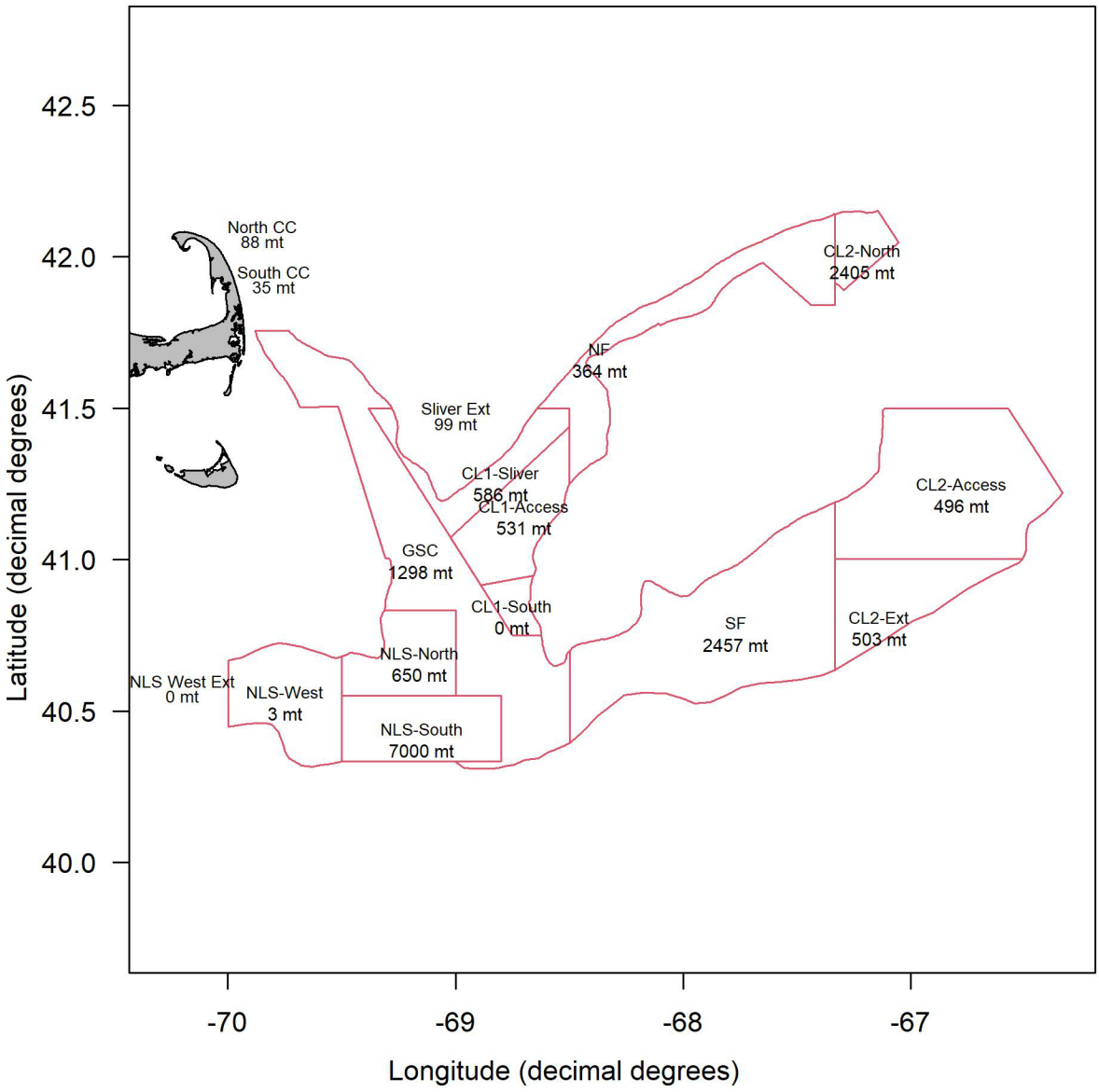

Figure 24. School for Marine Science and Technology Drop Camera Survey exploitable biomass (estimated using a selectivity curve) estimates from 2026, in metric tons, on Georges Bank by Scallop Area Management Simulator (SAMS) zones (red polygons) and surveyed non-SAMS areas. The grey land is the eastern portion of Cape Cod.

6.0 COMPARISON WITH PREVIOUS YEARS ESTIMATES

		Abundance (mil.)			Biomass (metric tons)			Exploitable Biomass (metric tons)		
Region	**Area**	**2025**	**2026**	**Percent Difference (%)**	**2025**	**2026**	**Percent difference (%)**	**2025**	**2026**	**Percent Difference (%)**
Georges Bank	CL1-Access	30.9	58.7	90	790	1131	43	346	531	54
	CL1-Sliver	411.5	137.1	-67	6213	1634	-74	2718	586	-78
	CL1-South	0.0	0.0	-	0	0	-	0	0	-
	CL2-North	199.3	164.9	-17	5268	4217	-20	3027	2405	-21
	CL2-South (Access)	92.1	359.8	290	1948	1525	-22	941	496	-47
	CL2-Extension	165.6	114.9	-31	1953	1337	-32	666	503	-24
	NLS-North	52.8	58.3	10	1107	1210	9	507	650	28
	NLS-South	7863.7	4805.9	-39	28271	32550	15	3875	7000	81
	NLS-West	34.6	9.5	-73	727	32	-96	284	3	-99
	GSC	210.8	340.1	61	2889	3070	6	1142	1298	14
	NF	138.6	80.6	-42	2148	958	-55	896	364	-59
	SF	964.3	724.1	-25	5629	7512	33	973	2457	153
Non-SAMS	NLS West Extension	2.9	0.0	-Inf	38	0	-Inf	10	0	Inf
	North OCC	14.6	7.2	-51	422	137	-67	266	88	-67
	Sliver Extension	43.7	8.8	-80	737	177	-76	388	99	-75
	South OCC	10.2	12.9	27	176	88	-50	74	35	-53
Total		**10235.7**	**6882.8**	**-33**	**58316.1**	**55577.6**	**-5**	**16111.9**	**16516.1**	**3**

7.0 SHELL-HEIGHT MEAT WEIGHT COMPARISONS

Include any relevant comparisons of biomass estimates using alternative SHMW equations

Comparison of biomass estimates from the 2026 School for Marine Science and Technology drop camera survey using different shell height meat weight equations in the NLS-South. Stations were 1.5 nautical miles apart. The VIMS 2025 equation was compared with an updated VIMS 2025-2026 combined equation. All values are for scallops greater than or equal to 40 mm in shell height.

	Biomass estimate using: VIMS 2025 equation.	Biomass estimate using: VIMS 2025-2026 equation.
	NLS South	
Average meat weight (g)	6.77	6.62
Biomass (mt)	32550	31826
Standard error	5774	5646
Exploitable average meat weight (g)	8.10	7.93
Exploitable biomass (mt)	7000	6851
Exploitable standard error	1242	1215

8.0 SPECIAL COMMENTS

We continued to observe very high densities in the NLS-South. We also observed considerable recruitment in CL2-Access.