An Assessment of Sea Scallop Abundance and Distribution in the Mid-Atlantic Bight and Georges Bank Resource Areas

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Preliminary – PDT use only

2026 VIMS-Industry Cooperative Survey

- Sampling design
  - Stratified random design
    - NMFS shellfish strata
    - SAMS Areas included in survey domains
  - Station Allocation
    - Hybrid approach – stratum area & prior year catch data (biomass & number)
- Tow a survey dredge & commercial dredge simultaneously
  - Survey dredge – 8 ft in width, 2 in rings & 1.5 in diamond mesh liner
  - Commercial dredge – varies by vessel and area
  - Survey dredge performance monitored

Biomass Estimation

- **Biomass calculated using swept area method (Cochran, 1997)**
- **Area swept per tow (a_s)**
  - **Navigational info**
  - **Tilt sensor**
- **Catch weight per tow (C_h)**
  - **Expanded length frequencies ≥ 40 mm**
  - **SHMW relationships from 2025 research track assessment or determined by PDT**
  - **Selectivity (Roman and Rudders, 2019)**
- **Efficiency (E_s)**
  - **Values from Miller et al. (2018) for survey dredge:**
    - **.40 in soft bottom**
  - **Commercial Dredge = .65**

Stratified mean biomass per tow in stratum and SAMS Area

$$\bar{C}_{h,s} = \frac{1}{n_h}\sum_{i=1}^{h} C_{i,h,s}$$

$$Var(\bar{C}_{h,s}) = \frac{1}{n_h(n_h-1)}\sum_{i=1}^{n_h}(C_{i,h,s} - \bar{C}_{h,s})^2$$

Stratified mean biomass per tow in SAMS Area

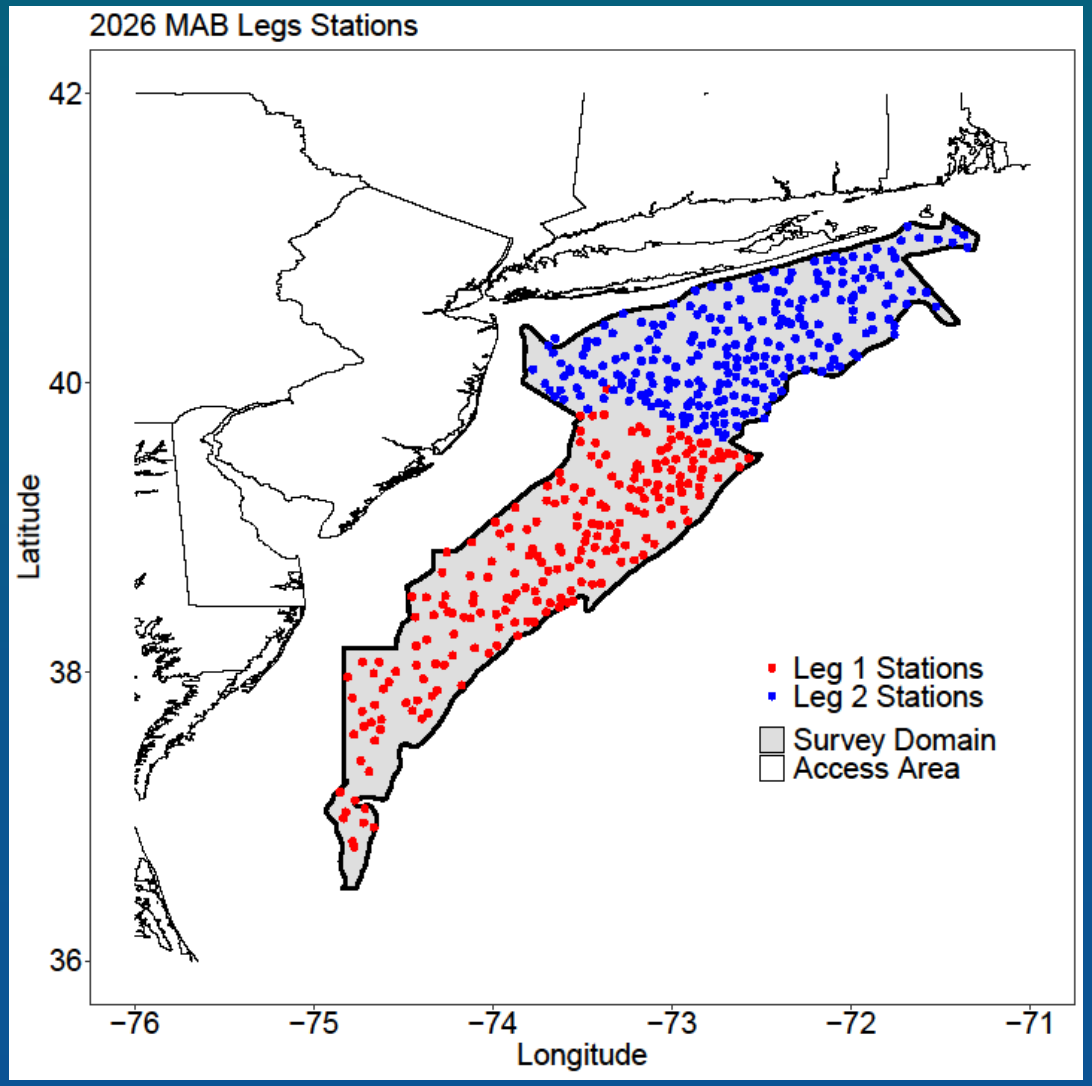
$$\bar{C}_s = \sum_{h=1}^{L} W_h \cdot \bar{C}_{h,s}$$

$$Var(\bar{C}_s) = \sum_{h=1}^{L} W_h^2 \cdot Var(\bar{C}_h)$$

Total biomass in SAMS Area

$$\widehat{B_s} = \left(\frac{\left(\frac{\bar{C}_s}{\bar{a}_s}\right)}{E_s}\right) A_s \qquad Var(\widehat{B_s}) = Var(\bar{C}_s) \cdot \left(\frac{A_s}{\bar{a}_s}\right)^2$$

2026 MAB Legs



First Leg

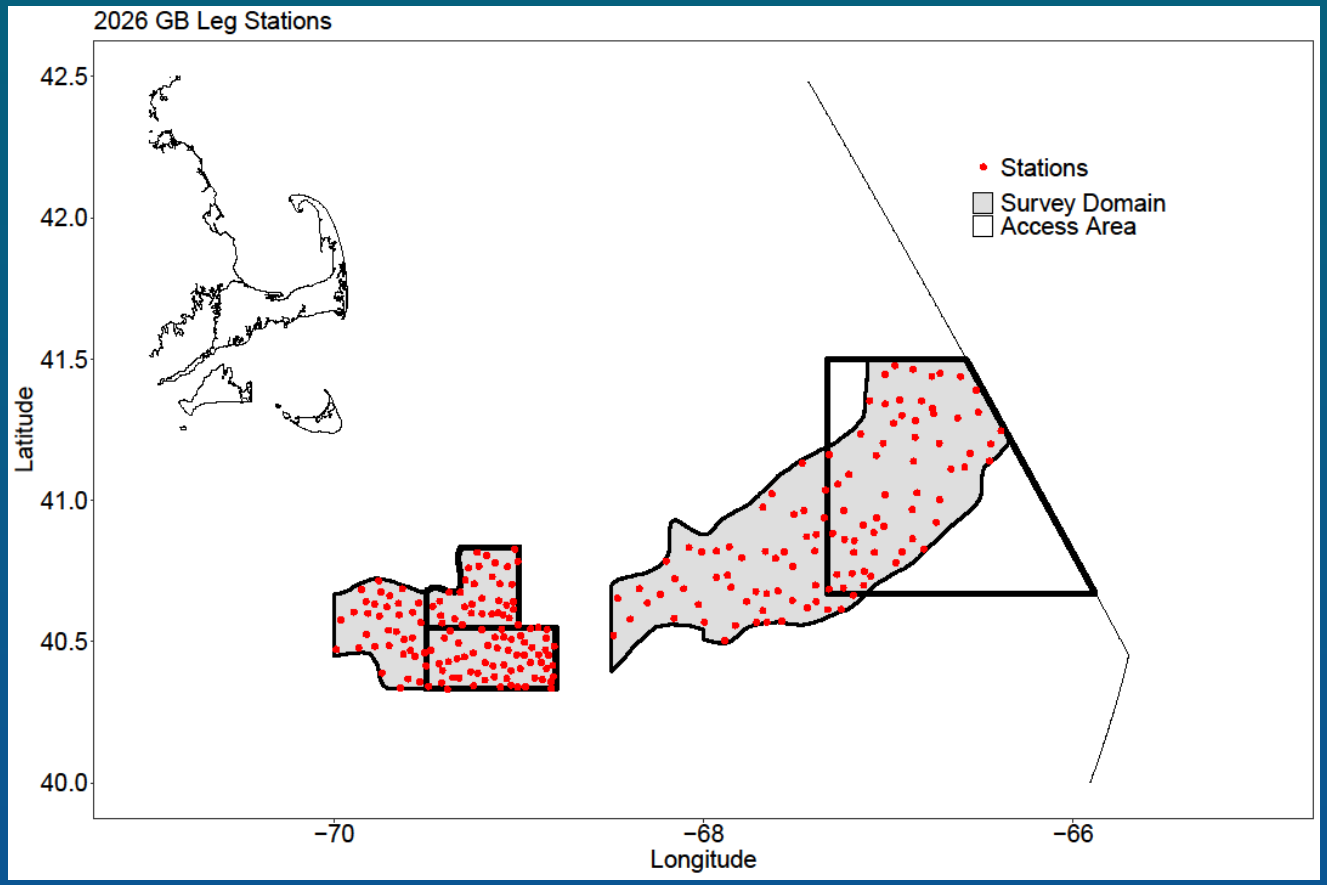
- **F/V Carolina Capes II**
- **5/11-5/21**

Second Leg

- **F/V Carolina Boy**
- **5/29-6/9**

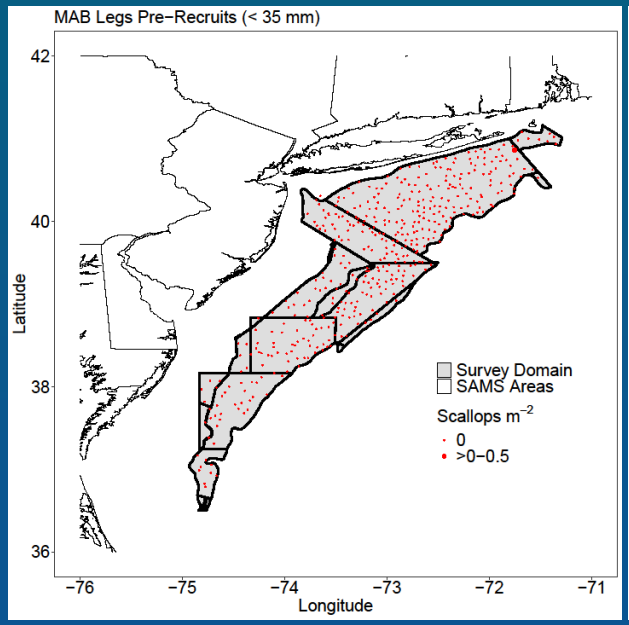
- **446 stations completed**

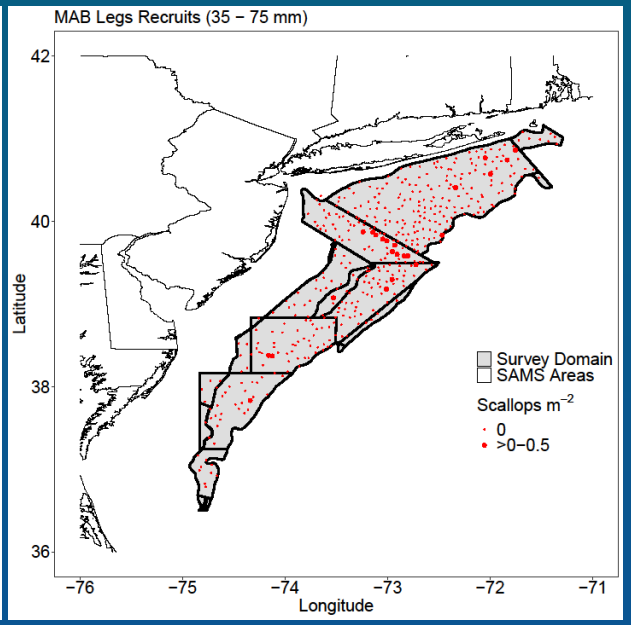
2026 GB Leg

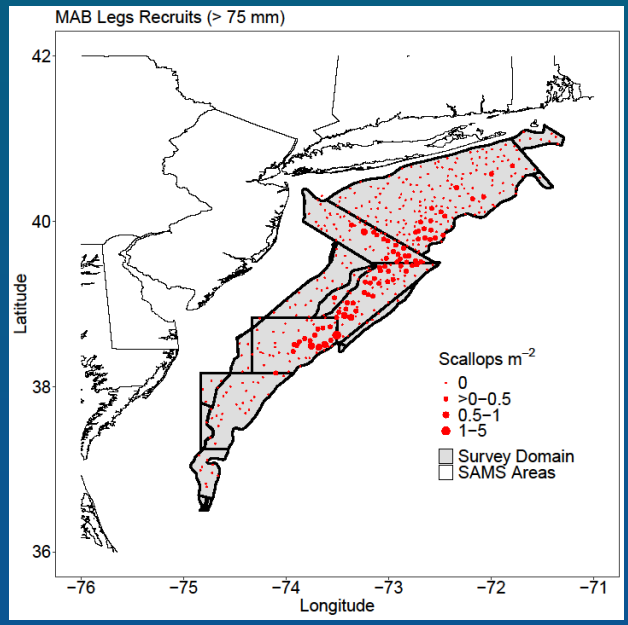


- F/V Queen of Peace
  - 6/17-6/26
- 240 Stations completed

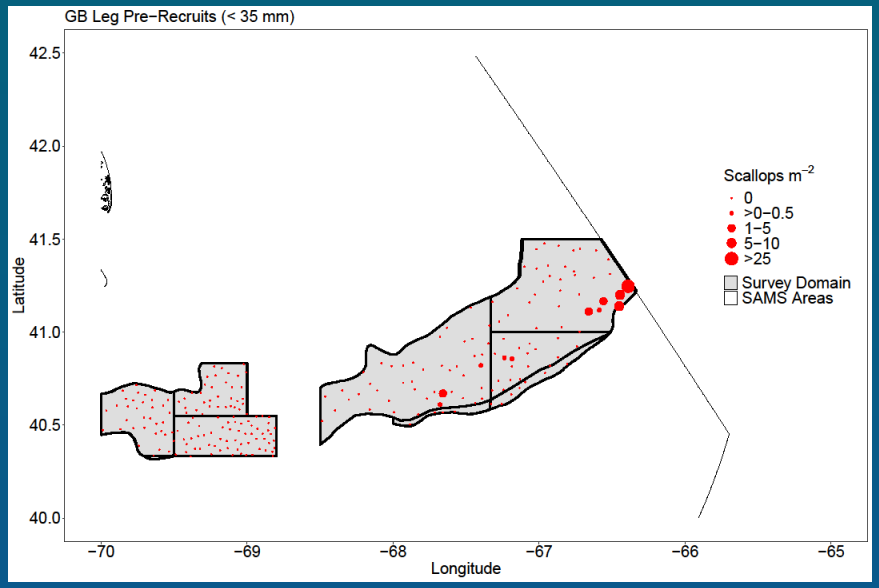
2026 MAB Legs
Scallop Distribution – Density per Station

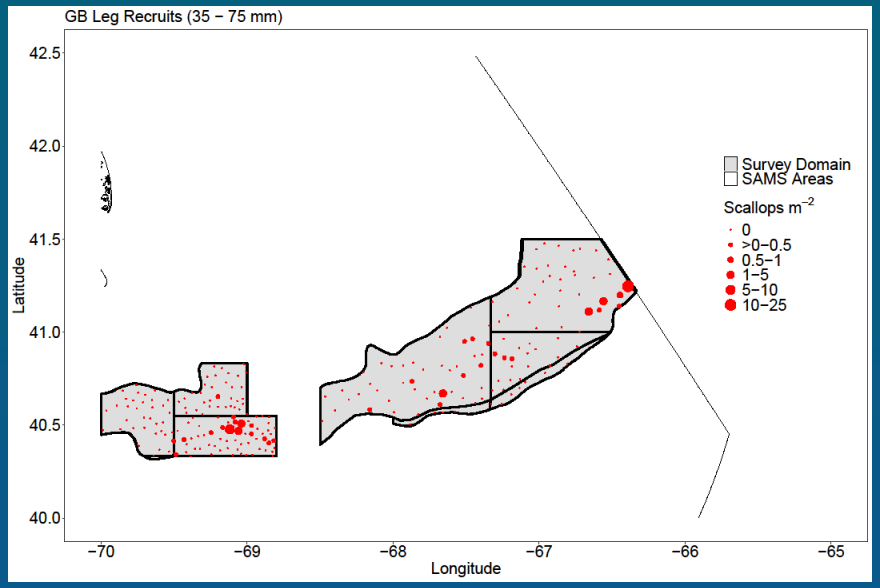


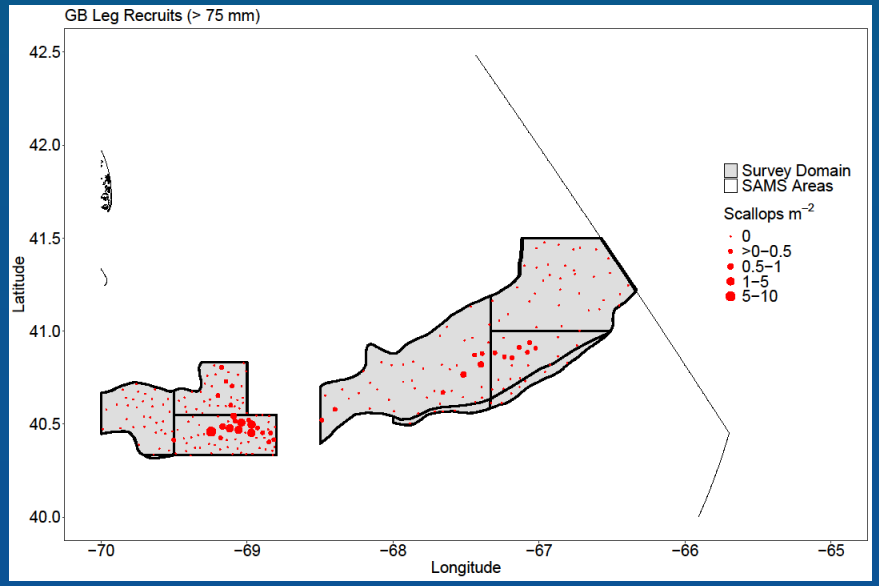




2026 GB Leg
Scallop Distribution – Density per Station



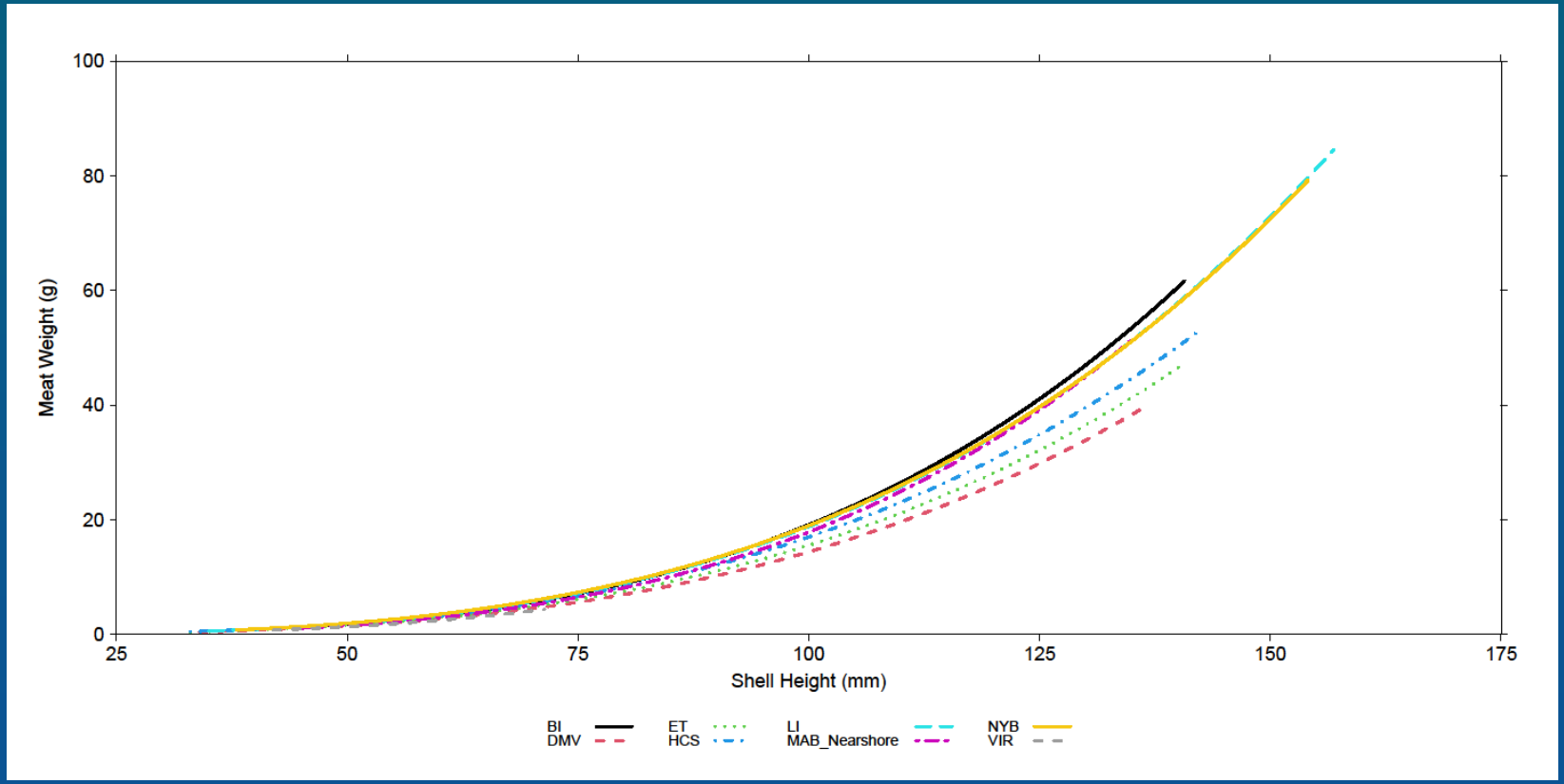




SHMW Relationships

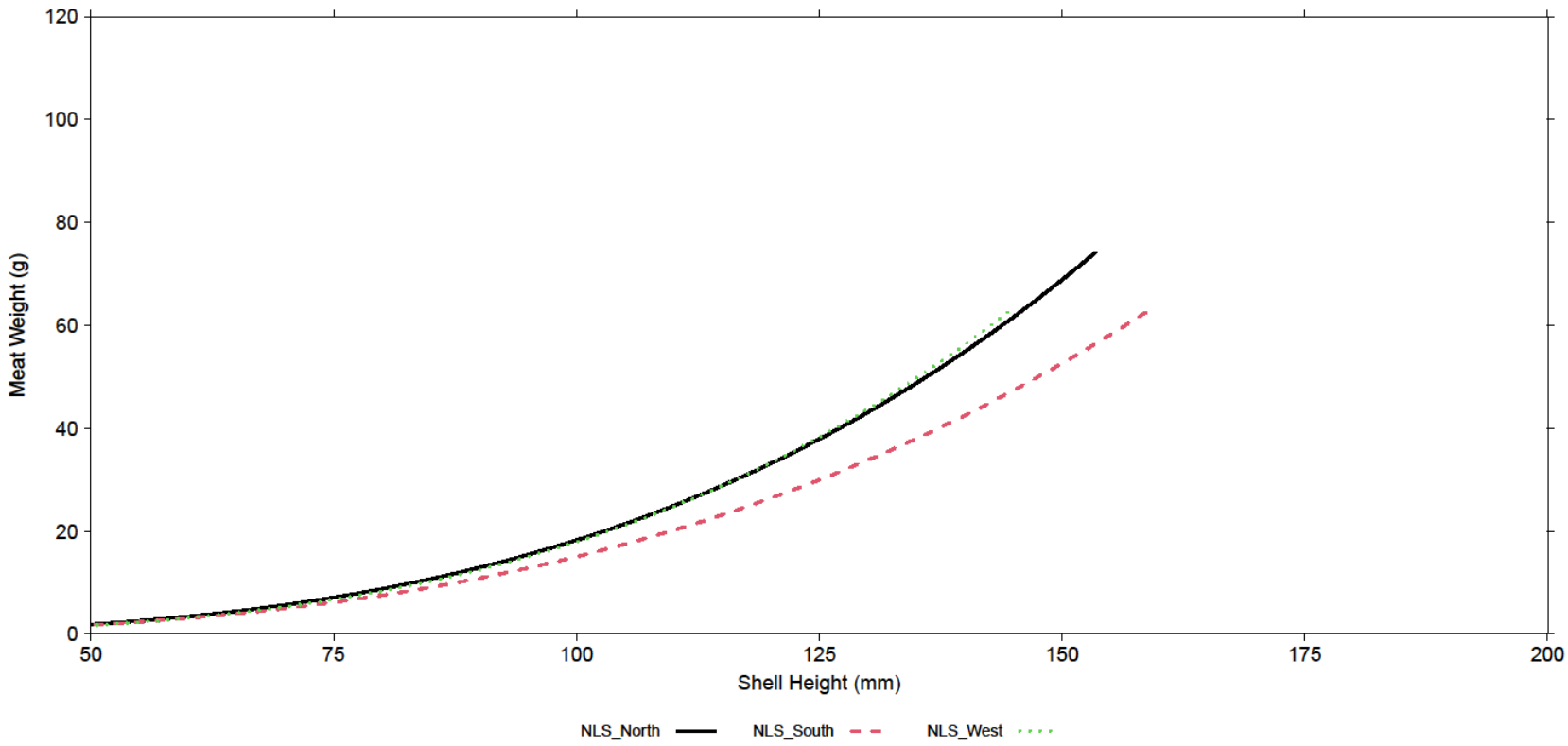
- SHMW samples (meat & gonad weight) were taken from all stations with scallop catch (15/station):
  - MAB Legs: 3,494 scallops, 312 stations
  - GB Leg: 2,317 scallops, 204 stations
    - NL: 1,165 scallops, 107 stations
    - CAII, etc.:1,152 scallops, 97 stations
- No minimum shell length
- Predict meat weight based on a suite of potential covariates (i.e. shell height, depth, SAMS Area)
- GLMM (Gamma distribution, log link, random effect at the station level)
  - SAMS Area included in all models

2026 MAB SAMS Areas
SHMW Results



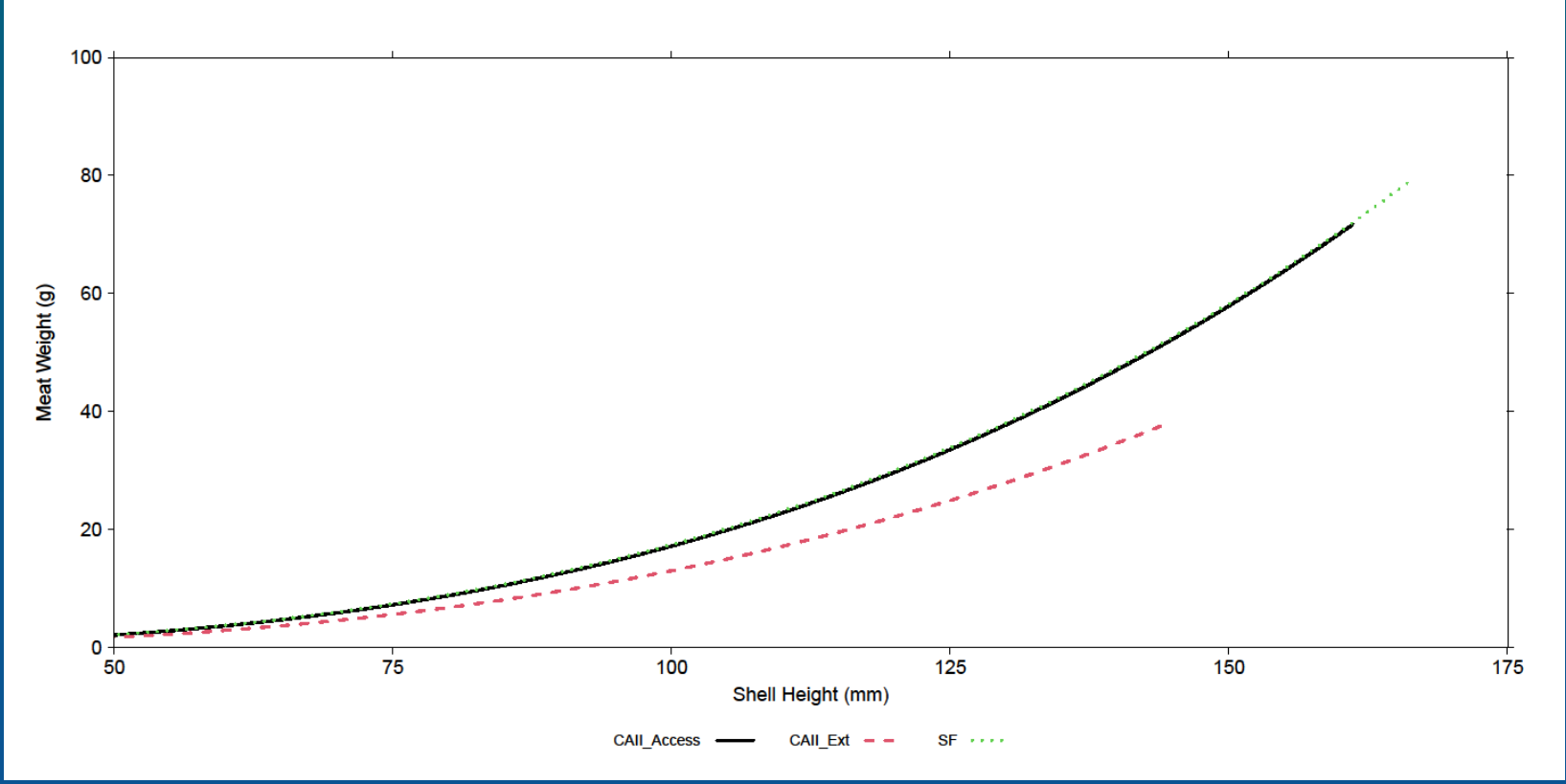
Northern gradient of increasing SHMW

2026 NL SAMS Areas
SHMW Results



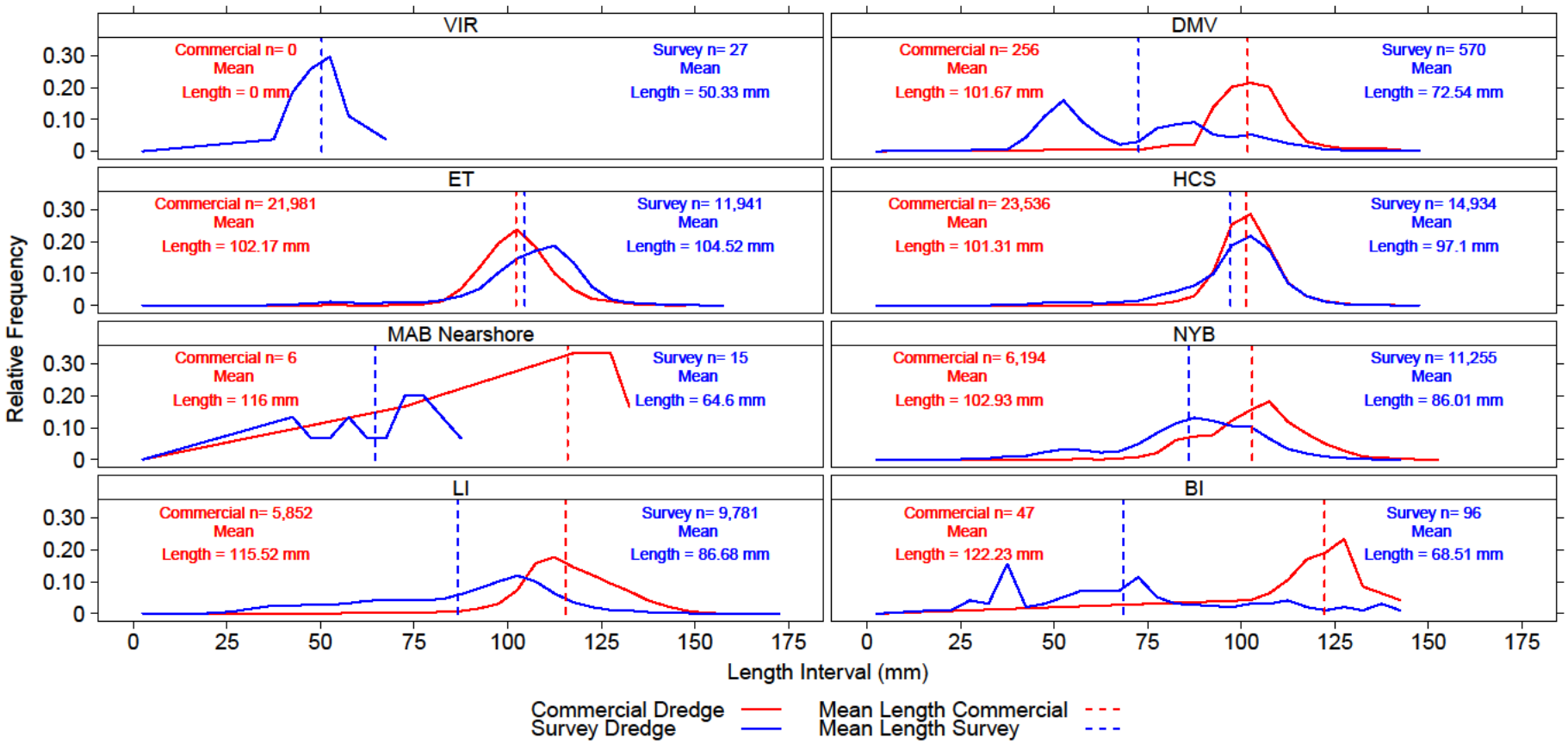
Similar trend to previous years - South Deep SAMS Area has a low meat weight at shell height & is significantly different from the North

2026 Eastern GB SAMS Areas
SHMW Results

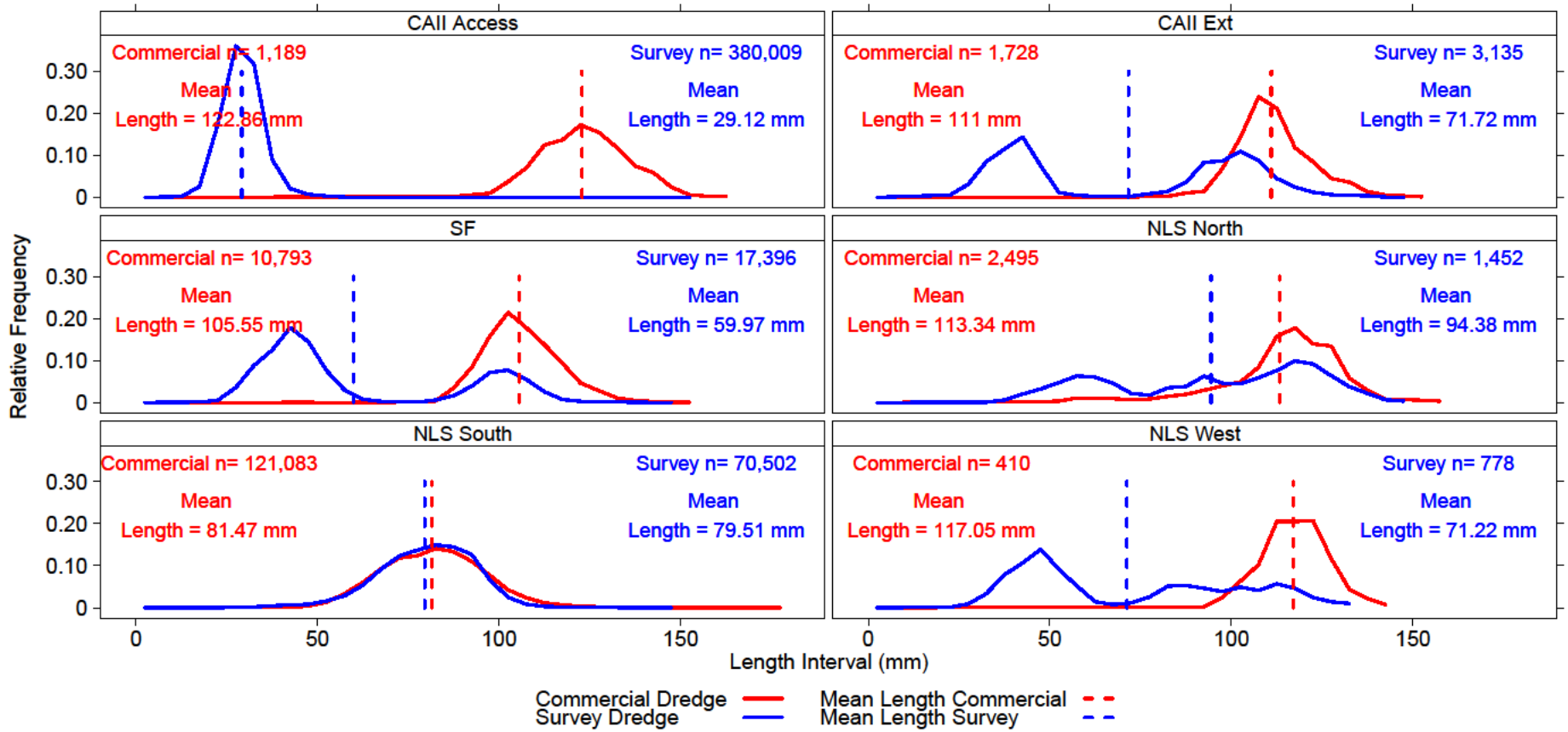


The traditional access area generally tends to have a higher meat weight for a given shell height

2026 MAB SAMS Area
Length Frequency



2026 GB SAMS Area
Length Frequency



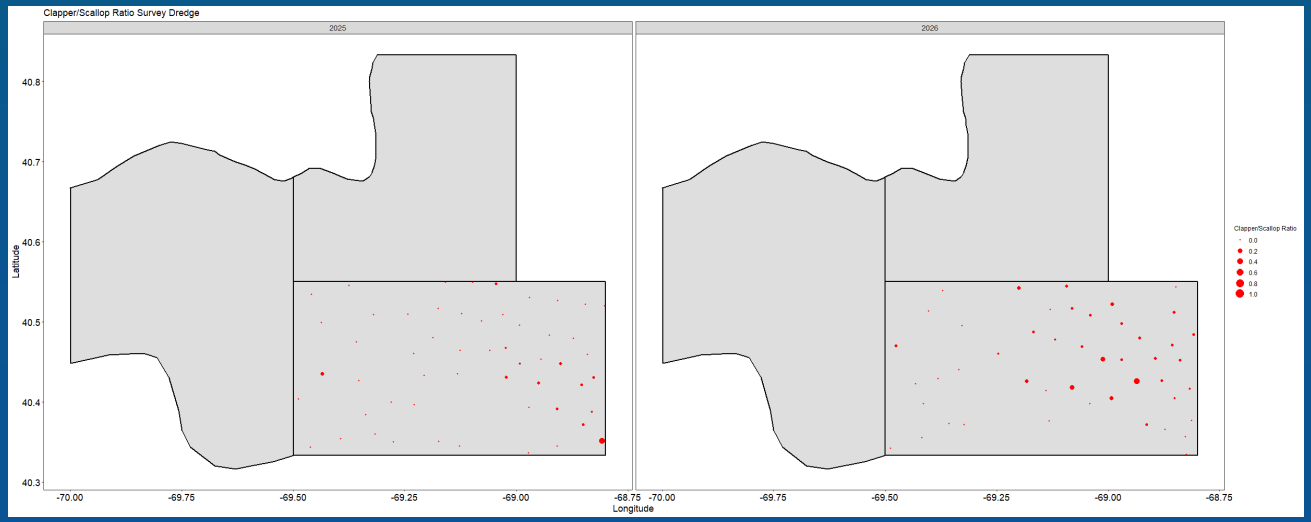
2026 Total Biomass Survey Dredge

SAMS Area	Total Biomass (mt)	SE Biomass (mt)	CV Biomass (mt)	Density (scal/m^2)	Avg MW (g)	Total Number
VIR	3.75	0.89	59.5	0.001	2.67	1,393,103
DMV	274.64	86.57	78.8	0.01	8.15	34,331,205
ET	8,875.92	754.16	21.24	0.14	19.12	466,402,171
MAB_Nearshore	6.18	1.1	44.54	0.0002	5.63	1,107,385
HCS	6,949.07	559.43	20.13	0.14	15.79	437,835,541
NYB	3,682.47	384.52	26.1	0.09	12.43	299,581,591
LI	4,116.72	228.89	13.9	0.03	14.58	284,617,030
BI	45.62	4.11	22.52	0.01	12.85	3,581,783
SF	5,016.93	649.78	32.38	0.15	9.28	534,297,194
CAII_Ext	931.22	105.54	28.33	0.05	12.34	72,510,414
CAII_Access	11,862.69	3,587.12	75.6	0.20	16.77	707,808,475
NLS_West	199.41	30.74	38.53	0.01	12.5	16,297,654
NLS_North	834.57	51.14	15.32	0.02	21.35	37,100,591
NLS_South	6,425.11	848.78	33.03	0.63	8.38	767,768,722

2025 updated Research Track SHMW
all SAMS Areas except NLS South (VIMS 2025 SHMW)

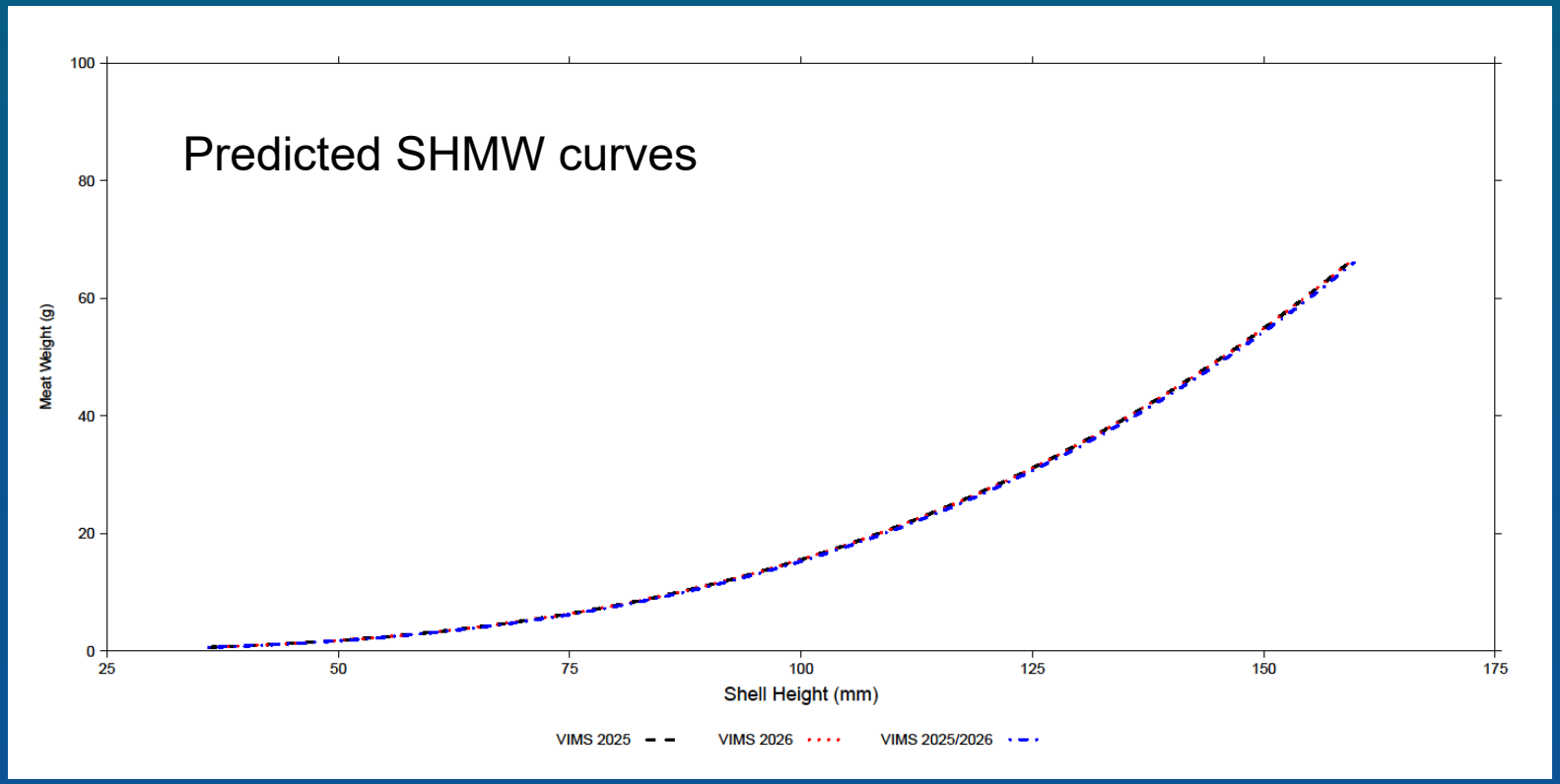
NL South

Clappers:
2025 - 40 animals
ratio = 0.002
2026 - 846 animals
ratio = 0.005
Percent change 150% increase



SHMW Sensitivity – NL South

SAMS Area	Total Biomass (mt)	
	VIMS 2025 SHMW	VIMS 2025/2026 SHMW
NLS_South	6,425.11	6,269.78



SHMW Sensitivity – MAB

2025 updated MAB research track SHMW equation:

exp(-12.7766+(3.2834*log(Length))+(0.0181*lat)+ ((0.03895 - 0.00933*log(Length))*Depthm))

2026 Updated MAB SHMW equation:

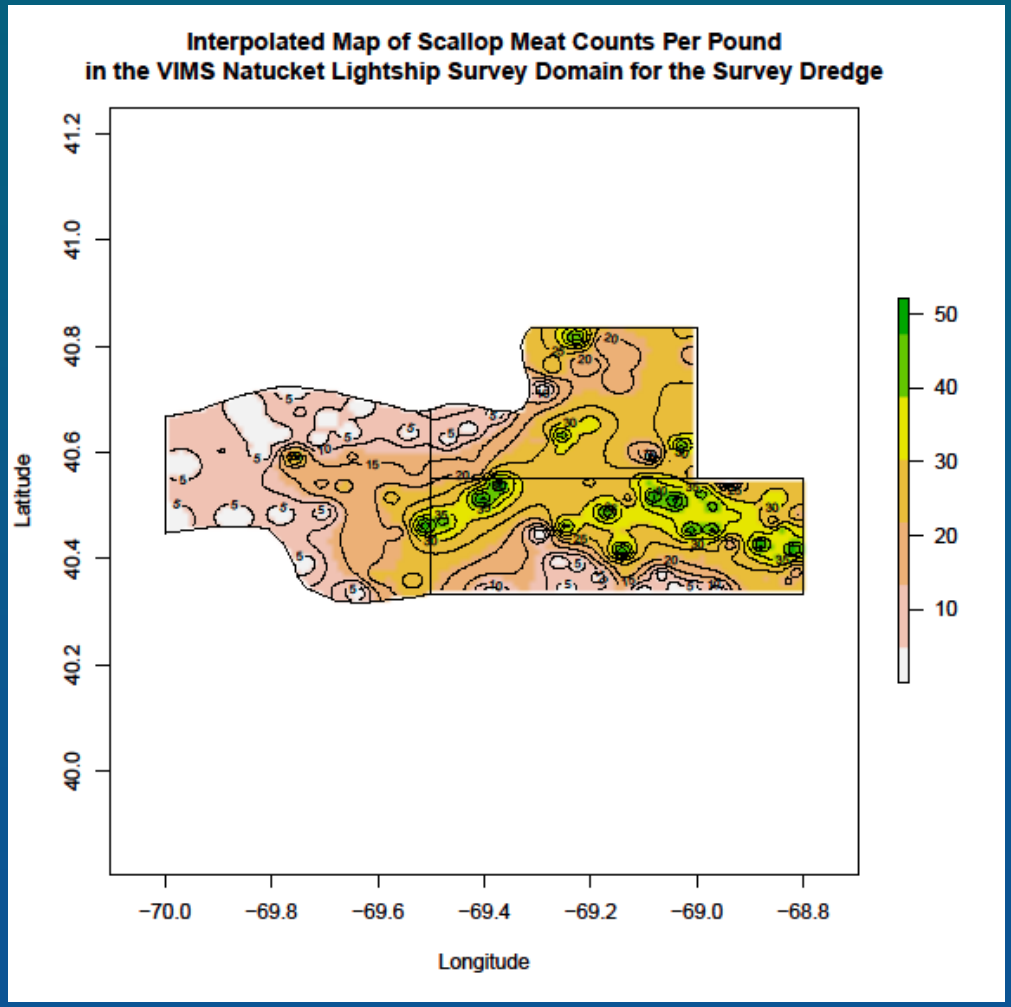
exp(-10.5641+(2.7896*log(Length))+(0.01257*lat)+ (0.0103*Depthm)-(0.000132*(Depthm^2)))

SAMS Area	Total Biomass (mt)	
	2025 SHMW Equation	2026 Updated SHMW Equation
VIR	3.75	4.15
DMV	274.64	292.11
ET	8,875.92	9,845.52
HCS	6,949.07	7,616.60
MAB_Nearshore	6.18	7.04
NYB	3,682.47	4,049.72
LI	4,116.72	4,547.84
BI	45.62	50.24

Acknowledgements

- The owners, captains and crews:
  - *F/V Carolina Capes II*
  - *F/V Carolina Boy*
  - *F/V Queen of Peace*
- Scientific Staff:
  - Liam Miller, Andie Munoz, Derek Jackson, Reece Aponte
- Reidar's Manufacturing Inc.
- Support from NMFS NEFSC
- Funding through Sea Scallop RSA program.

Extra NL South Information


Interpolated Map of Scallop Meat Counts Per Pound
in the VIMS Natucket Lightship Survey Domain for the Survey Dredge
Latitude
41.2
41.0
40.8
40.6
40.4
40.2
40.0
−70.0
−69.8
−69.6
−69.4
−69.2
−69.0
−68.8
Longitude
50
40
30
20
10

608 scallops in SHMW workups assessed for overall marketability

Marketability scores:
Marketable (code 4): 603 scallops, 99 percent
Slightly Inferior (code 3): 3 scallops
More Inferior (code 2): 2 scallops

608 scallops in SHMW workups with spawning condition

Reproductive Stage	Number of Scallops	Percent
Mature	27	4%
Spawning	202	33%
Spent	305	50%
Resting	1	0%
Unknown	73	12%