2026 Scallop Survey Short Report

Gulf of Maine

Prepared by:

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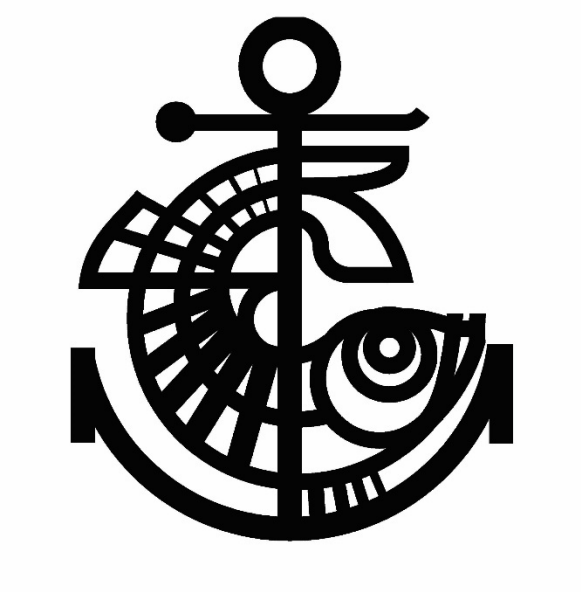

August 21st, 2026

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1.0 METHODS

In 2026, 1,148 stations were targeted for sampling across Gulf of Maine on a 1 km sampling grid (Figure 1).

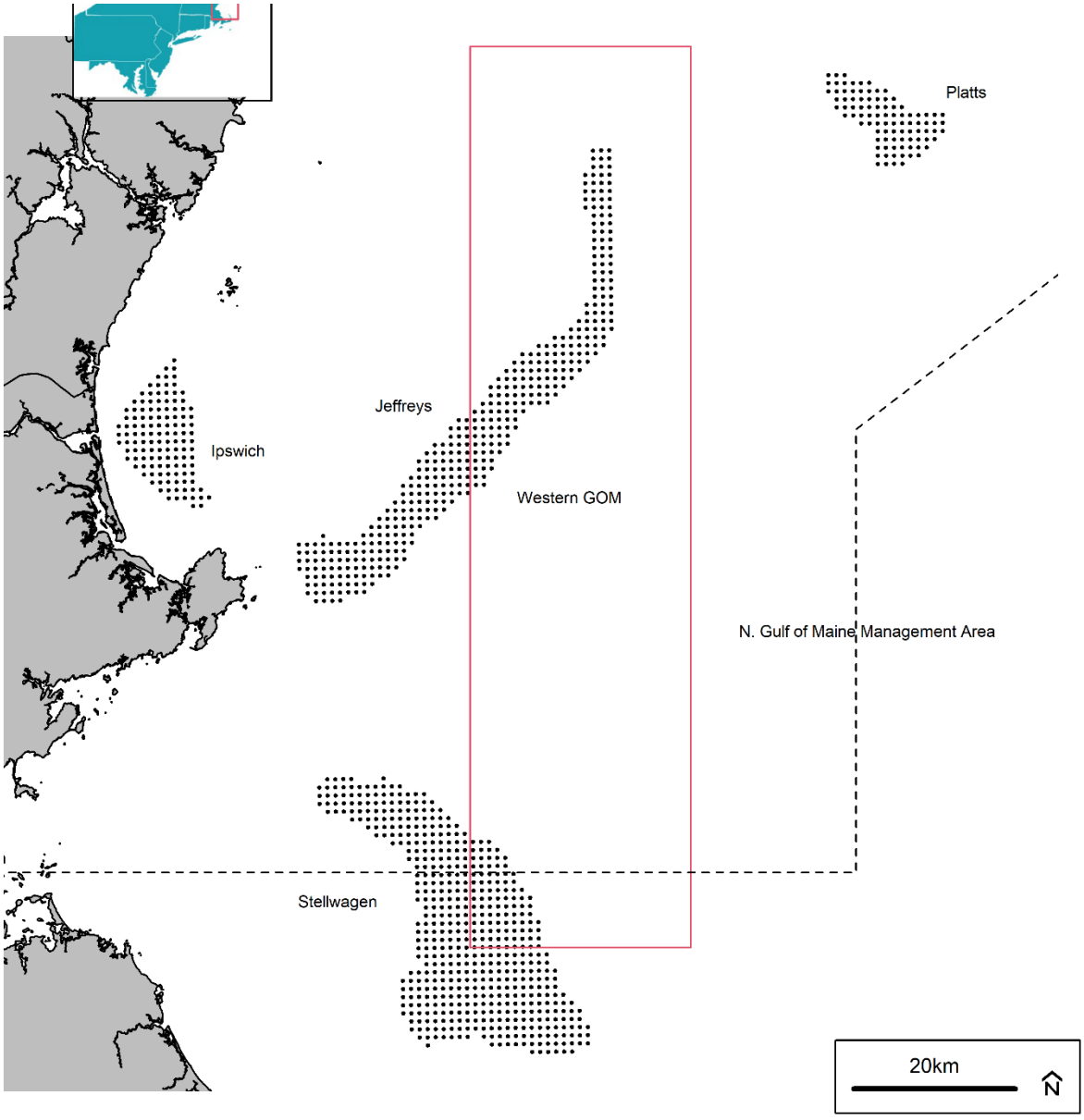

Figure 1. Proposed drop camera survey stations in the Gulf of Maine in 2026.

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

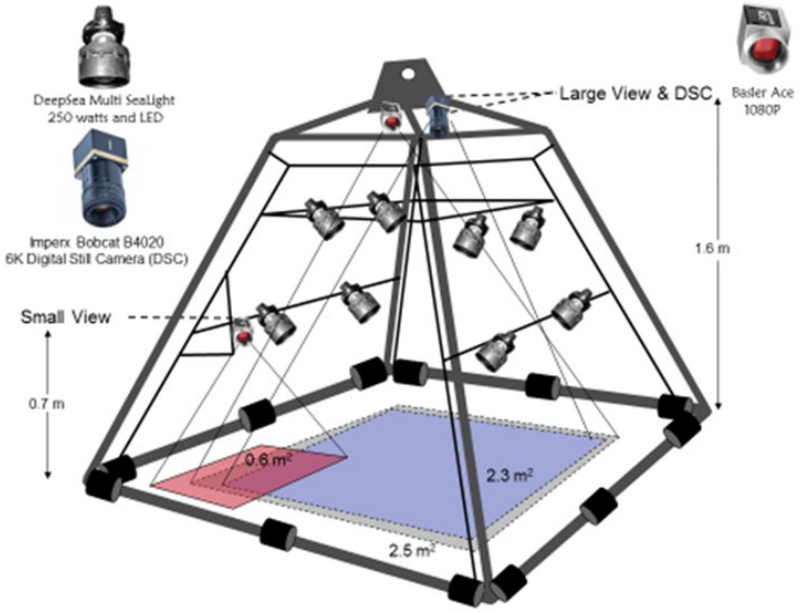

Figure 2. The SMAST drop camera survey pyramid, including cameras and lights used for data collection.

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 (*MW*) was calculated using equations developed from joint SMAST and Maine Department of Marine Resources (DMR) dredge samples from 2016 to 2026. The shell height meat weight regressions were fit as a log-link Gamma family generalized linear mixed effects models that estimated meat weight (MW, g) as a function of shell height (SH, mm), water depth (D, m), and latitude (L, decimal degrees), with random intercept effects of dredge station ($\mu_{stat[i]}$) and area ($\mu_{area[i]}$, either Ipswich Bay, Jeffreys Ledge, or Stellwagen Bank) (Equation 5) (Hennen and Hart 2012).

$$\ln(MW_i) = \beta_0 + \beta_1 ln(SH_i) + \beta_2 \ln(D_i) + \beta_3 L_i + \mu_{stat[i]} + \mu_{area[i]} \quad (5)$$

A specific Platts Bank equation was developed by the Maine DMR using the same methodology. This specific equation was fit using only Platts Bank samples obtained by the Maine DMR from

2016 to 2026 and the resulting equation was used to convert the drop camera Platts Bank shell height and abundance data into biomass estimates (Equation 6).

(6) $$MW = \exp(189.9926 + 2.1389 * \ln(SH) - 0.2476 * \ln(D) - 4.5429 * L)$$

A sensitivity was also run to compare the new shell height to meat weight regressions developed in 2026 to those developed using 2016 to 2025 data for Ipswich, Jeffreys, and Stellwagen (Equation 7) and Platts (Equation 8).

(7) $$MW = \exp(-9.916 + 2.942 * \ln(SH) - 0.2132 * \ln(D) - \ 0.00003543 * L)$$

(8) $$MW = \exp(182.0968 + 2.12241 * \ln(SH) - \ 0.05176 * \ln(D) - 4.3775 * L)$$

Dredge surveys were conducted with the target of sampling 40 stations, with 20 on Stellwagen Bank, 10 in Ipswich Bay, and 10 on Jeffreys Ledge (Figure 3). Station locations were targeted towards high density locations from the 2025 drop camera survey observations. The dredge was an eight foot-wide New Bedford-style dredge with two-inch rings, rock chains, a 1 ¾" headbail, and 4 ½" twine top. At each station the dredge was hauled for five minutes, and fifteen scallops were randomly subsampled for dissections. If 15 scallops were not caught, stations were repeatedly fished with five-minute tows until a cumulative total of 15 scallops were obtained for dissection at each station.

After each tow, the shell height of each scallop was measured to the nearest millimeter and the adductor muscle (hereafter meat)) was dissected and weighed. The resultant meat weight and shell weight data were combined with shell height and meat weight samples obtained from the same three areas by the Maine DMR and used to develop shell height to meat weight regressions used to convert the drop camera shell height frequency and count data into biomass estimates.

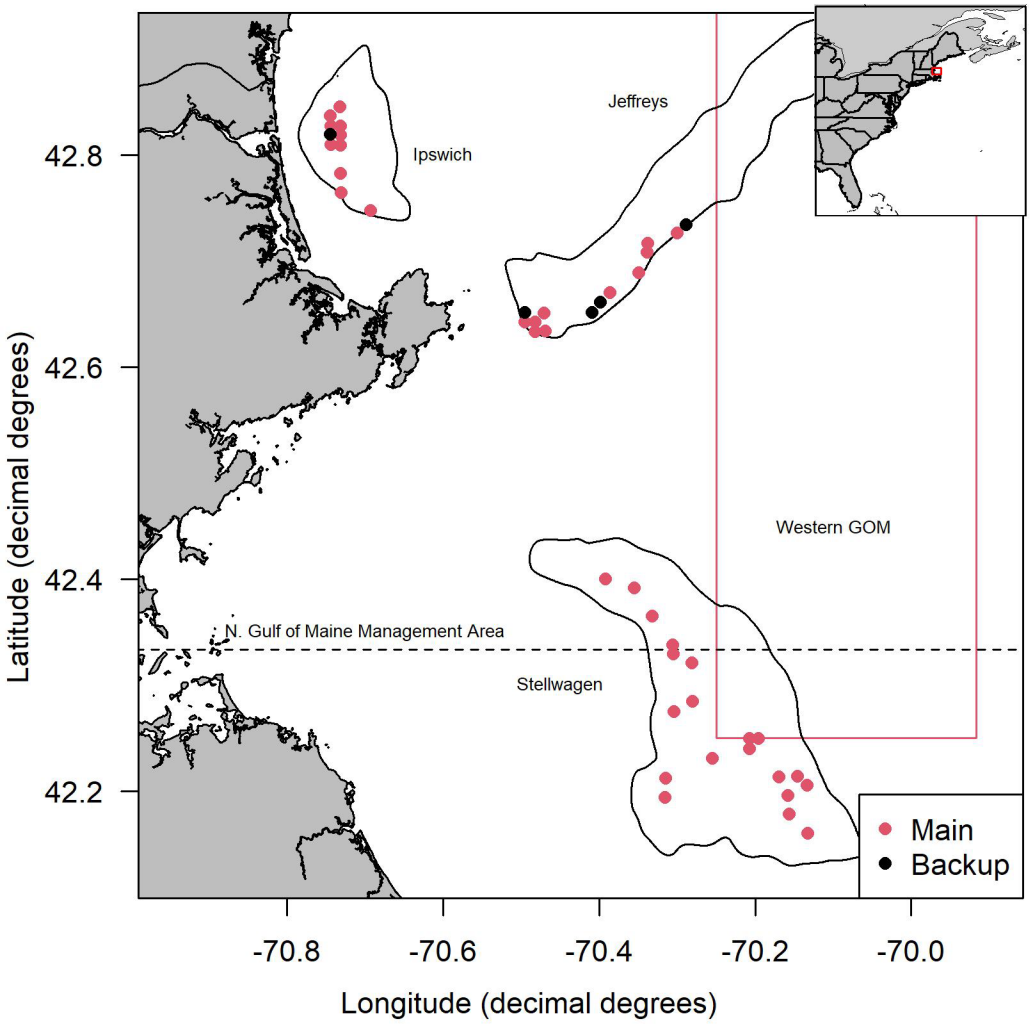

Figure 3. The proposed SMAST dredge survey stations (red) and backups (black). The backups were in case any stations could not be towed due to rough bottom or static gear. The purpose of this survey is to obtain scallop samples to dissect for shell height to meat weight regressions.

2.0 2026 SURVEY BIOMASS ESTIMATES

Drop camera. **Size cutoff for estimates is 40 mm.**

Area	Sub-Area		Abundance (mil.)	Biomass (mt)	SE	Avg. Weight (g)	Avg. Size (mm)	Avg. Density (#/m^2)	# Stations, all 1 km grid
NGOM	Platts Bank		4.8	66	13	13.83	93.3	0.010	92
	Ipswich Bay	SMAST domain	6.8	121	13	17.91	98.2	0.072	94
	Jeffreys Ledge	SMAST domain	5.7	110	10	19.15	96.3	0.031	186
	Stellwagen Bank (AOI from 2025)	SMAST domain	12.4	253	20	20.45	93.8	0.094	130
	NGOM Total		**29.7**	**550**	**56**	**-**	**-**	**-**	**502**
Non-NGOM	Stellwagen Bank (Stellwagen South)		71.8	428	18	5.96	60.5	0.230	312
	WGOM Closure (Stellwagen)		49.3	2401	212	48.67	133.9	0.533	96
	Ipswich Bay (MA State Waters)		1.6	15	3	9.37	77.2	0.050	30
	WGOM Closure (Jeffreys)		30.2	776	52	25.67	107.9	0.139	208

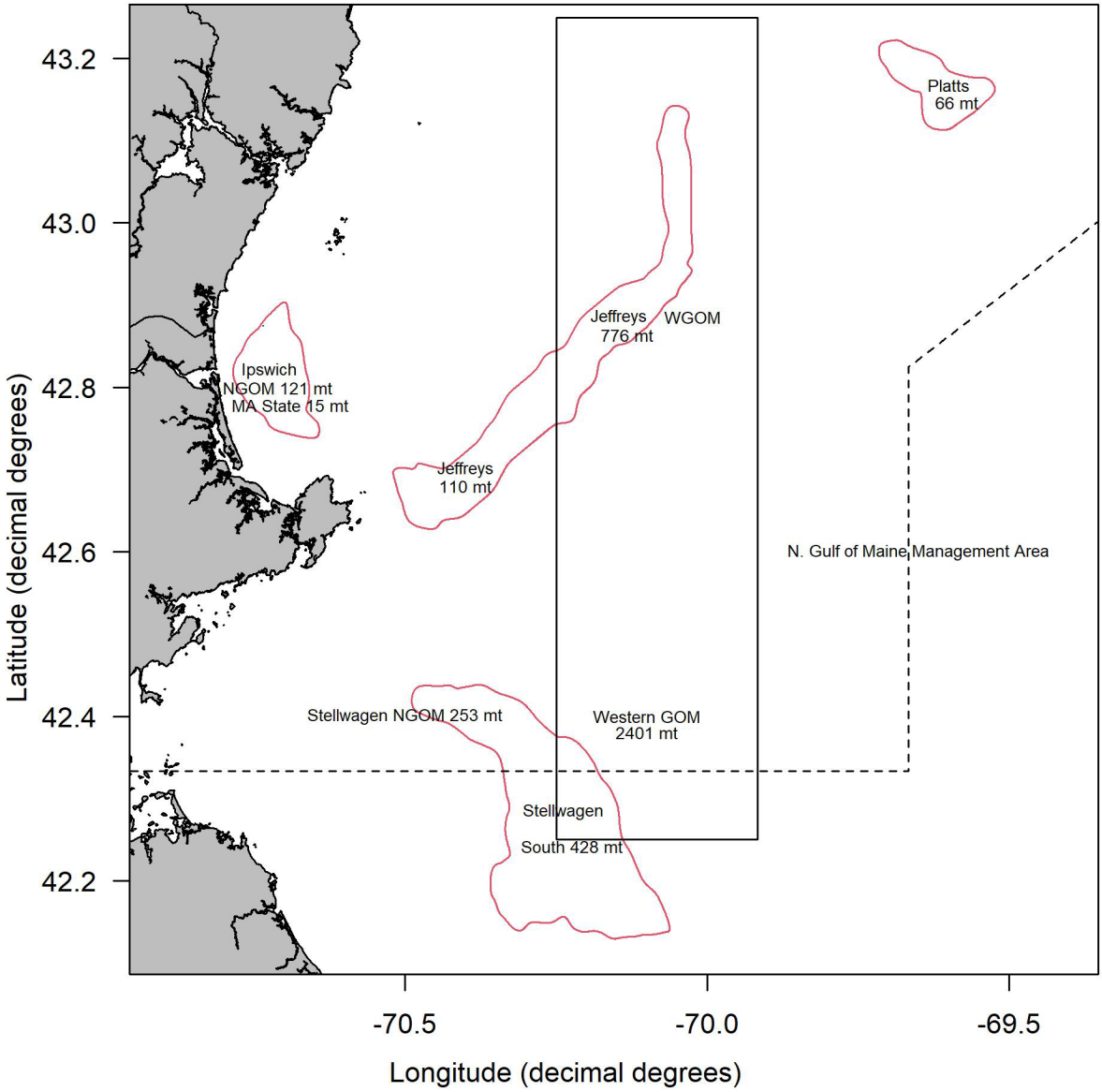

Figure 4. School for Marine Science and Technology Drop Camera Survey biomass estimates from 2026 for scallops ≥ 40 mm shell height, in metric tons, in the Gulf of Maine.

3.0 FIGURES OF SURVEY COVERAGE

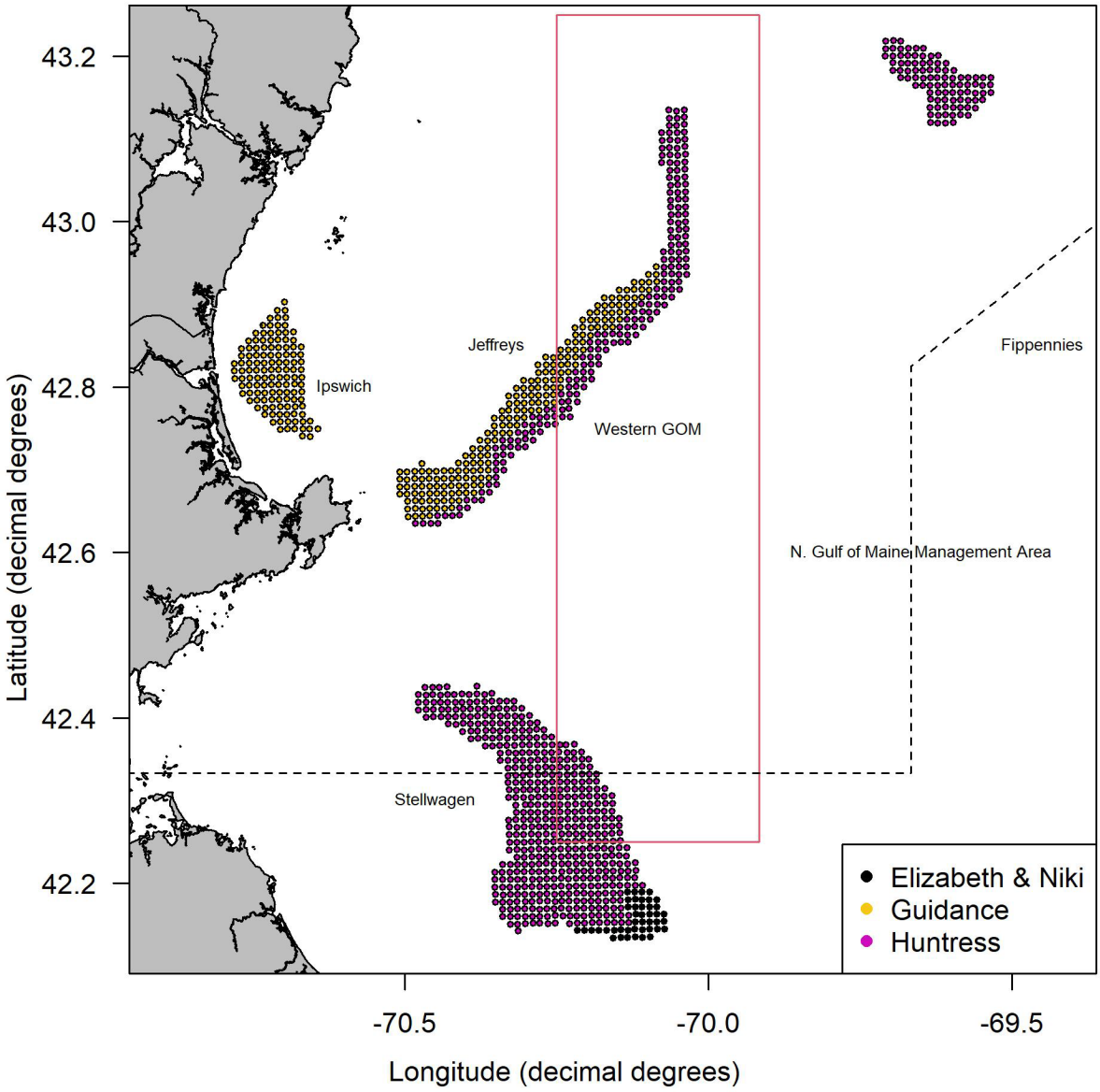

Figure 5. School for Marine Science and Technology Drop Camera Survey station locations by sampling vessel in the Gulf of Maine in 2026. Stations were attempted to be 1 km apart.

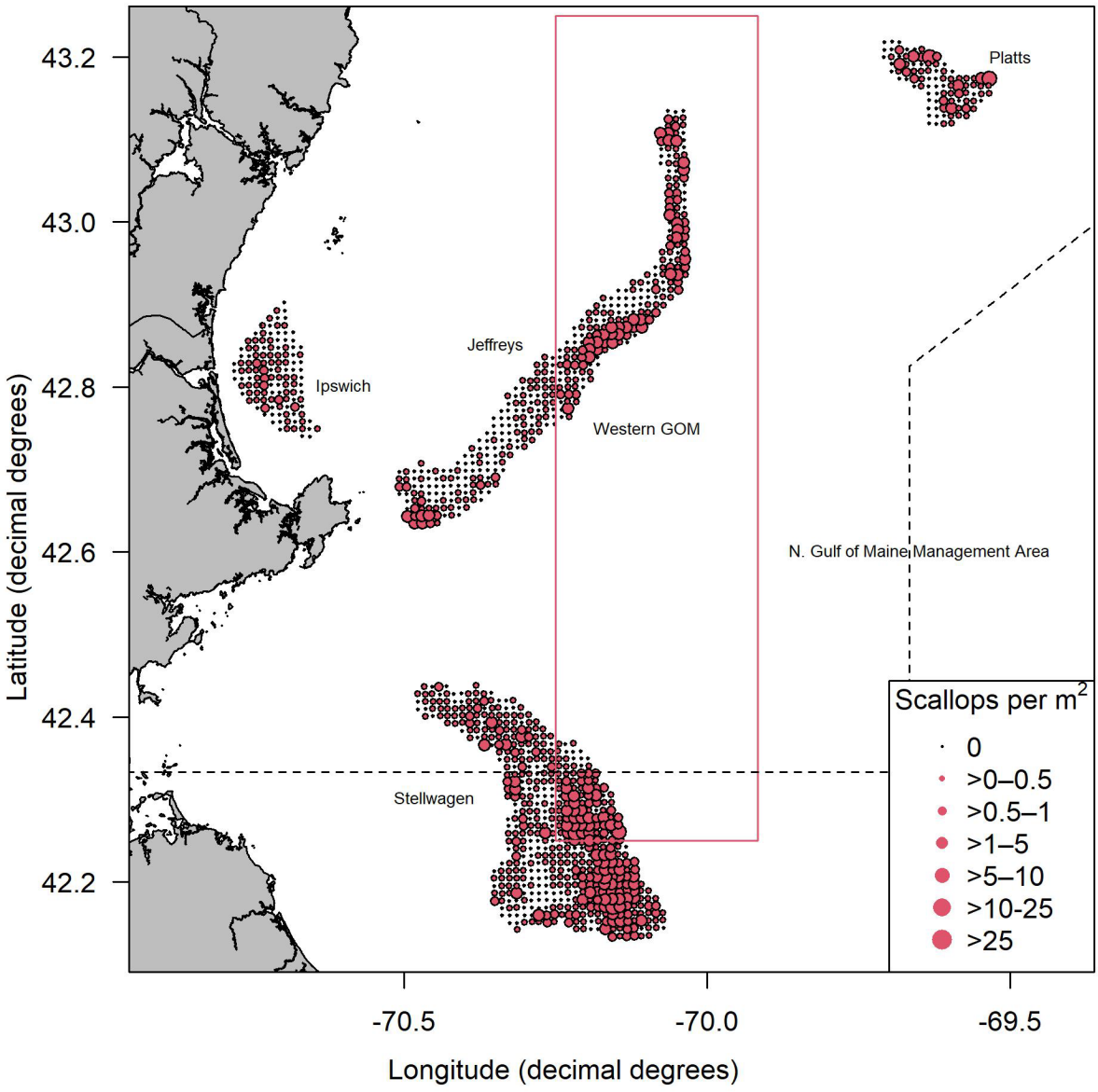

Figure 6. Mean scallop density (number of scallops of all sizes per m^2, including less than 40 mm shell height) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey in the Gulf of Maine.

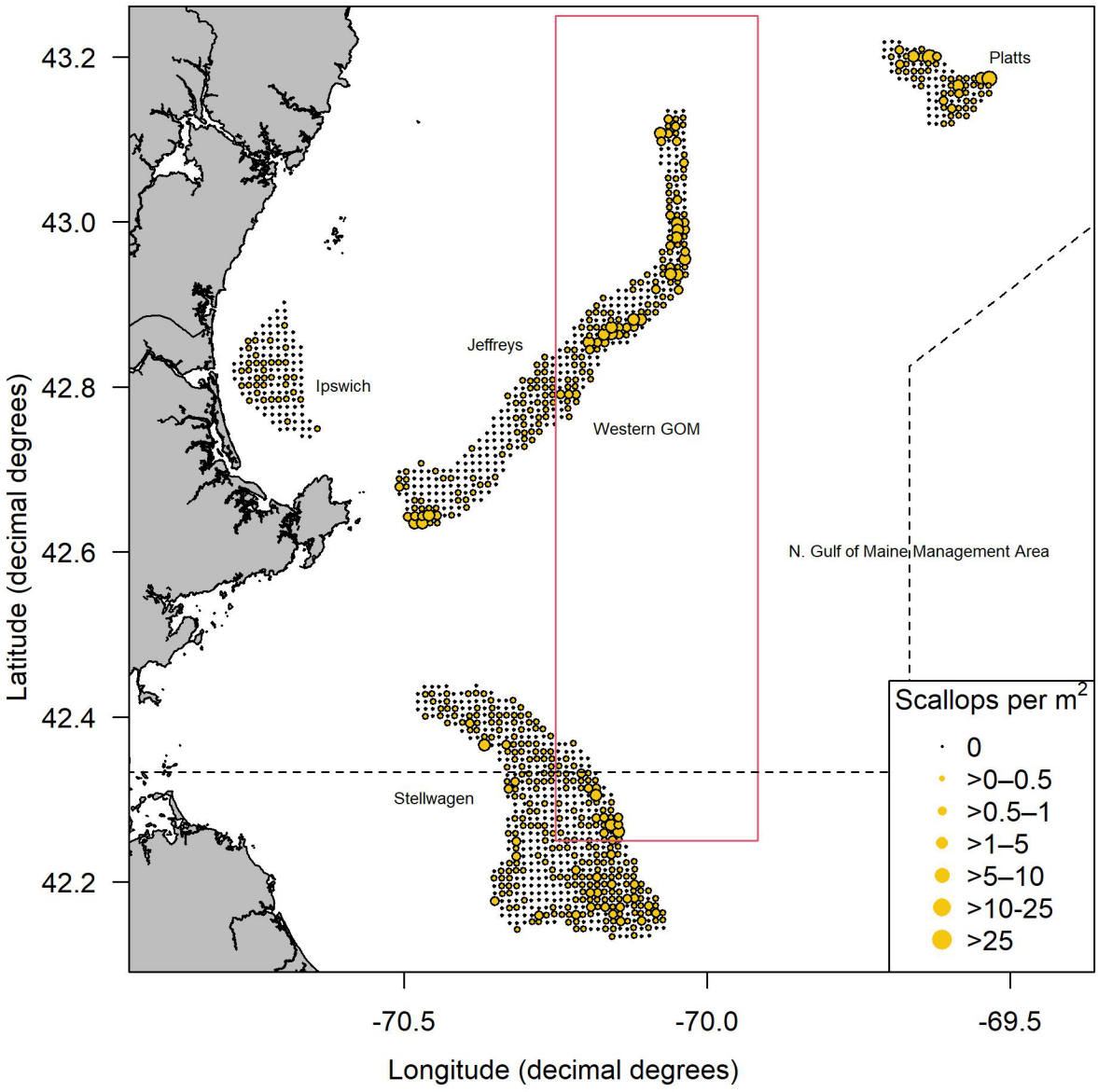

Figure 7. Mean pre-recruit scallop density (scallops less than 35 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey in the Gulf of Maine.

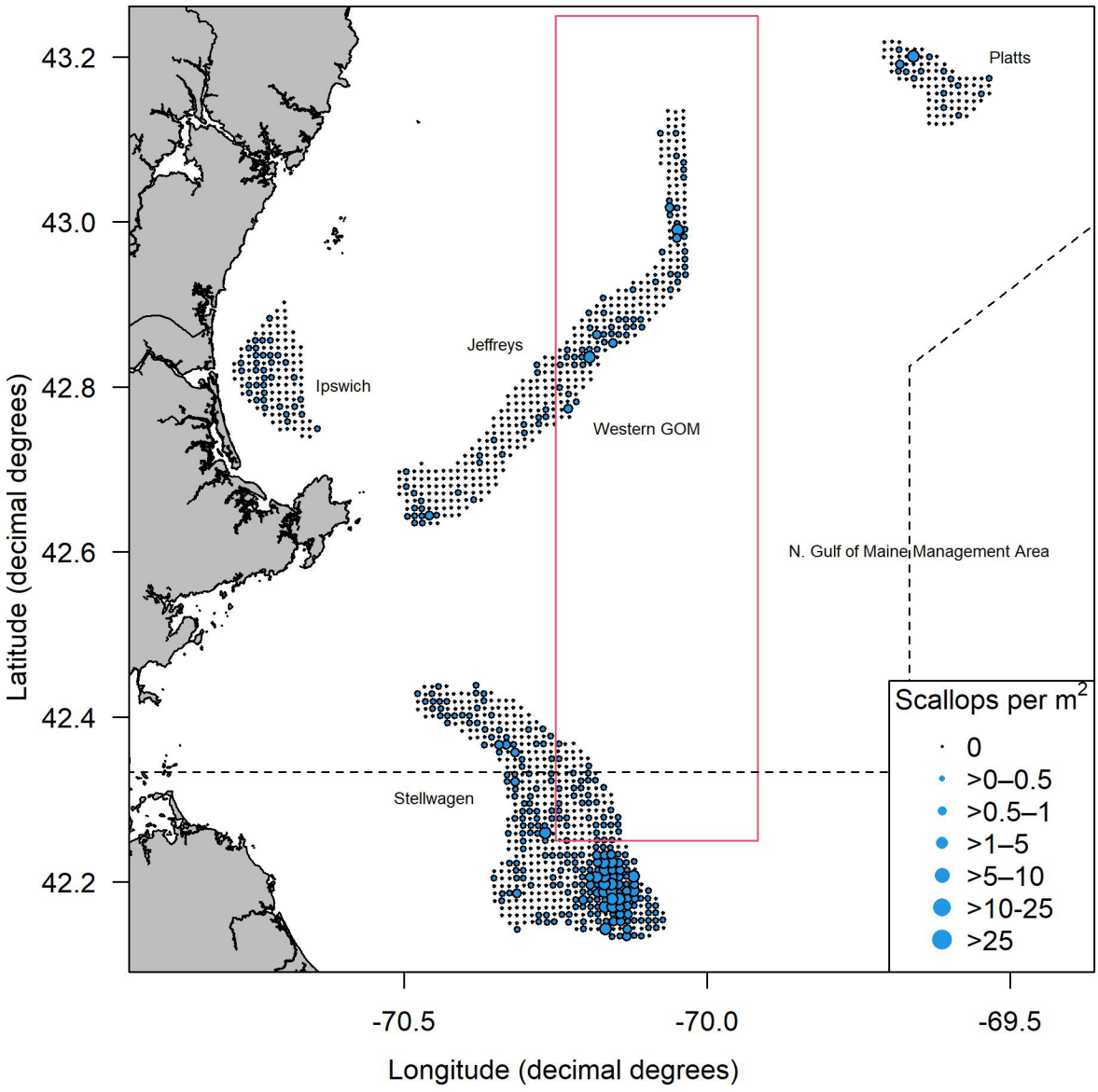

Figure 8. Mean recruit scallop density (scallops 35 to 75 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey in the Gulf of Maine.

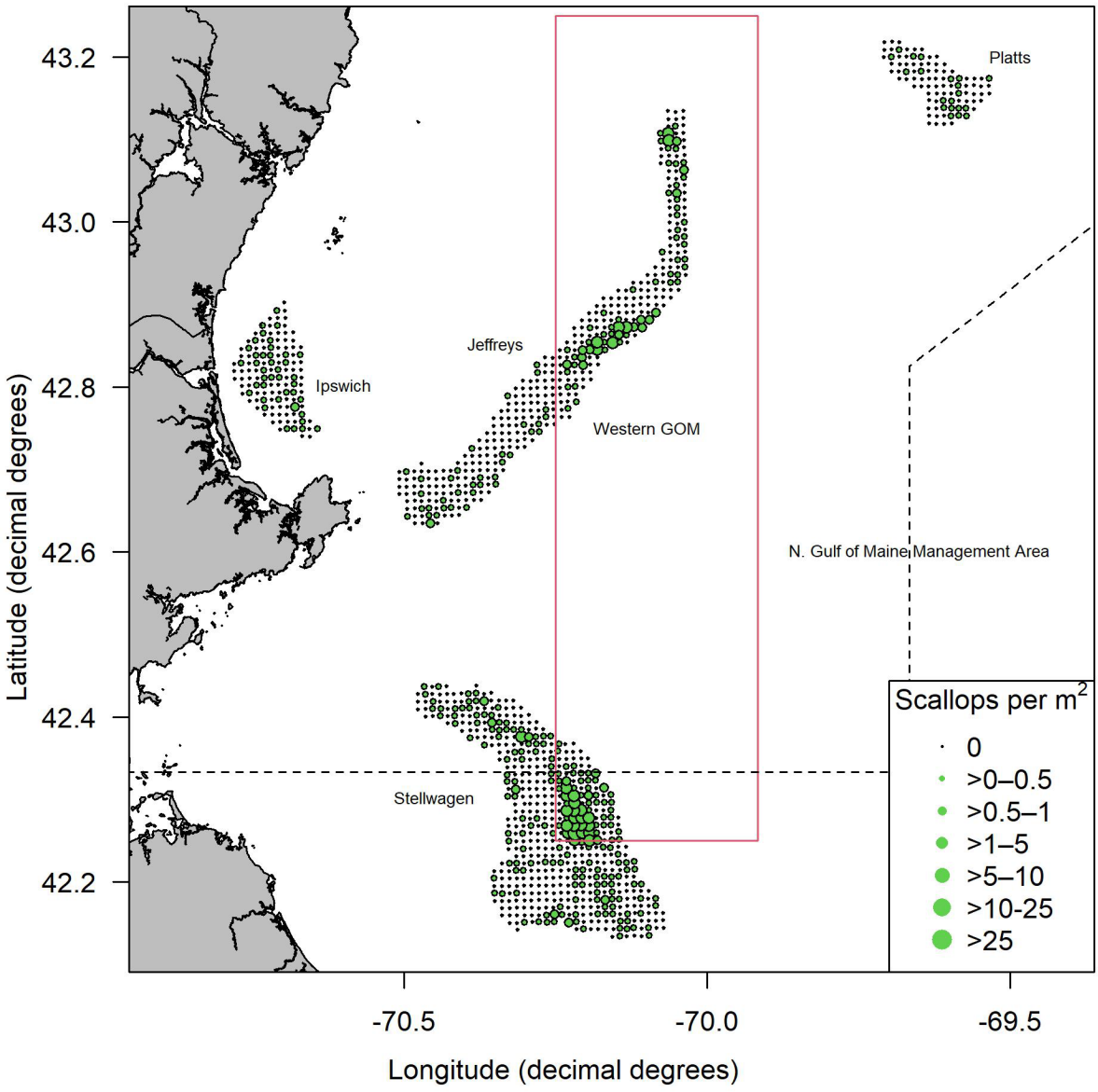

Figure 9. Mean recruited scallop density (scallops greater than 75 mm shell height per m^2) at each station from the 2026 School for Marine Science and Technology Drop Camera Survey in the Gulf of Maine.

4.0 LENGTH FREQUENCY PLOTS BY SAMS AREA

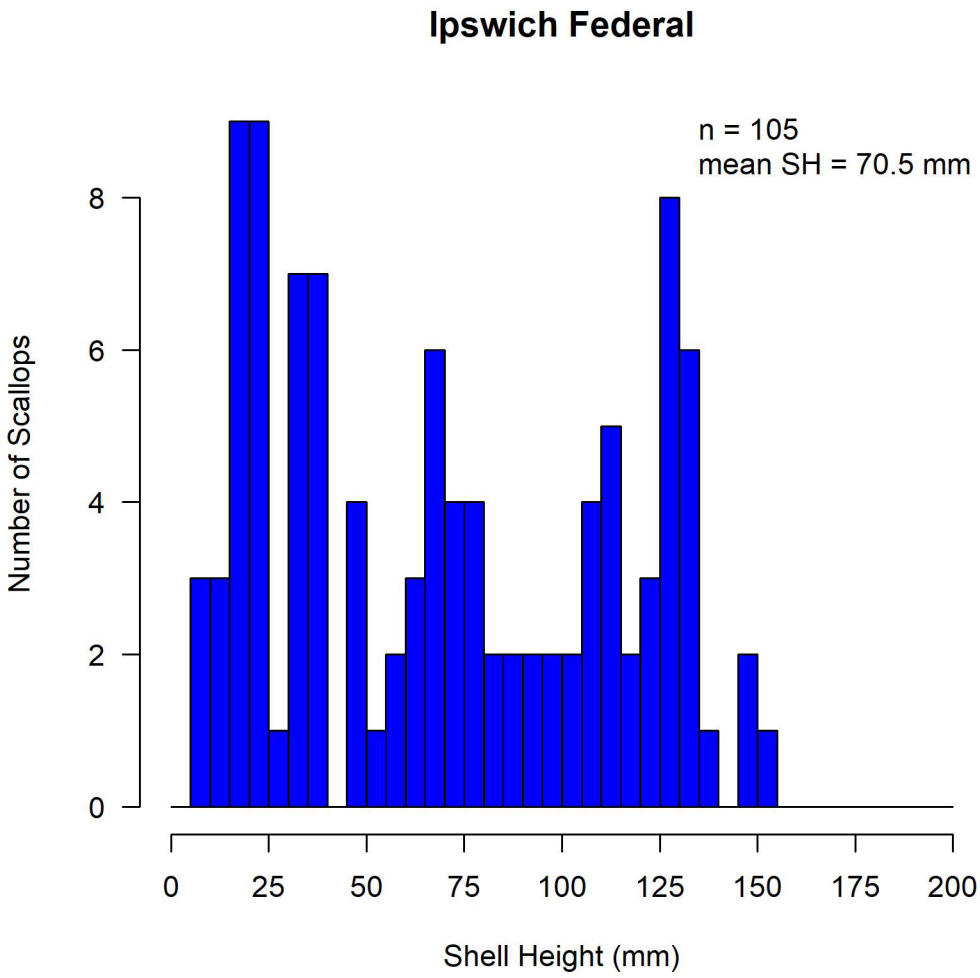

Figure 10. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Ipswich Bay within the Northern Gulf of Maine Federal area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

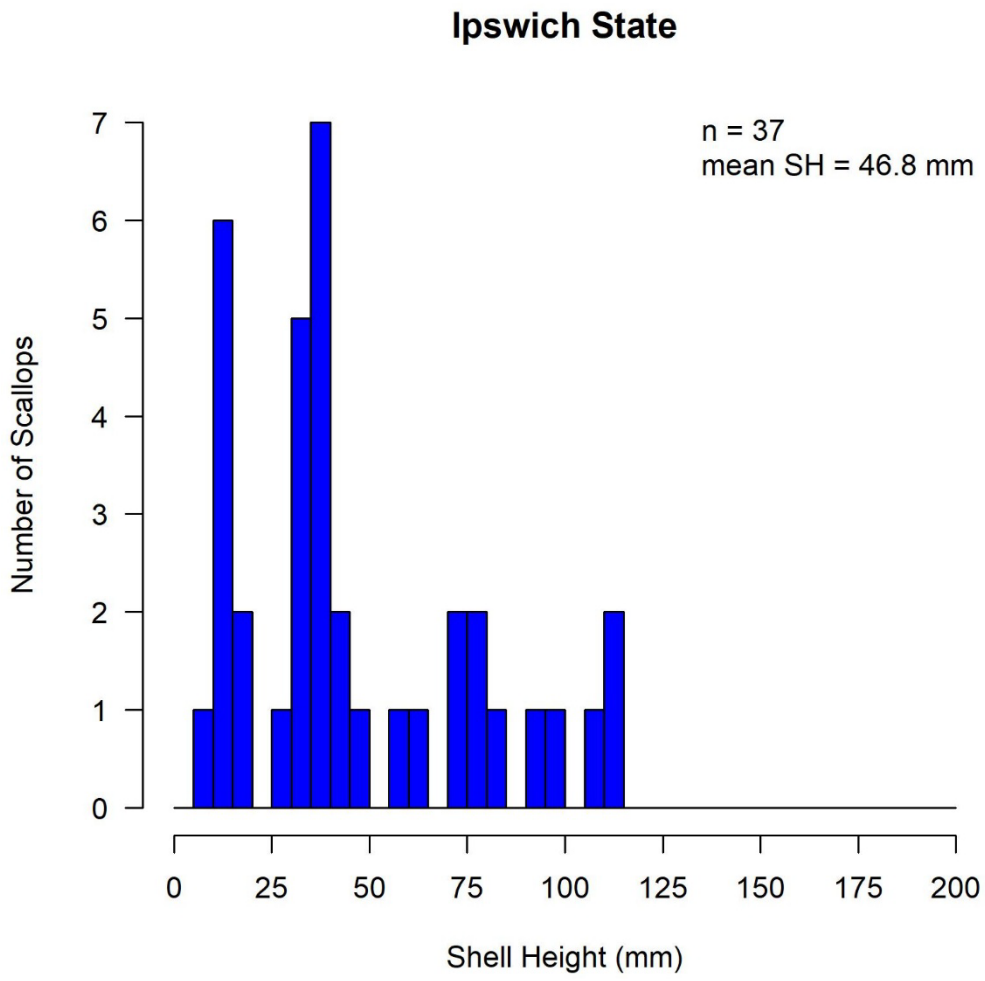

Figure 11. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Ipswich Bay in Massachusetts State waters in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

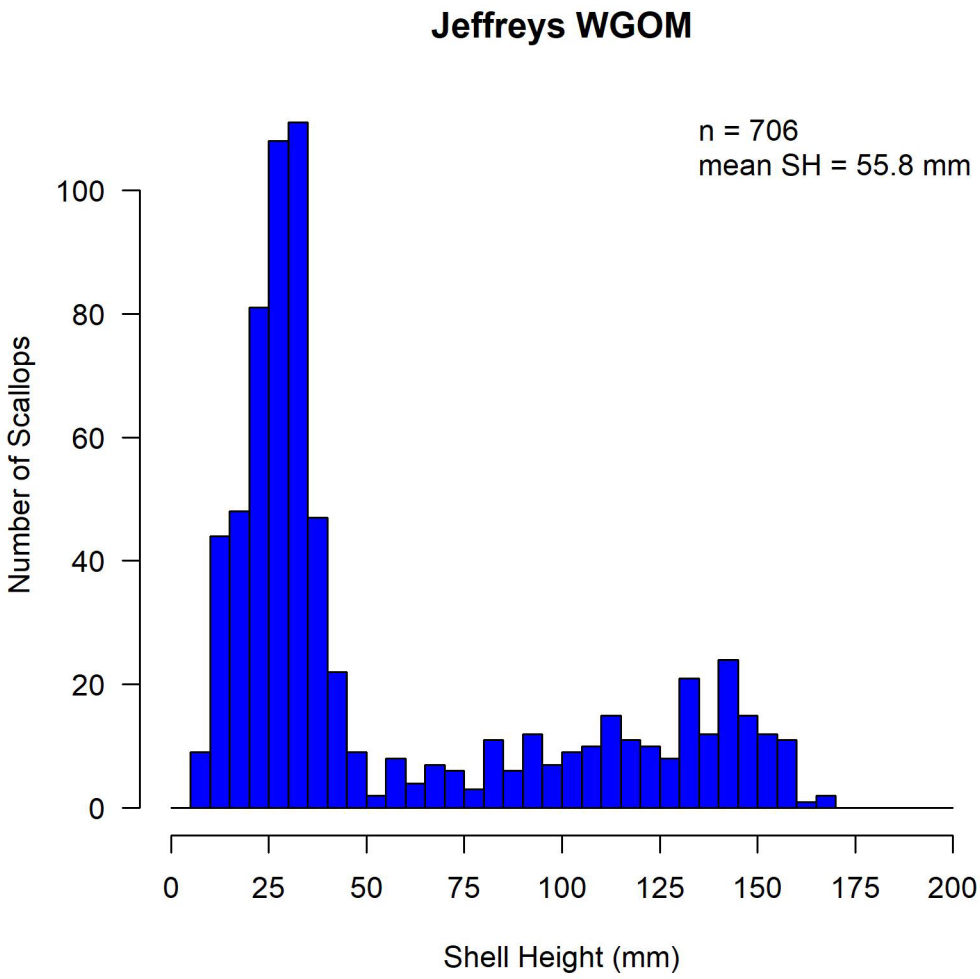

Figure 12. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Jeffreys Ledge within the Western Gulf of Maine Closure Area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

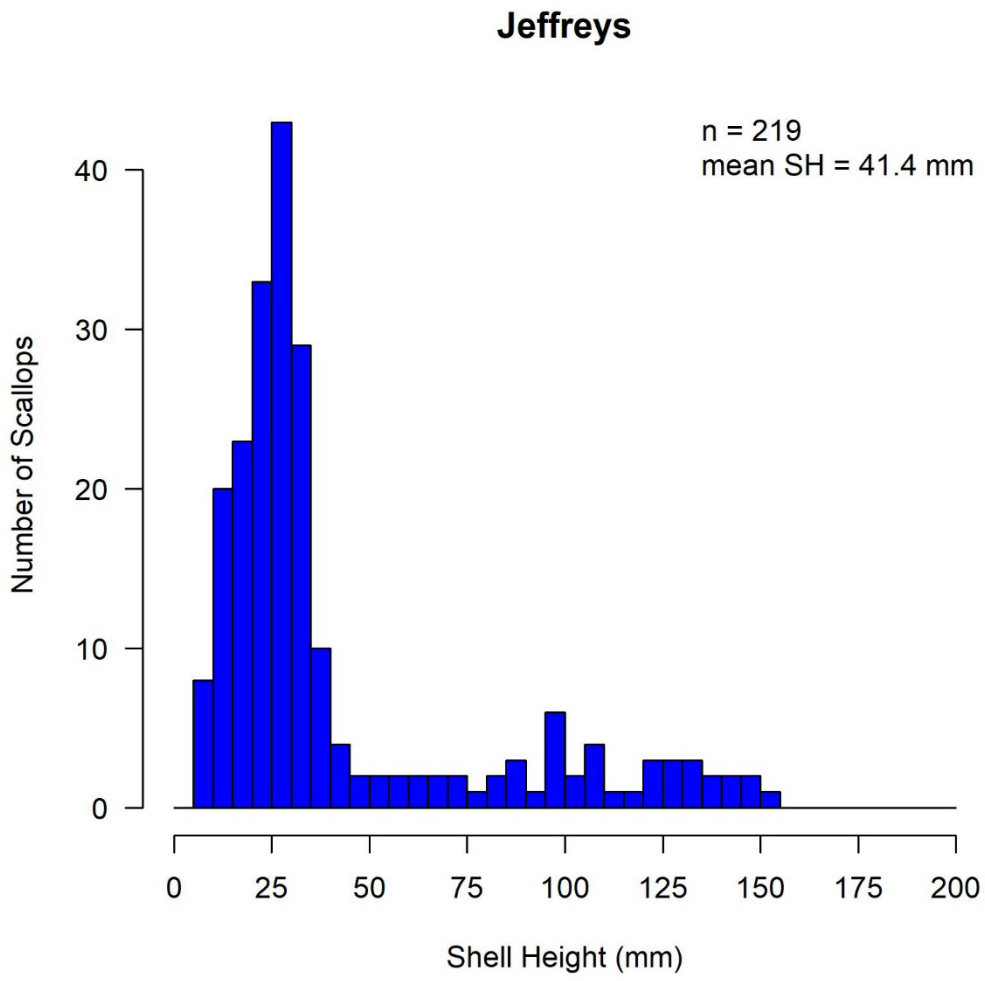

Figure 13. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Jeffreys Ledge outside the Western Gulf of Maine Closure Area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

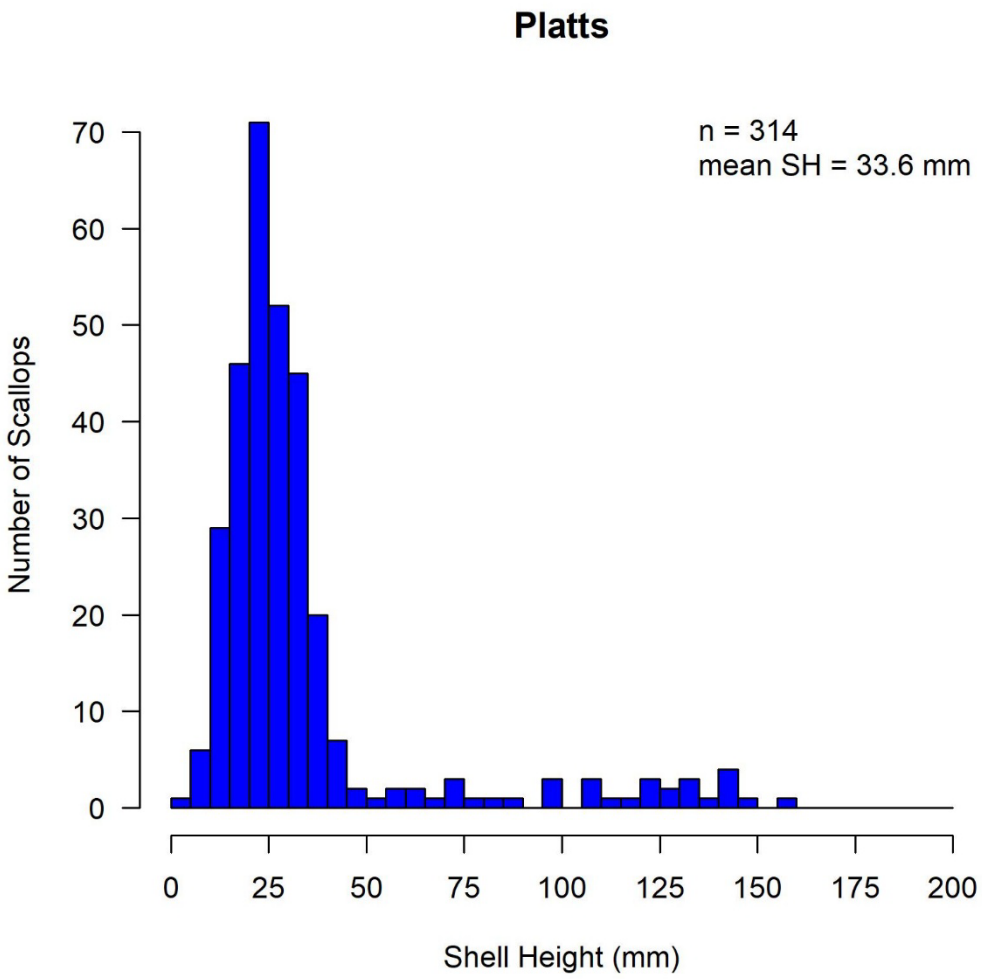

Figure 14. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey on Platts Bank in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

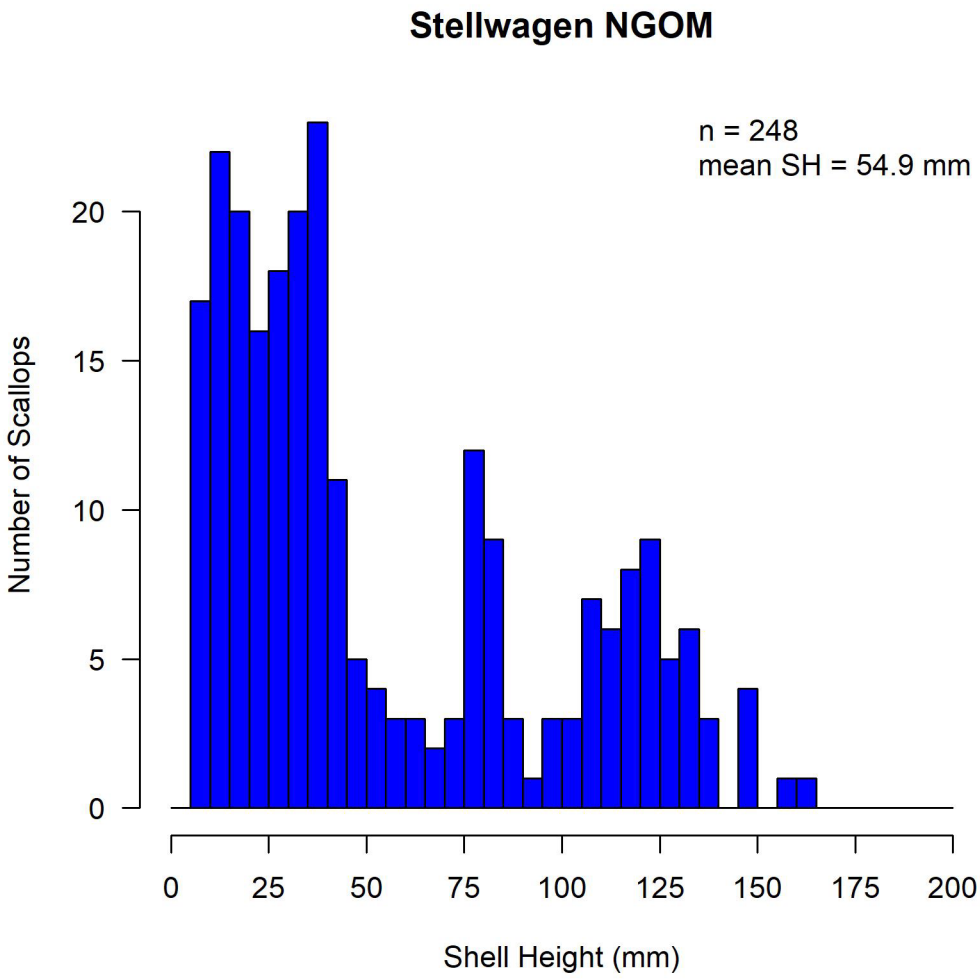

Figure 15. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Stellwagen Bank inside the Northern Gulf of Maine management area and outside the Western Gulf of Maine Closure Area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

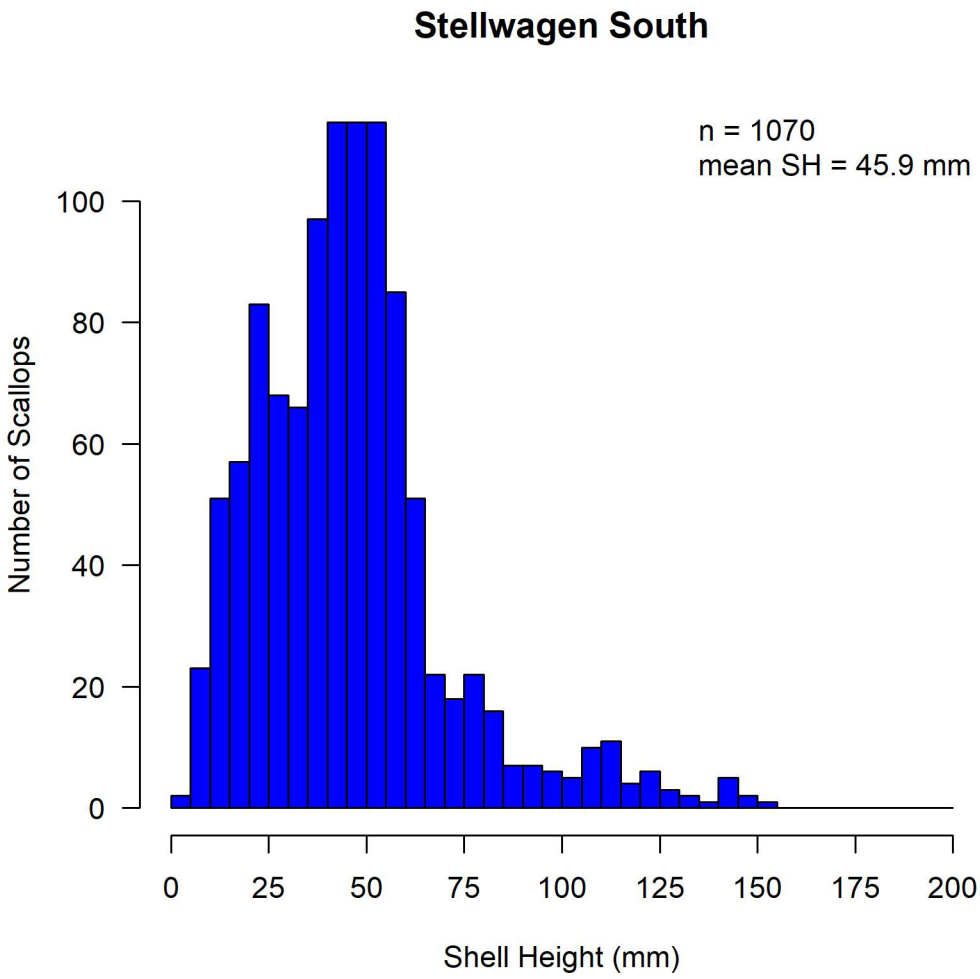

Figure 16. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Stellwagen Bank outside both the Northern Gulf of Maine management area and the Western Gulf of Maine Closure Area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

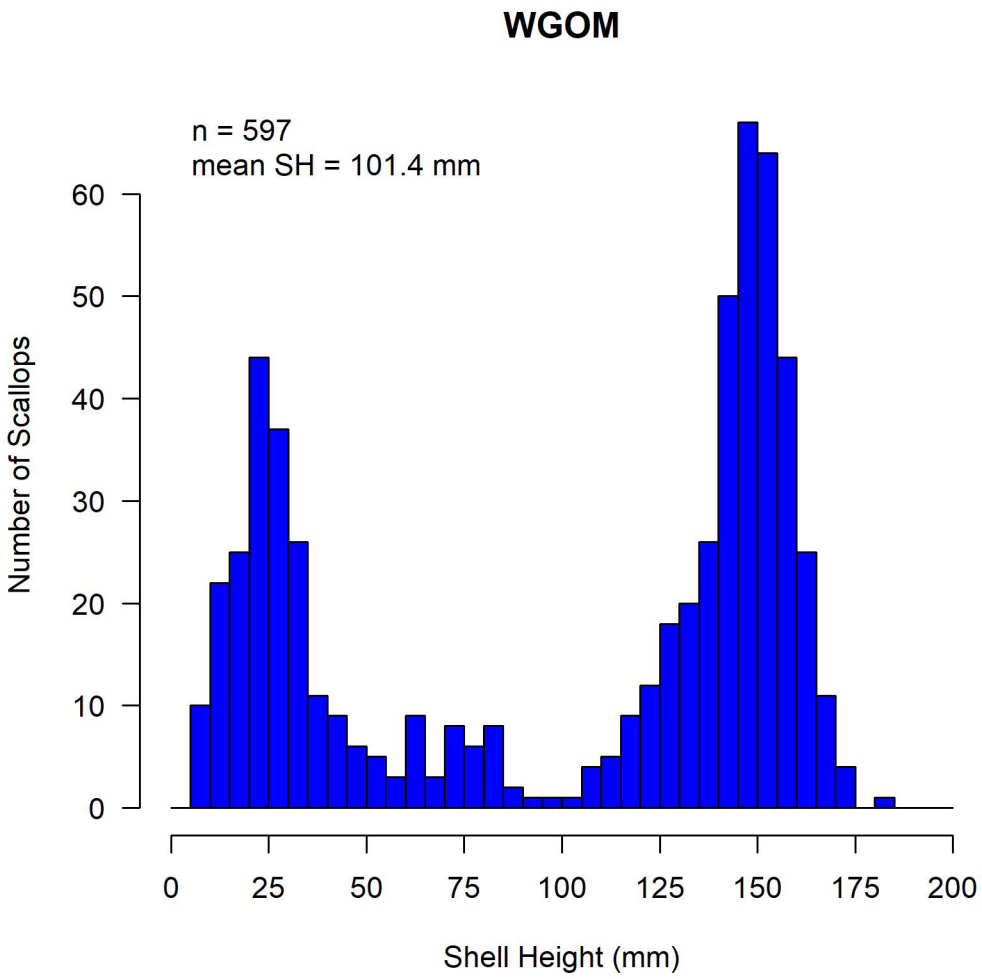

Figure 17. Shell height distribution (5 mm bins) of scallops measured by the School for Marine Science and Technology Drop Camera Survey in the part of Stellwagen Bank inside the Western Gulf of Maine Closure Area in 2026. The number of scallops measured, and the mean shell height are also displayed in the figure.

5.0 EXPLOITABLE BIOMASS ESTIMATES FOR 2026 (CURRENT FY)

Size cutoff for estimates is 40 mm.

Area	Sub-Area		Exp. Abundance (mil.)	Exp. Biomass (mt)	SE	Avg. Weight (g)
NGOM	Platts Bank		1.7	37	7	21.34
	Ipswich Bank	SMAST domain	2.6	67	7	25.90
	Jeffreys Ledge	SMAST domain	2.1	62	6	29.15
	Stellwagen Bank (AOI from 2025)	SMAST domain	4.4	140	11	31.77
	NGOM Total		**10.8**	**306**	**31**	**-**
Non-NGOM	Stellwagen Bank (Stellwagen South)		9.5	143	6	15.01
	WGOM Closure (Stellwagen)		33.3	1874	166	56.24
	Ipswich Bay (MA State Waters)		0.3	5	1	14.13
	WGOM Closure (Jeffreys)		14.3	518	35	36.30
	Non-NGOM Total		**57.4**	**2540**	**208**	**-**

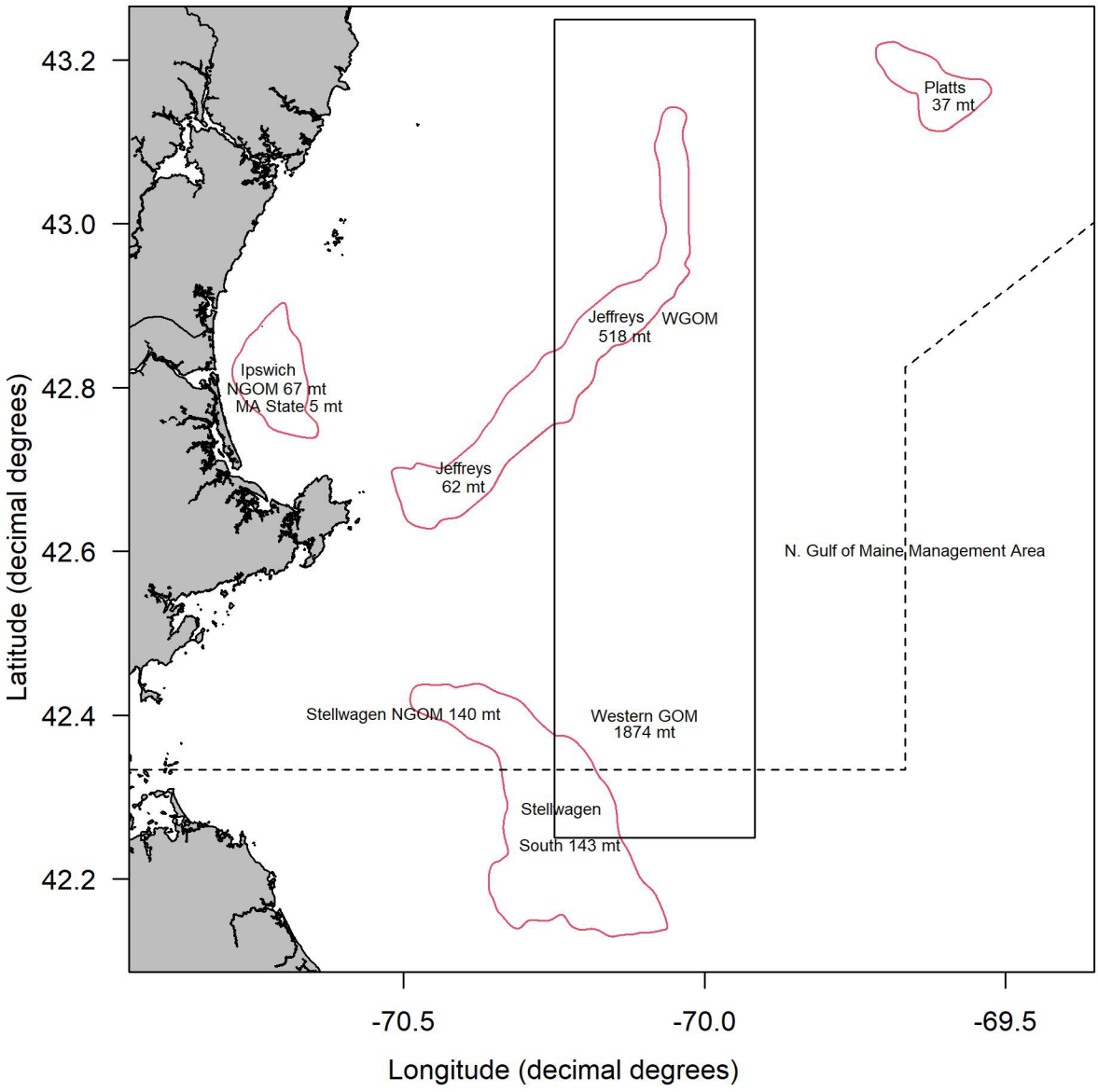

Figure 18. School for Marine Science and Technology Drop Camera Survey exploitable biomass (estimated using a selectivity curve) estimates from 2026, in metric tons, in the Gulf of Maine.

6.0 COMPARISON WITH PREVIOUS YEARS ESTIMATES

			Abundance (mil.)			Biomass (mil.)			Exploitable Biomass (mil.)		
Area	**Sub-Area**		**2025**	**2026**	**Percent Difference (%)**	**2025**	**2026**	**Percent difference (%)**	**2025**	**2026**	**Percent Difference (%)**
NGOM	Platts Bank		3.2	4.8	50	60	66	10	36	37	4
	Ipswich Bank	SMAST domain	4.7	6.8	43	130	121	-7	75	67	-11
	Jeffreys Ledge	SMAST domain	8.0	5.7	-28	188	110	-42	113	62	-45
	Stellwagen Bank (AOI from 2025)	SMAST domain	16.7	12.4	-26	389	253	-35	219	140	-36
	NGOM Total		**32.6**	**29.7**	**-9**	**767**	**550**	**-28**	**443**	**306**	**-31**
Non-NGOM	Stellwagen Bank (Stellwagen South)		23.3	71.8	208	297	428	44	128	143	12
	WGOM Closure (Stellwagen)		54.9	49.3	-10	2559	2401	-6	1968	1874	-5
	Ipswich Bay (MA State Waters)		1.1	1.6	42	15	15	-1	7	5	-26
	WGOM Closure (Jeffreys)		24.1	30.2	26	721	776	8	502	518	3
	Non-NGOM Total		**103.4**	**152.9**	**48**	**3592**	**3620**	**1**	**2605**	**2540**	**-2**
Total			**135.9**	**182.6**	**34**	**4358.2**	**4170.2**	**-4**	**3047.0**	**2845.1**	**-7**

7.0 SHELL-HEIGHT MEAT WEIGHT COMPARISONS

Comparison of biomass estimates from the 2026 School for Marine Science and Technology drop camera survey using different shell height meat weight equations in selected areas. Stations were 0.54 nautical miles apart. The primary DMR/SMAST shell height meat weight equation was derived from dredge sampling conducted in 2016, 2019, 2021, 2022, 2023, 2024 and 2025, and is compared to an additional year of data collected in 2026. The Platts equation was derived from Platts samples only from 2016, 2019, 2024, and 2025, and is compared to additional year of data in 2026. All values are for scallops greater than or equal to 40 mm in shell height. Both Platts equations and the 2025 Ipswich-Jeffreys-Stellwagen equation are detailed in the Methods of this report. The estimated 2026 equation for Ipswich-Jeffreys-Stellwagen was:

$$MW = \exp(-10 + 2.946 * \ln(SH) - 0.1955 * \ln(D) - 0.0004299 * L + area)$$

The area specific values were Ipswich = -0.1120070; Jeffreys = 0.0206076; Stellwagen = 0.0852951.

	Biomass estimate using: DMR & SMAST combined 2016 to 2025 equation.	Biomass estimate using: DMR & SMAST combined 2016 to 2026 equation.
NGOM Stellwagen Bank		
Average meat weight (g)	19.10	20.45
Biomass (mt)	237	253
Standard error	19	20
Exploitable average meat weight (g)	29.67	31.77
Exploitable biomass (mt)	130	140
Exploitable standard error	10	11
Non-NGOM Stellwagen Bank (Stellwagen South)		
Average meat weight (g)	5.56	5.96
Biomass (mt)	399	428
Standard error	17	18
Exploitable average meat weight (g)	13.99	15.01
Exploitable biomass (mt)	133	143
Exploitable standard error	6	6
Ipswich Bank		

Average meat weight (g)	20.36	17.91
Biomass (mt)	138	121
Standard error	15	13
Exploitable average meat weight (g)	29.44	25.90
Exploitable biomass (mt)	76	67
Exploitable standard error	8	7
Non-NGOM Ipswich Bay		
Average meat weight (g)	10.72	9.37
Biomass (mt)	17	15
Standard error	3	3
Exploitable average meat weight (g)	16.16	14.13
Exploitable biomass (mt)	6	5
Exploitable standard error	1	1
Jeffreys Ledge (outside WGOM)		
Average meat weight (g)	18.98	19.15
Biomass (mt)	109	110
Standard error	10	10
Exploitable average meat weight (g)	28.87	29.15
Exploitable biomass (mt)	62	62
Exploitable standard error	6	6
Jeffreys Ledge (inside WGOM)		
Average meat weight (g)	25.32	25.67
Biomass (mt)	766	776
Standard error	51	52
Exploitable average meat weight (g)	35.80	36.30

Exploitable biomass (mt)	511	518
Exploitable standard error	34	35
Stellwagen Bank (outside WGOM)		
Average meat weight (g)	45.30	48.67
Biomass (mt)	2234	2401
Standard error	197	212
Exploitable average meat weight (g)	52.34	56.24
Exploitable biomass (mt)	1744	1874
Exploitable standard error	154	166
Platts Bank (using Platts specific equations)		
Average meat weight (g)	14.13	13.83
Biomass (mt)	68	66
Standard error	13	13
Exploitable average meat weight (g)	21.77	21.34
Exploitable biomass (mt)	38	37
Exploitable standard error	7	7

8.0 SPECIAL COMMENTS

We observed pockets of recruitment throughout Jeffreys Ledge, Platts Bank, and Stellwagen Bank. On Jeffreys and Stellwagen there were high-density pre-recruit stations inside the Western Gulf of Maine Closure Area portions of these banks, with more sporadic stations in the parts open to fishing.