Scallop PDT

September 1, 2021

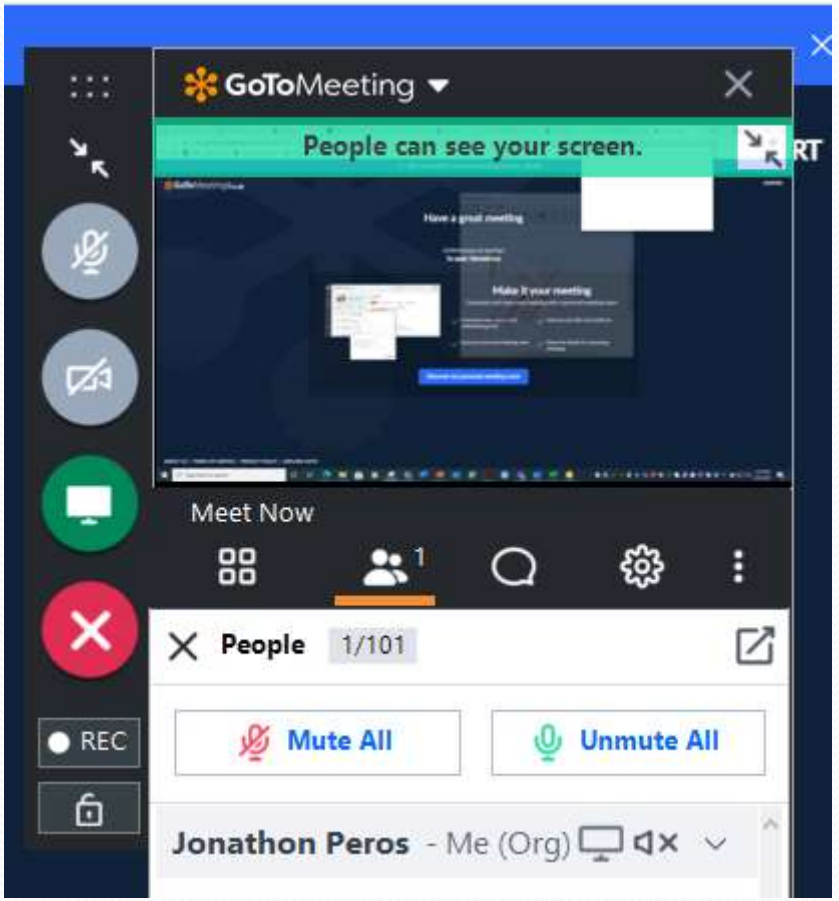
GoToMeeting

Welcome & Announcements

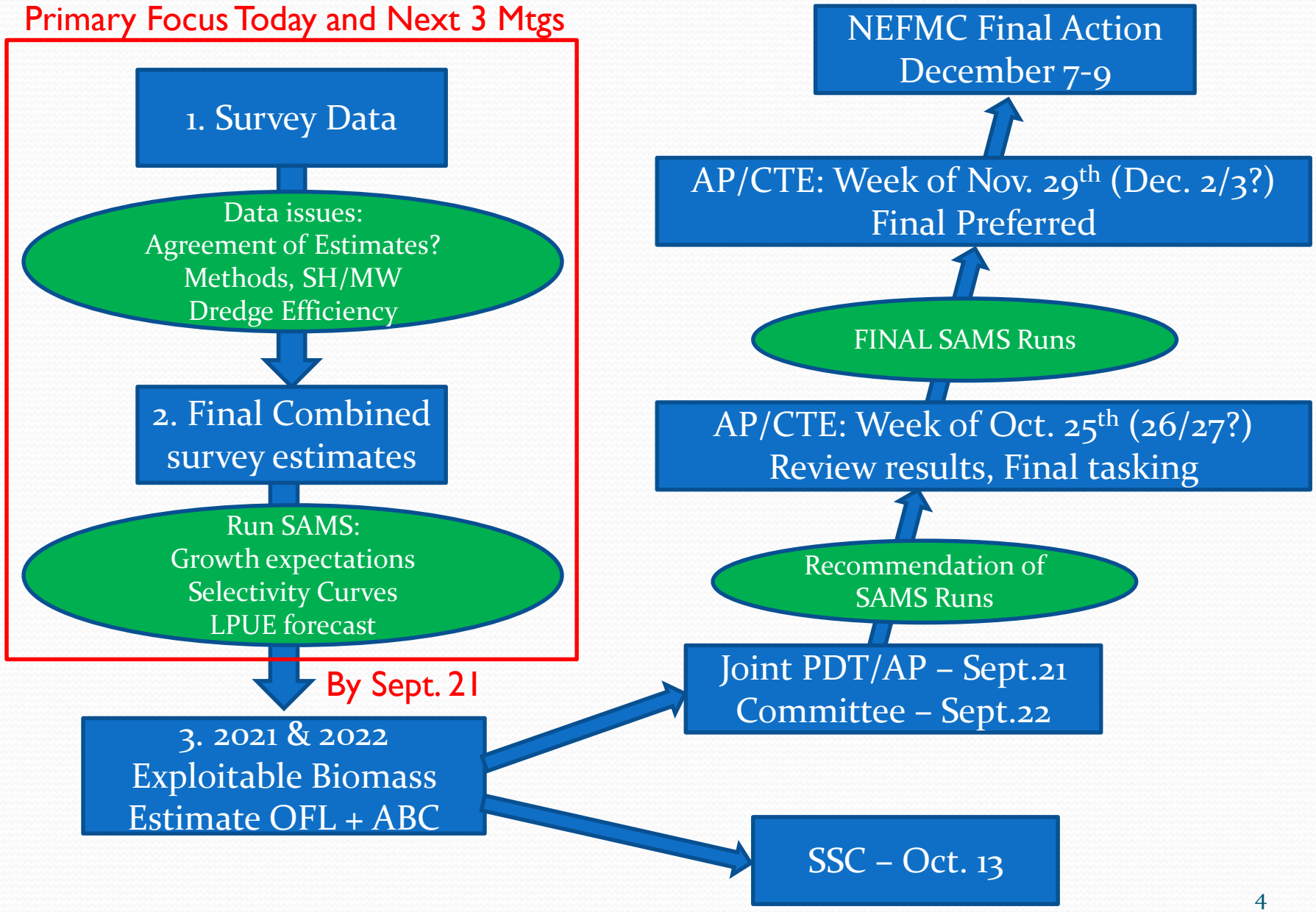
- Thank you: Survey Groups and Presenters
- Working, technical meeting of PDT: Joint PDT/AP and Committee meet next month.
  - Survey groups will be participating with the PDT.
- Please mute when you are not speaking.
- Turn on your camera when speaking, if you can.

Mute/Unmute button
(RED means you're muted)

Camera button
(Turn on camera when you are speaking or would like to speak)



Specs Process:



Goals for Sept 1, 2, 8 meetings:

PART 1: Agreement/Consensus on how to treat survey data to initialize SAMS model. Modifications to SAMS parameters.

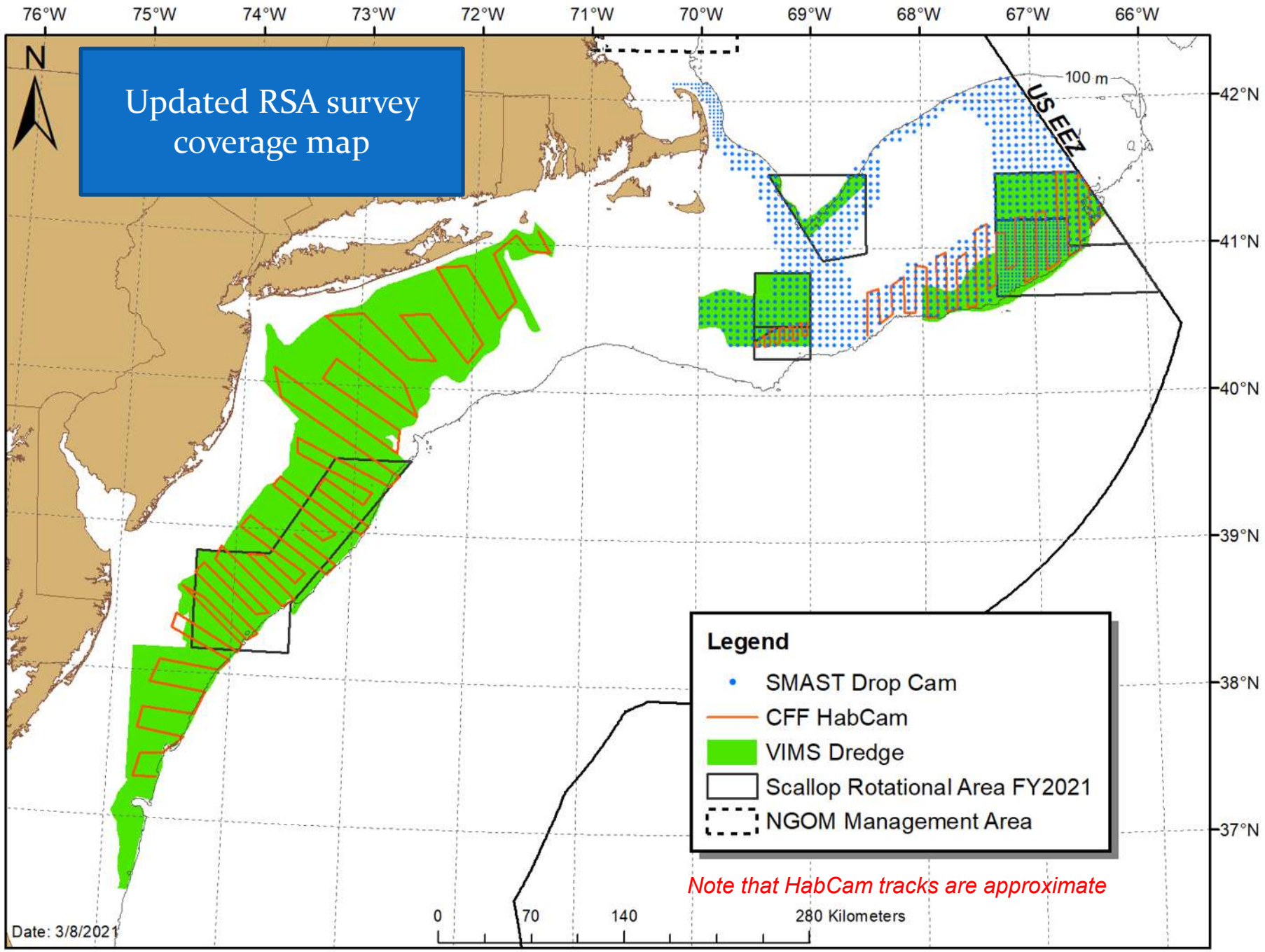
- Survey data treatment (SH/MW, dredge efficiency)
- Projection assumptions (growth, selectivity, LPUE)

PART 2: Develop initial input around biological considerations in particular resource areas. EX: NLS-S-deep, CAII region, MAAA.

Upcoming Meeting/Milestones:

We'll need several meetings to review and agree on survey data and SAMS parameters, prepare memo to SSC:

- **TODAY:** September 1, 2021 – Scallop PDT review survey results
- **TOMORROW:** September 2, 2021 – Scallop PDT
- September 8, 2021 – Scallop PDT review survey results, FW34
- September 21, 2021 – Joint Scallop PDT/AP meeting
- September 22, 2021 – Scallop Committee meeting
- September 29, 2021 – Scallop Report , Council meeting (tent.)
- TBD – Scallop PDT calls to finalize report to SSC.
- October 13, 2021 – Science and Statistical Committee meeting


Updated RSA survey coverage map
N
76°W
75°W
74°W
73°W
72°W
71°W
70°W
69°W
68°W
67°W
66°W
42°N
41°N
40°N
39°N
38°N
37°N
100 m
US EEZ
Legend
SMAST Drop Cam
CFF HabCam
VIMS Dredge
Scallop Rotational Area FY2021
NGOM Management Area
Note that HabCam tracks are approximate
0
70
140
280 Kilometers
Date: 3/8/2021

1. Survey Data Treatment issues

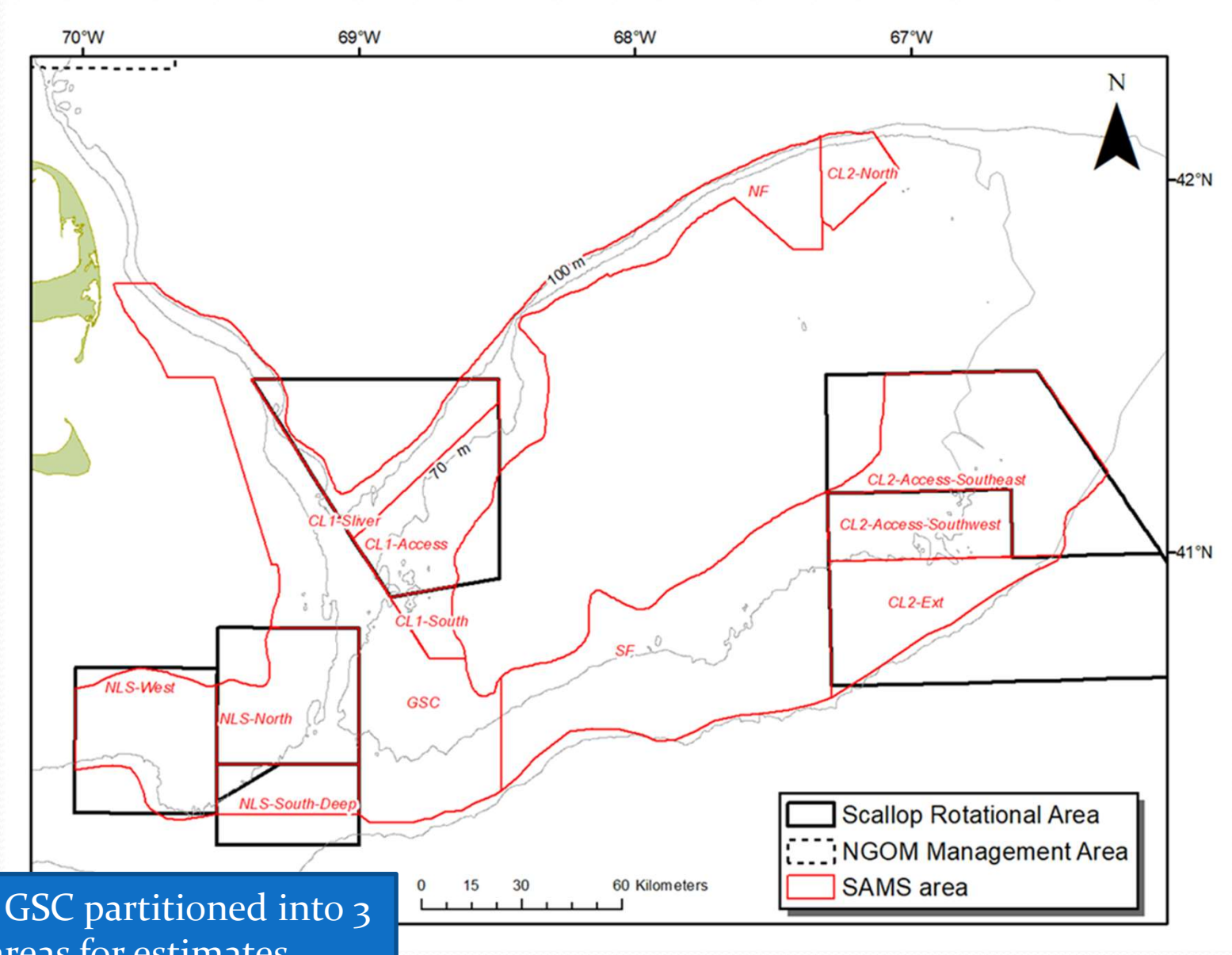
- **SAMS Areas:** MAB the same, changes on GB
  - GSC: sensitivity estimates for 1 area vs. 3 areas.
- **STARTING POINTS FOR DISCUSSION:**
- **NGOM** now part of overall survey estimates, OFL/ABC.
- **SH/MW equations:** SARC 65 for all areas.
  - Consider VIMS SHMW from 2016-2021 in NLS-South.
- **Data agreement by SAMS Area?**
  - Dredge, HabCam, Drop Camera
- **Combining Data:** Use average of all available surveys for each SAMS area to initialize the model.
  - **Dredge efficiency:** Factor of 3 (SARC 65, recent FWs)
  - Timing of surveys (any special comments?)

1. Projection topics

Will start or continue discussion on Sept. 2nd or 8th.

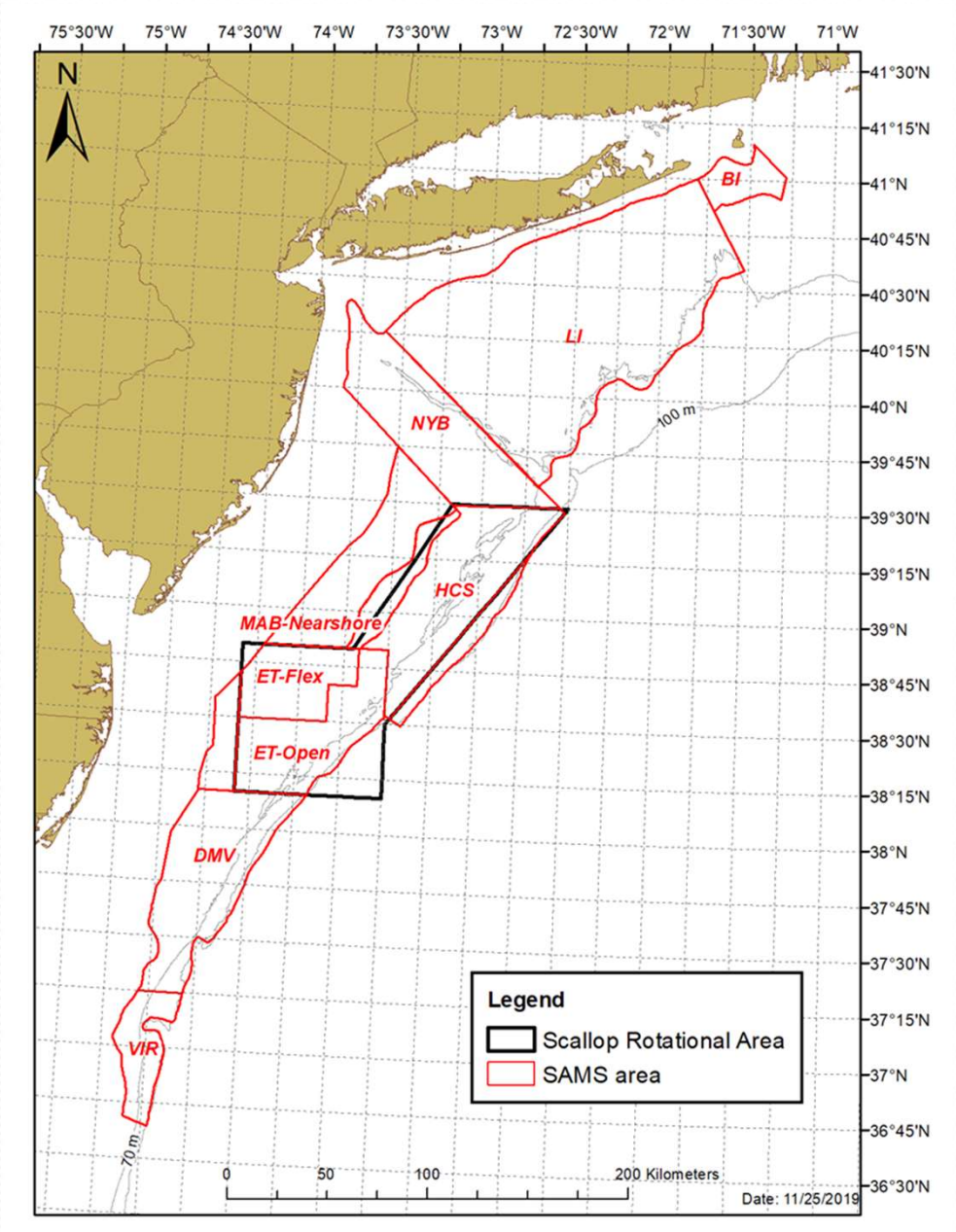
- **SAMS Areas:** Start with no changes from FW33
- **STARTING POINTS FOR DISCUSSION:**
- **Review Growth Assumptions:**
  - Slow growth in the NLS-South-Deep area.
  - Performance of projections (see Dvora's spreadsheet)
- **Selectivity Curves:** Discuss appropriate curves for scallops in high density areas, such as NLS-S-deep.
- **LPUE Model:** Did not use model in FW33, overly optimist projection of LPUE.

SAMS areas – Georges Bank



Note: GSC partitioned into 3 areas for estimates

SAMS areas – Mid-Atlantic



Survey Presentations

Combining Estimates

- **Starting point: Use the mean of available surveys in each SAMS area**
  - SMAST, VIMS, & NEFSC estimates for GB and MA.
  - CFF estimates provided as a sensitivity.
  - In NGOM, combined SMAST and DMR in area of interest.
- Considerations:
  - **Dredge efficiency, SH/MW**
    - VIMS has adjusted dredge efficiency in NLS-S-deep in estimates
    - ME DMR data SH/MW and dredge efficiency for Stellwagen Bank
- How well do the surveys agree in each SAMS area?
  - Several slides with data from short reports
  - Review by "regions"

Data Agreement

- NOTE: The Avg size in the 2021 Survey Biomass Estimates of the Short Reports excludes scallops less than 40mm.
- Need to look at the L-F plots to see all sizes.

Conversions

- Grams to market grades….

grams	count
46	U10
30	15
23	20
15	30
11.5	40
9	50

- **Document #3 – Combined Survey Estimates**

Placeholder

- **Any special considerations for 2021?**
  - Timing of the surveys? 14 months last year between surveys, so shorter time between surveys this year.

NGOM Areas: OFL and ABC estimates

- **GOAL: Outline new process for FW34.**
- **A21 Change:** For the OFL and ABC, use exploitable biomass from the NGOM.
- Calculated using GB Fmsy

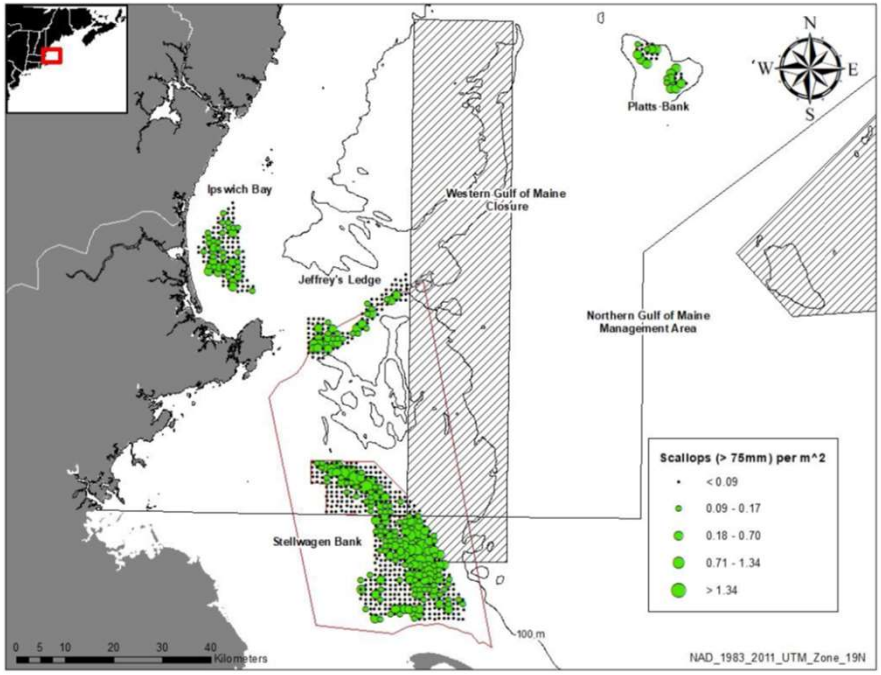
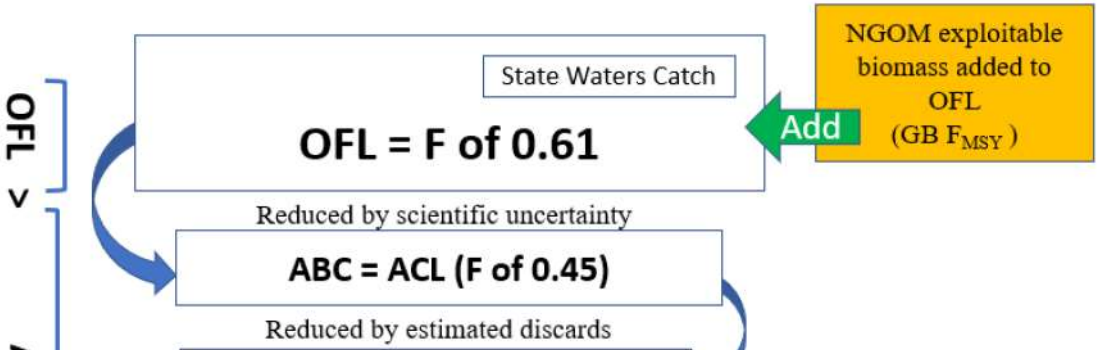
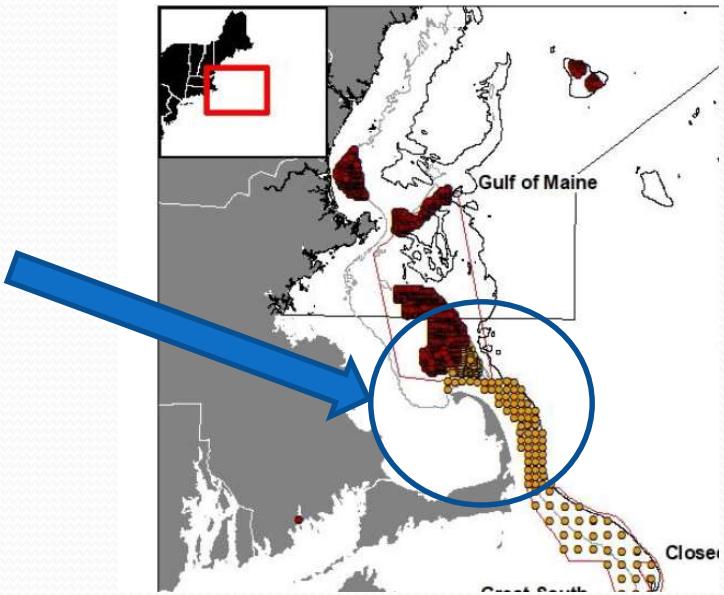


Figure 2. Example of scallop legal limits (OFL, ABC, ACL) with the Northern Gulf of Maine incorporated into estimates of the OFL and ABC (Alternative 2, 4.1.2).



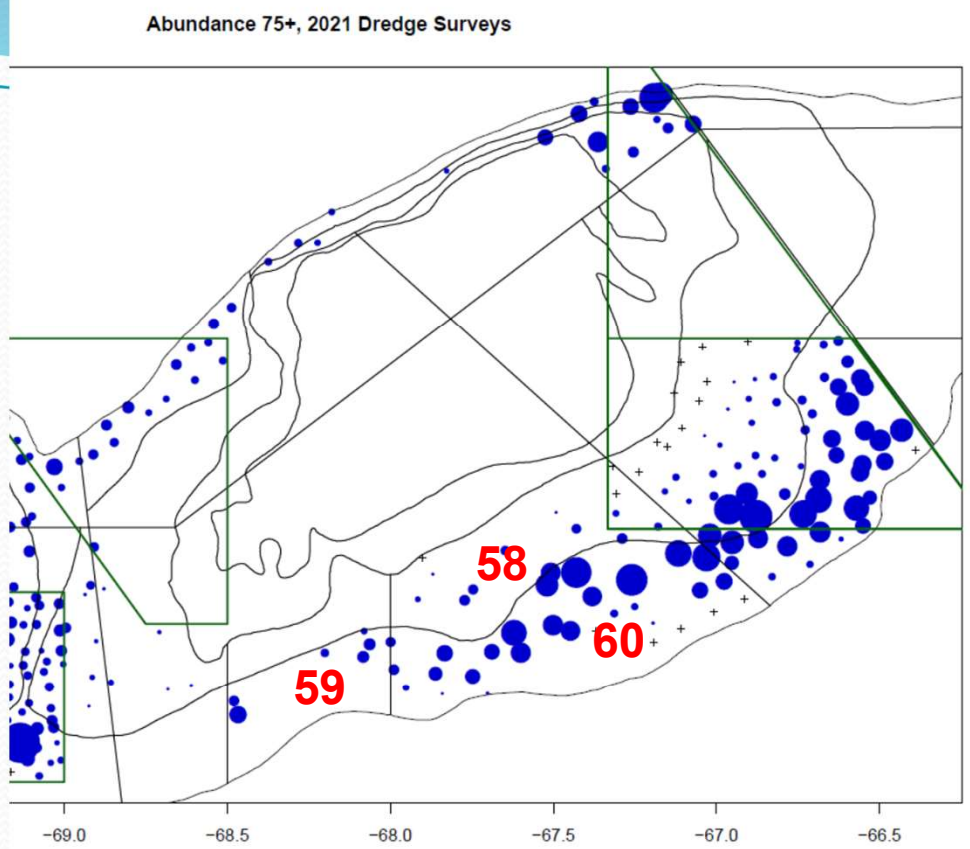
Survey Areas

- **GOAL: Confirm areas that will be used for forward projections in the SAMS model.**
- **Starting point for discussion:** Do not include estimates from southern Stellwagen and the outer Cape in FW34.
- *Rationale:* Areas are not part of SAMS areas reviewed at the last benchmark or 2020 management track assessment. Council identified areas for the NGOM to be included as part of OFL/ABC estimates but did not include these areas. Ongoing work on survey strata could identify these areas. Revisit again next year.
- *PDT: input needed. Agree? Disagree?*



Southern Flank

- 2021 Process:
- Combine VIMS and NEFSC dredge estimates together to develop a single dredge estimate
  - Dredge coverage: NEFSC in strata 58 and 59, VIMS covered rest of area.
- Take mean of dredge, drop cam, and HabCam
- Strong agreement in estimates from drop cam, HabCam, and VIMS dredge.



SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
SF							
CFF	704	12,084	3,632	17	91	0.20	1,940
NEFSC	707	11,398	729	16	97	0.17	2,287
SMAST	734	11,516	2,829	16	89	0.18	129
SF (58 + 59)							
NEFSC dredge	97	1,544	465	16	94	0.04	14
SF (60)							
VIMS	645	11,581	1,504	18	94	0.36	18

SH/MW equations

- **GOAL: Recommend appropriate SH/MW relationships for estimating survey biomass.**
- **Starting point: SARC 65 (2018)**
  - Equations for MA, GB, and NLS-S-deep
- Slow growth in the NLS:
  - VIMS data from 2016-2021
  - PDT recommended using VIMS data in 2016, 2017, 2018, 2019, and 2020
  - For 2020, SARC and VIMS SHMW are similar.
- Limited data for the GOM, no equation from stock assessment:
  - Hart 2020 SH/MW developed last year using 2019 survey data
  - 2021 ME DMR/UMaine survey on Stellwagen Bank
- *PDT: Other areas to consider?*

SH/MW equations

Table 2 - SH./MW equations to be used in the survey short report.

GB	SHMW equation for the short report	Sensitivity
CL1-Access	SARC 65	
CL1-Sliver	SARC 65	
CL1-South	SARC 65	
CL2-North	SARC 65	
CL2-Southeast	SARC 65	
CLS-Southwest	SARC 65	
CL2-Ext	SARC 65	
NLS-North	SARC 65	
NLS-South	SARC 65 specific equation	VIMS 16-21 SH/MW
NLS-West	SARC 65	
NF	SARC 65	
GSC (entire area)	SARC 65	
GSC-North	SARC 65	
GSC-Middle	SARC 65	
GSC-South	SARC 65	
SF	SARC 65	
MidAtlantic		
BI	SARC 65	
LI	SARC 65	
NYB	SARC 65	
MAB-Nearshore	SARC 65	
HCS	SARC 65	
ET Open	SARC 65	
ET Flex	SARC 65	
DMV	SARC 65	
Gulf of Maine		
Stellwagen – NGOM – Agreed to Area	Hart 2020	DMR 2021 - GLM
Ipswich - NGOM	Hart 2020	
Ipswich – MA State	Hart 2020	
Jeffreys - NGOM	Hart 2020	
Platts - NGOM	Hart 2020	
GOM – South 42 20'	Hart 2020	
WGOM Closure	Hart 2020	

- **Values in the short report use the SARC 65 SHMW equations for GB & MAB.**
- **GOM use Hart 2020, which was based on the 2019 DMR survey data.**
- **VIMS 2016-2021 SHMW: Survey groups prepared sensitivity analyses.**
- **ME DMR 2021 survey data SH/MW analysis as a sensitivity.**

2021 Survey Data

Data from NLS-Region

SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
NLS-North							
SMAST	83	1,830	926	22	90	0.06	42
VIMS	28	886	85	31	103	0.02	61
NLS-South							
CFF	1,596	20,347	7,053	13	93	2.69	844
NEFSC	1,285	19,995	1,207	16	95	2.05	1,601
SMAST	2,012	24,263	10,188	12	91	3.10	21
VIMS	802	9,863	2,235	12	92	1.28	32
NLS-West							
NEFSC	17	400	171	24	99	0.01	6,972
SMAST	10	202	1,658	20	93	0.01	49
VIMS	8	228	50	28	103	0.01	32

SH/MW equations for NLS

- **Proposal for discussion:** Continue to use updated VIMS data, small difference between VIMS and benchmark equations.

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

SAMS Area	BmsMT (SARC 65)	BmsMT (VIMS)	%Diff
NLS-South	19995	17333	13.32

	SARC 65 SH/MW BmsMT (SE)	VIMS SH/MW 2016-2021 BmsMT (SE)
NLS-South	24,263 (10,188)	23,009 (9,662)

	SARC 65 SH/MW	VIMS SH/MW 2016-2021
NLS-South	9,863.43	9,375.19

VIMS | William & Mary
Virginia Institute of Marine Science
Marine Advisory Services

SH/MW equations for NLS

- **Proposal for discussion:** ~~BACK to SARC 65~~, small difference between VIMS and benchmark equations, stay with VIMS SH/MW equations. Using the same process as 2020. CHECK IN WITH Survey groups to confirm the new numbers.

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Virginia Institute of Marine Science
Marine Advisory Services

	SARC 65 SH/MW	VIMS SH/MW 2016-2021
NLS-South	9,863.43	9,375.19

	No adjustment		Reduced efficiency (*0.13)	
	NumMill	BiomassMT	NumMill	BiomassMT
NLS-South	802,244,531	9,863.43	2,468,444,710	30,349.02

Dredge efficiency in NLS-South

- **<u>Starting point:</u> Use the mean of available surveys in each SAMS area**
- **Suggestion:** *Review density estimates from dredge and optical surveys. Optical is not 3x dredge (less)*
- **Options:**
  - *No change for dredge efficiency. Use the mean average.*
  - *Drop dredge data.*
  - *Apply reduced dredge efficiency.*

Estimated Scallop Density in the NLS-S-deep area

SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
NLS-South							
CFF	1,596	20,347	7,053	13	93	2.69	844
NEFSC	1,285	19,995	1,207	16	95	2.05	1,601
SMAST	2,012	24,263	10,188	12	91	3.10	21
VIMS	802	9,863	2,235	12	92	1.28	32
Grand Total	**5,695**	**74,468**	**20,683**	**53**	**371**	**9.12**	**2,498**

2020 Dredge density: 1.79 in NLS-South, 1.03 in CAII-SW (no adjustment)

VIMS sensitivity analyses for dredge efficiency in NLS-South area

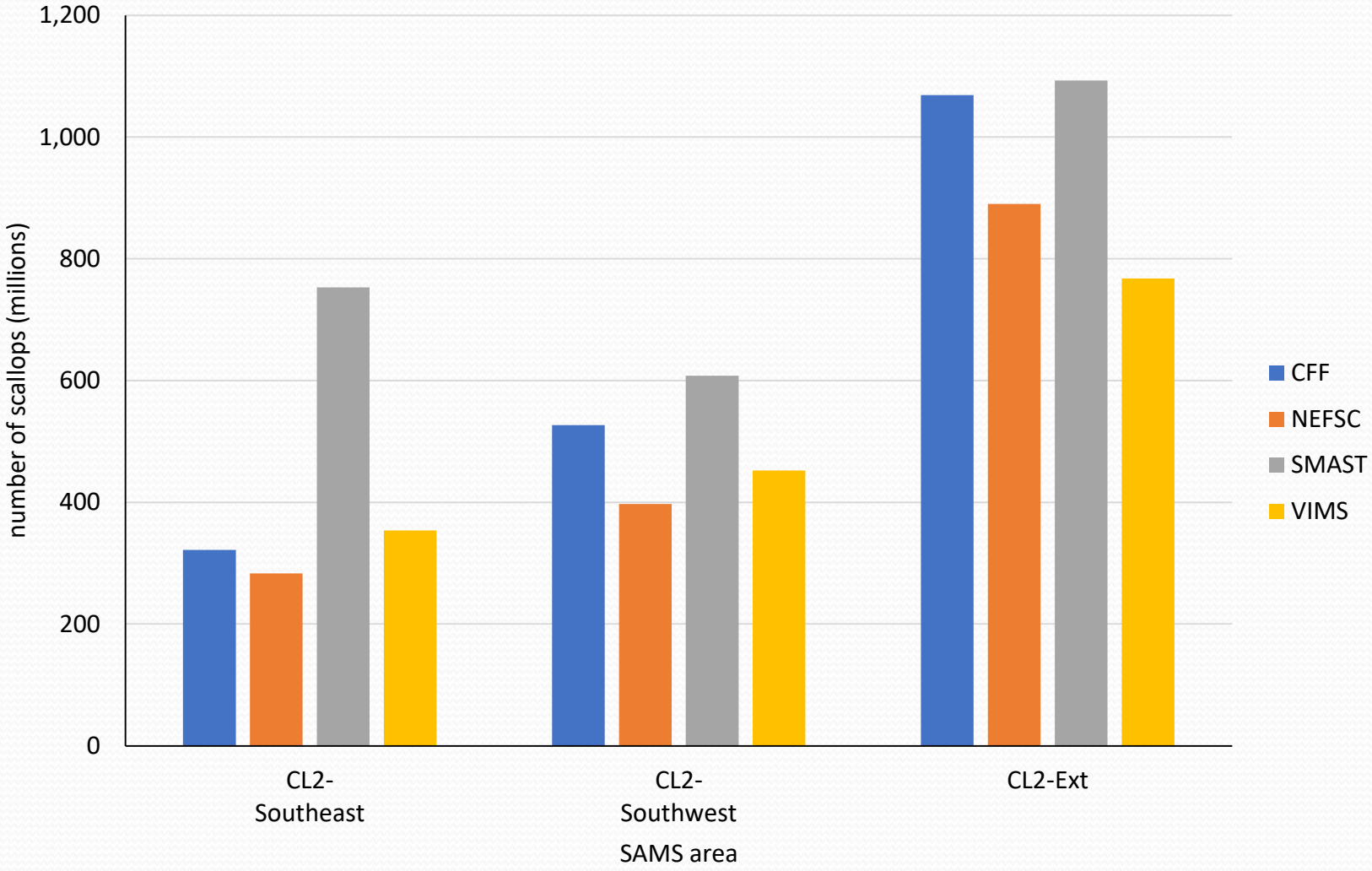
	No adjustment		Reduced efficiency (*0.13)	
	NumMill	BiomassMT	NumMill	BiomassMT
NLS-South	802,244,531	9,863.43	2,468,444,710	30,349.02

Data from CAII Rotational Areas

SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
CL2-Southeast							
CFF	322	5,193	1,661	14	82	0.21	1,624
NEFSC	283	3,947	429	14	82	0.11	1,616
SMAST	753	9,464	2,634	13	83	0.29	85
VIMS	354	5,942	409	17	88	0.15	46
CL2-Southwest							
CFF	527	15,314	4,830	29	106	0.65	770
NEFSC	397	9,970	682	25	106	0.36	768
SMAST	608	14,724	2,578	24	104	0.59	134
VIMS	452	11,852	1,684	26	104	0.39	19
CL2-Ext							
CFF	1,069	19,945	5,514	19	91	0.88	939
NEFSC	890	14,724	829	17	91	0.64	937
SMAST	1,093	18,983	2,420	17	93	0.79	179
VIMS	768	13,602	1,581	18	90	0.37	22

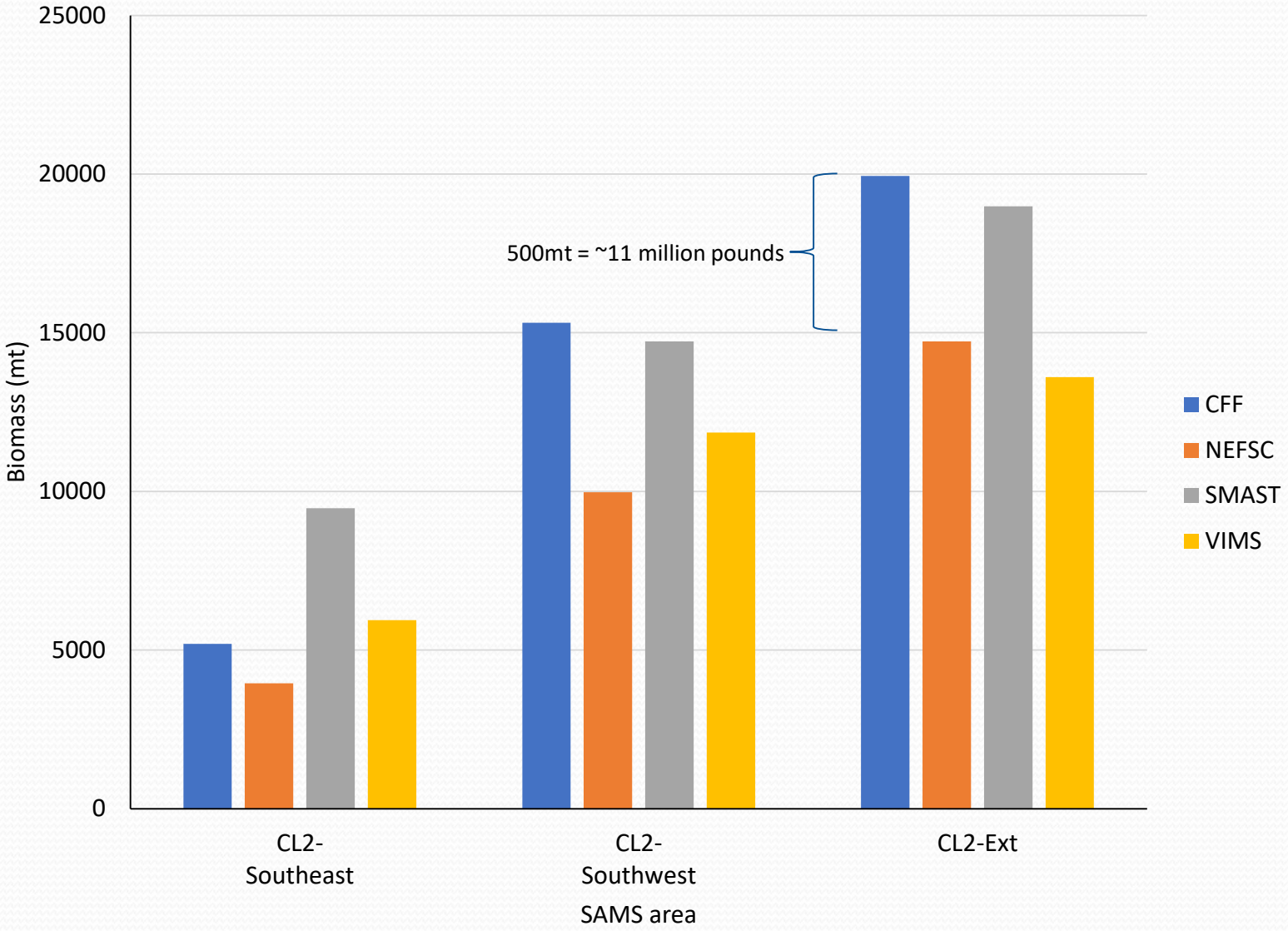
Data from CAII Rotational Areas

Millions of Scallops (# scallops per area)



Data from CAII Rotational Areas

Biomass (mt)

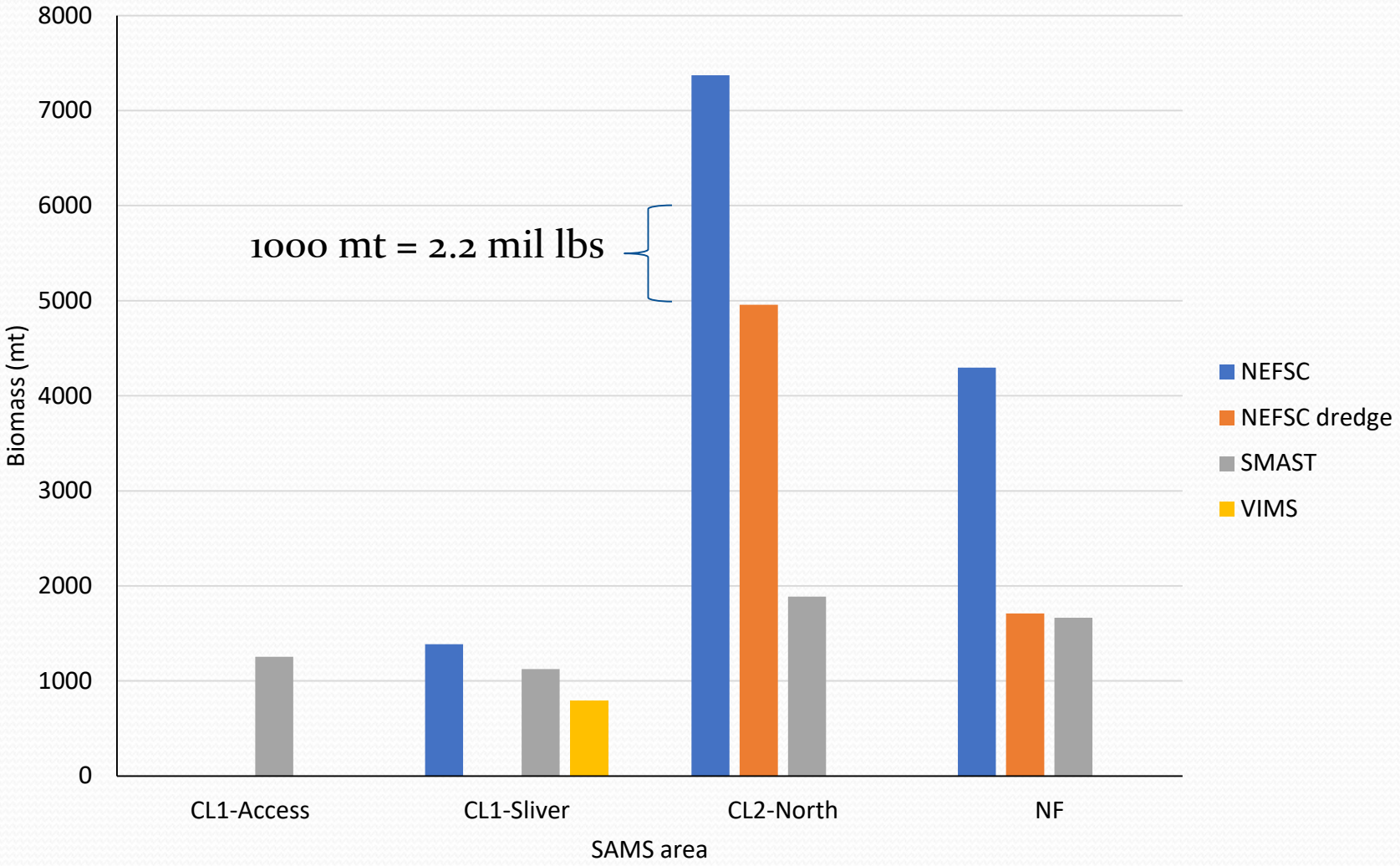


Data from CAI, NF, CAII-N

SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
CL1-Access							
SMAST	65	1,254	634	19	89	0.05	39
CL1-Sliver							
NEFSC	113	1,387	224	12	84	0.14	1,731
SMAST	131	1,125	382	9	70	0.15	29
VIMS	38	792	55	20	91	0.05	20
CL1-South							
SMAST	3	6	6	2	47	0.01	8
CL2-North							
NEFSC	282	7,371	103	26	95	0.64	3,705
NEFSC dredge	178	4,958	1,418	28	91	0.40	7
SMAST	246	1,886	727	14	77	0.27	16
NF							
NEFSC	296	4,295	361	15	86	0.16	6,949
NEFSC dredge	118	1,710	639	14	84	0.11	12
SMAST	94	1,665	614	18	90	0.06	54

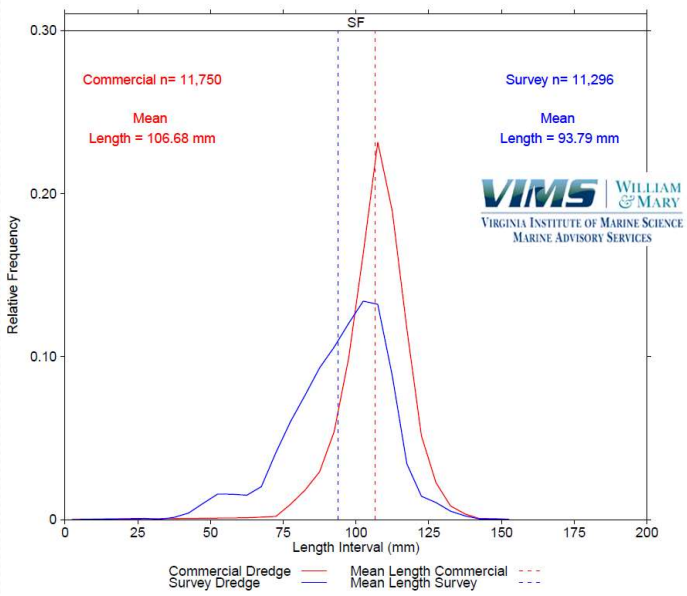
Data from CAII Rotational Areas

Biomass (mt)

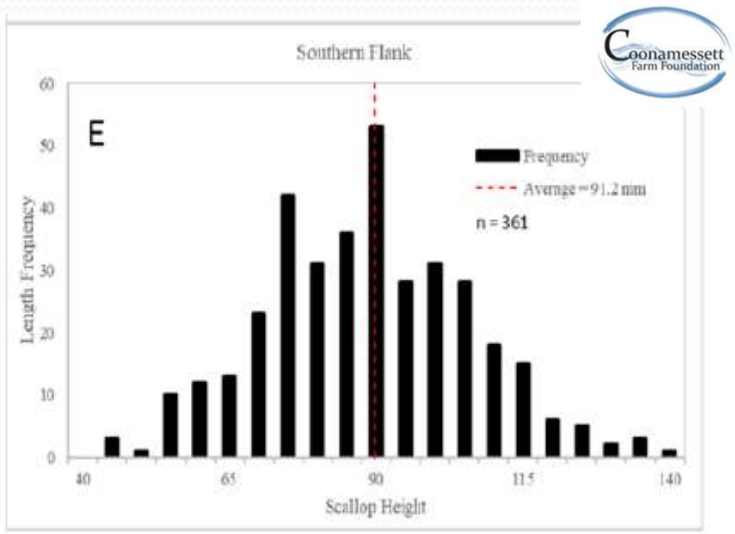


Data from SF

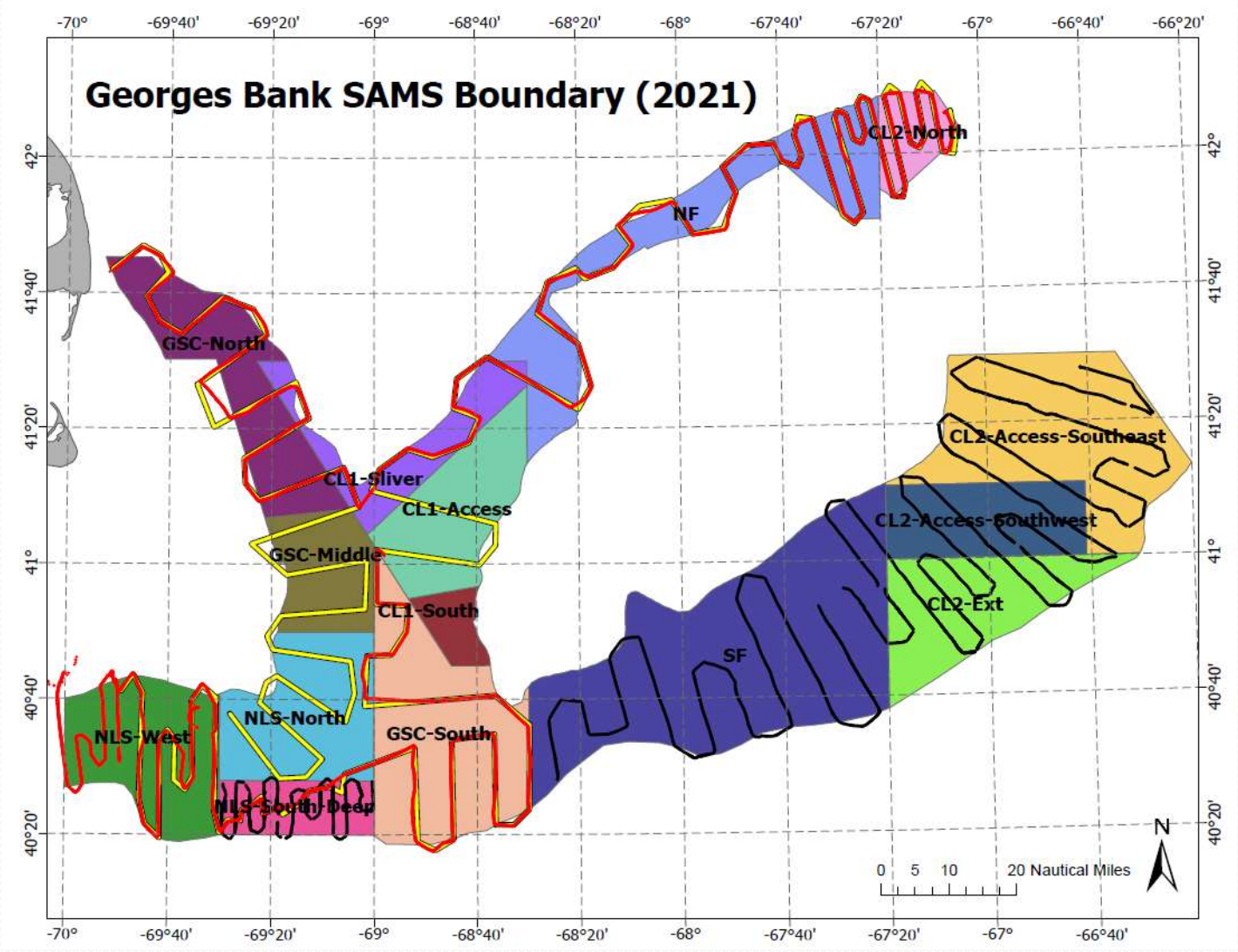
SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
SF							
CFF	704	12,084	3,632	17	91	0.20	1,940
NEFSC	707	11,398	729	16	97	0.17	2,287
SMAST	734	11,516	2,829	16	89	0.18	129
SF (58 + 59)							
NEFSC dredge	97	1,544	465	16	94	0.04	14
SF (60)							
VIMS	645	11,581	1,504	18	94	0.36	18



SAMS_Area	Length	Commercial	Survey
SF	27.5	0	8
SF	32.5	0	2
SF	37.5	0	15
SF	42.5	0	45
SF	47.5	0	112
SF	52.5	0	177
SF	57.5	0	175
SF	62.5	13	169
SF	67.5	0	228
SF	72.5	23	464
SF	77.5	109	678
SF	82.5	212	861
SF	87.5	344	1,051
SF	92.5	632	1,194
SF	97.5	1,164	1,359
SF	102.5	1,916	1,513
SF	107.5	2,719	1,491
SF	112.5	2,222	995
SF	117.5	1,375	386
SF	122.5	603	161
SF	127.5	266	118
SF	132.5	98	58
SF	137.5	40	25
SF	142.5	7	4
SF	147.5	6	4
SF	152.5	1	1



GSC Stratification (3 areas)



Data from GSC with post-stratification for discussion

SAMS/Survey Group	NumMil	BmsMT	SE	Mean Wt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
GSC original							
SMAST	539	12,338	1,980	23	93	0.12	150
GSC-Middle							
NEFSC dredge	54	1,091	167	20	96	0.08	11
SMAST	190	4,872	1,200	26	98	0.23	27
GSC-North							
NEFSC	141	3,024	394	22	88	0.10	3,077
NEFSC dredge	222	3,936	924	18	92	0.10	18
SMAST	246	5,716	1,269	23	91	0.17	47
GSC-South							
NEFSC	66	1,396	209	21	99	0.03	5,724
NEFSC dredge	16	353	156	22	104	0.01	11
SMAST	103	1,775	553	17	89	0.04	76
Split GSC Total							
SMAST	539	12,363					150

Data from GSC with post-stratification for discussion (all values in mt)

	SMAST	NEFSC	NEFSC		
	DropCam	Dredge	HabCam	Mean of surveys	Mean of the sum of the DropCam+Dredge
GSC-North	5,716	3,936	3,024	4225.3	
GSC-Middle	4,872	1,091		2981.5	
GSC-South	1,775	353	1,396	1174.7	
Total (mt) (SUM)	12,363	5,380		8381.5	
Do not use the HabCam data					8871.5

Data from Georges Bank

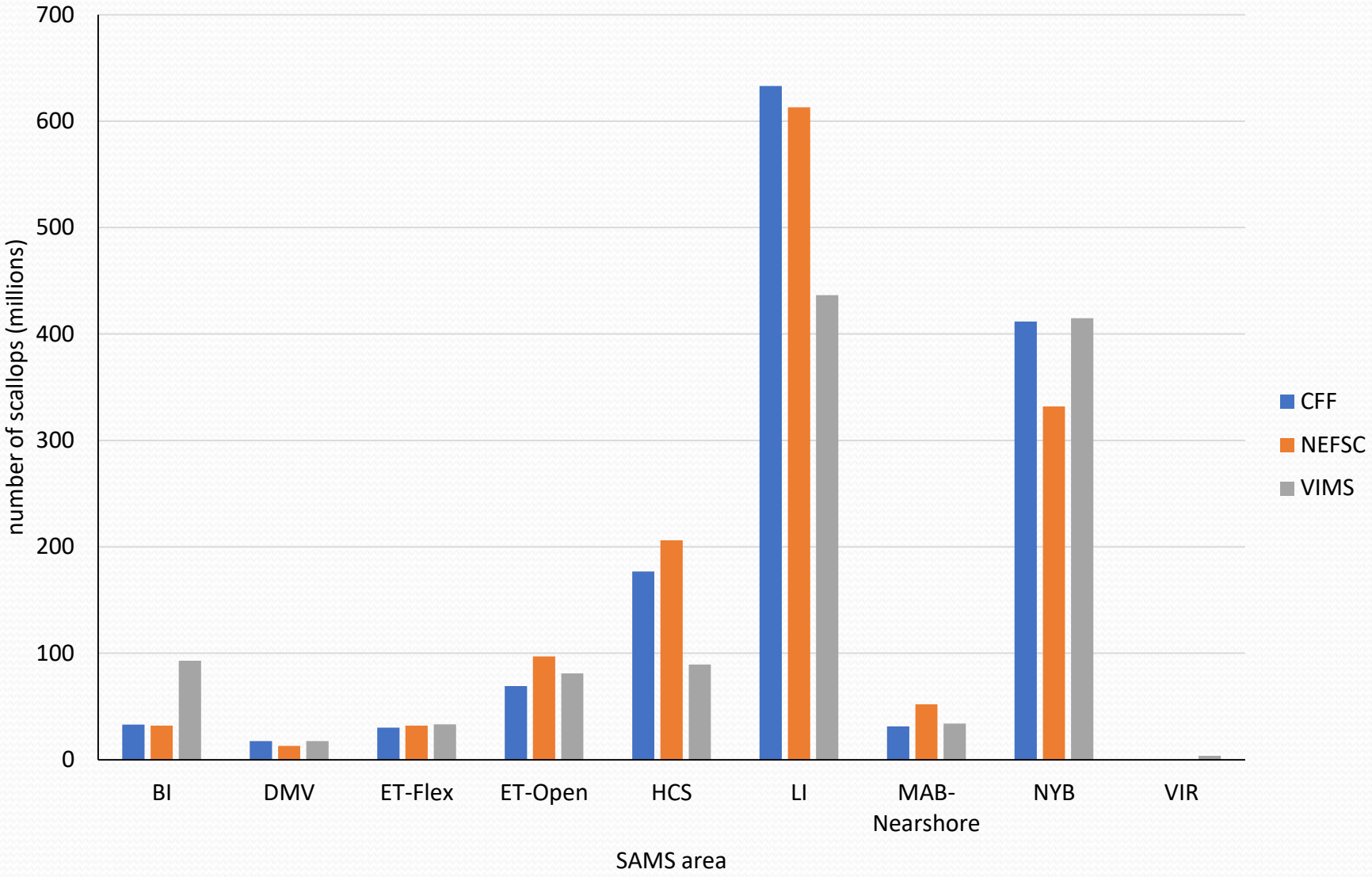
- Data issues? Agreement between surveys?

Data from Mid-Atlantic

SAMS/Survey Group	NumMil	BmsMT	SE	MeanWt	Avg. Size	Scallop density per m2	# Tows/Drops, HabCam images annotated
BI							
CFF	33	814	486	25	104	0.04	368
NEFSC	32	815	66	26	104	0.04	368
VIMS	93	1,564	274	17	92	0.14	12
DMV							
CFF	18	212	186	12	84	0.00	1,510
NEFSC	13	163	80	12	84	0.00	1,508
VIMS	18	115	15	7	64	0.00	51
ET-Flex							
CFF	30	633	265	21	103	0.02	862
NEFSC	32	677	190	21	103	0.02	862
VIMS	33	812	58	27	113	0.02	29
ET-Open							
CFF	69	1,243	515	17	92	0.04	1,530
NEFSC	97	1,664	272	17	92	0.04	1,529
VIMS	81	1,814	71	23	105	0.04	53
HCS							
CFF	177	3,818	1,123	22	107	0.05	1,796
NEFSC	206	4,453	239	22	107	0.05	1,966
VIMS	89	2,019	94	23	108	0.03	60
LI							
CFF	633	14,100	4,197	22	100	0.05	4,115
NEFSC	613	13,463	269	22	99	0.05	4,112
VIMS	436	8,302	367	19	95	0.04	142
MAB-Nearshore							
CFF	31	919	533	31	116	0.01	1,171
NEFSC	52	1,479	130	29	116	0.01	1,171
VIMS	34	513	44	15	79	0.01	21
NYB							
CFF	412	6,124	2,232	16	88	0.08	2,047
NEFSC	332	4,919	851	15	87	0.07	1,868
VIMS	415	6,043	446	14	86	0.11	65
VIR							
VIMS	4	16	2	5	60	0.00	17
Grand Total	**3,982**	**76,694**	**13,005**	**479**	**2,389**	**0.95**	**27,233**

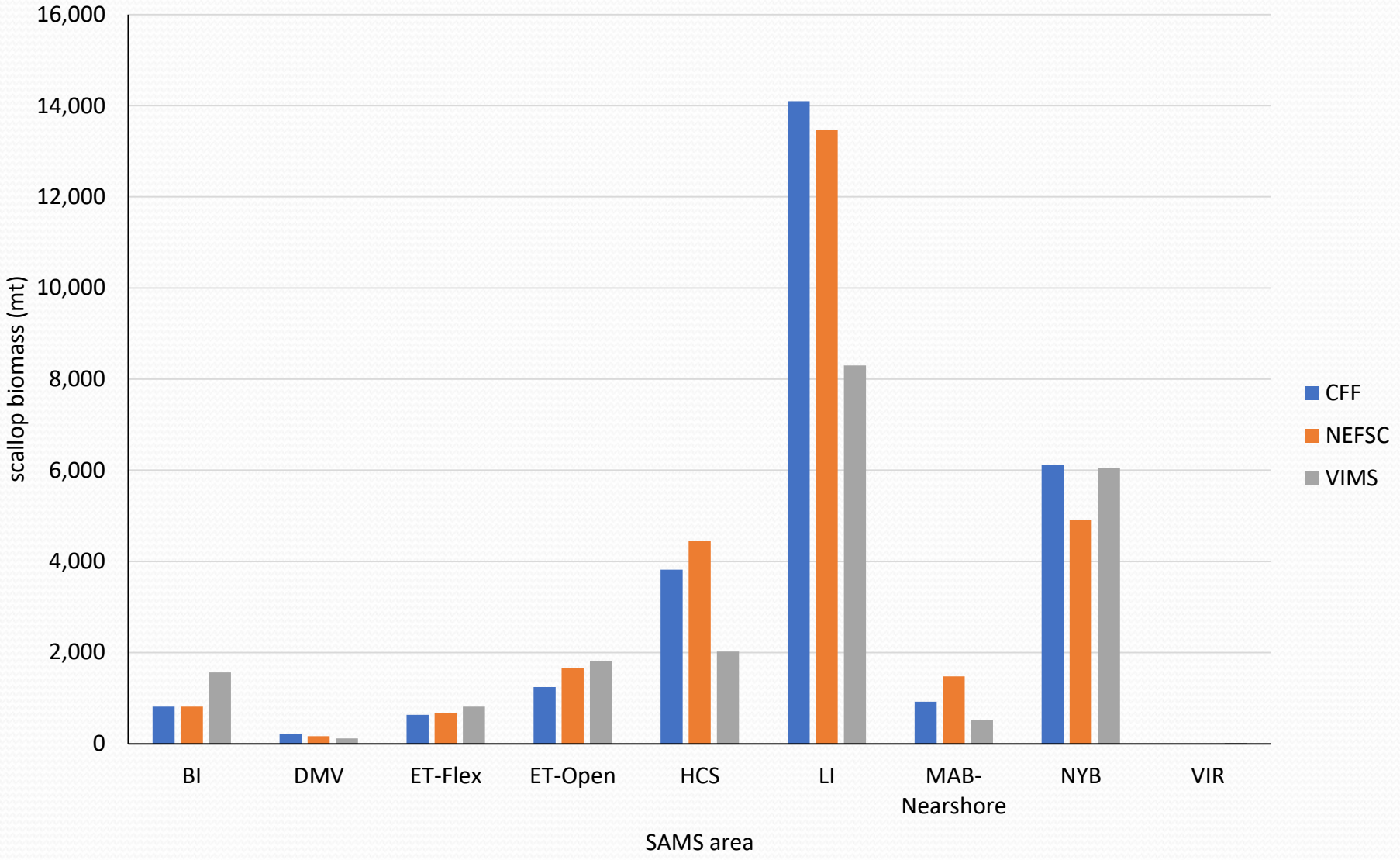
Data from Mid-Atlantic

Millions of Scallops (# scallops per area)



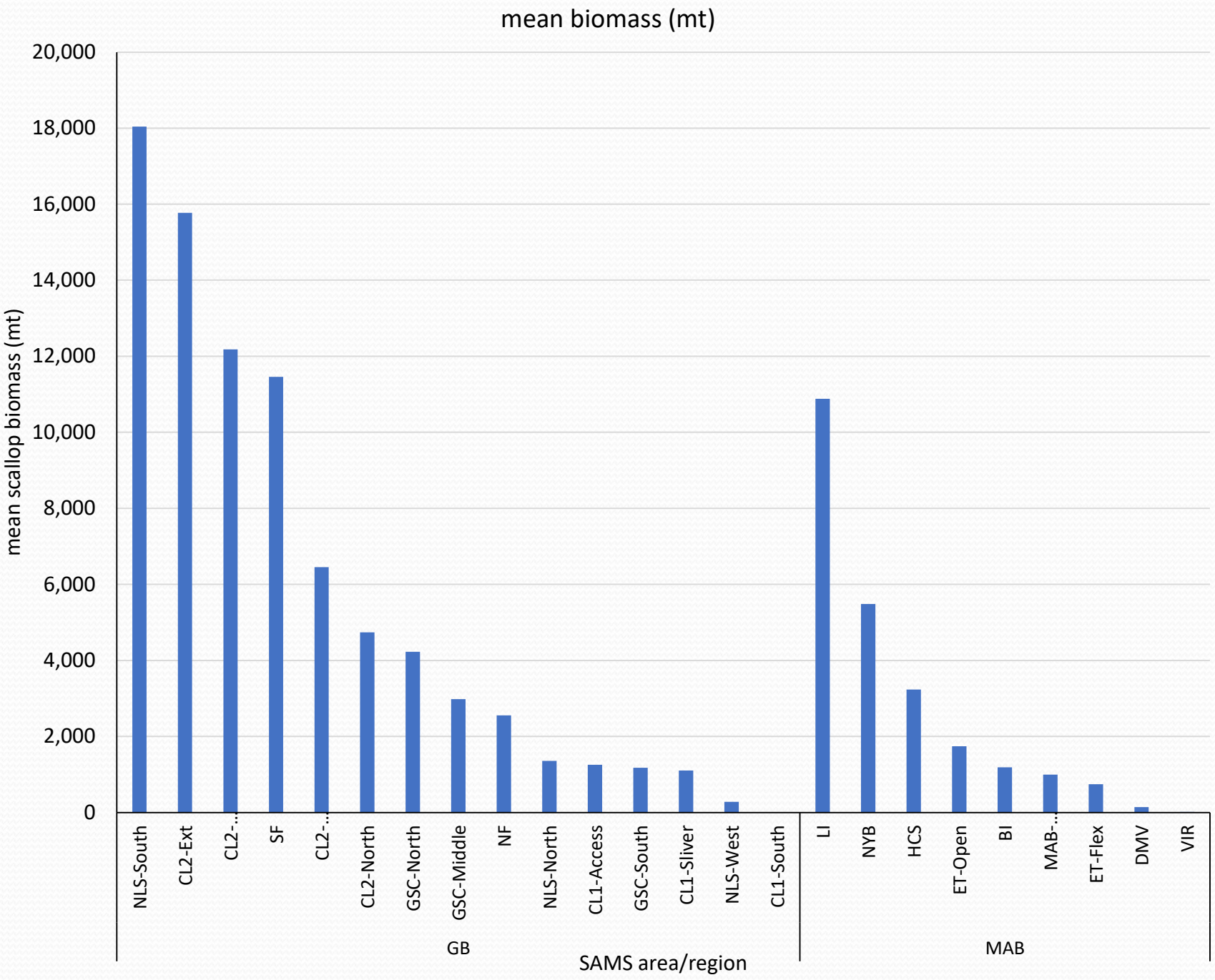
Data from Mid-Atlantic

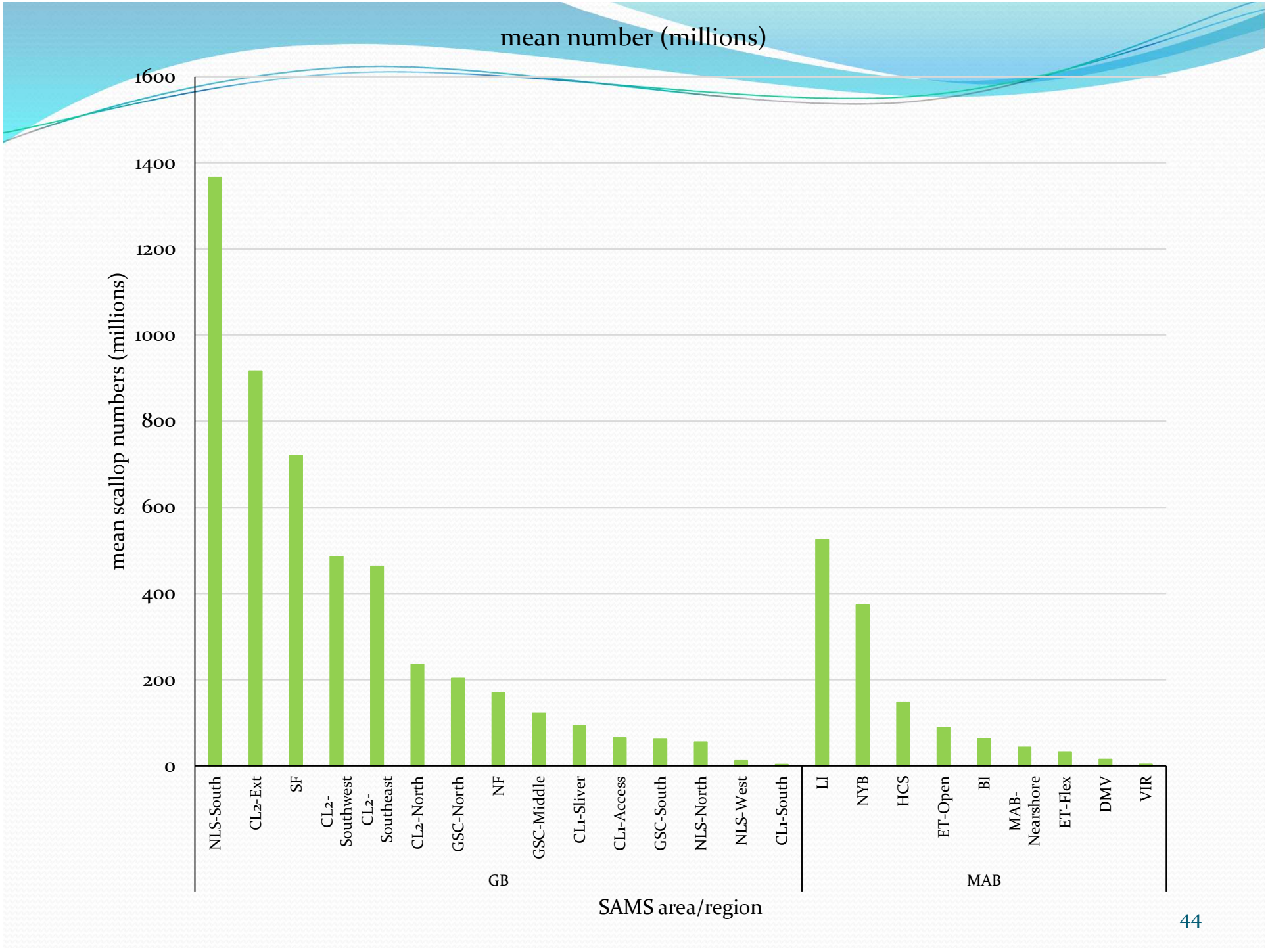
Biomass



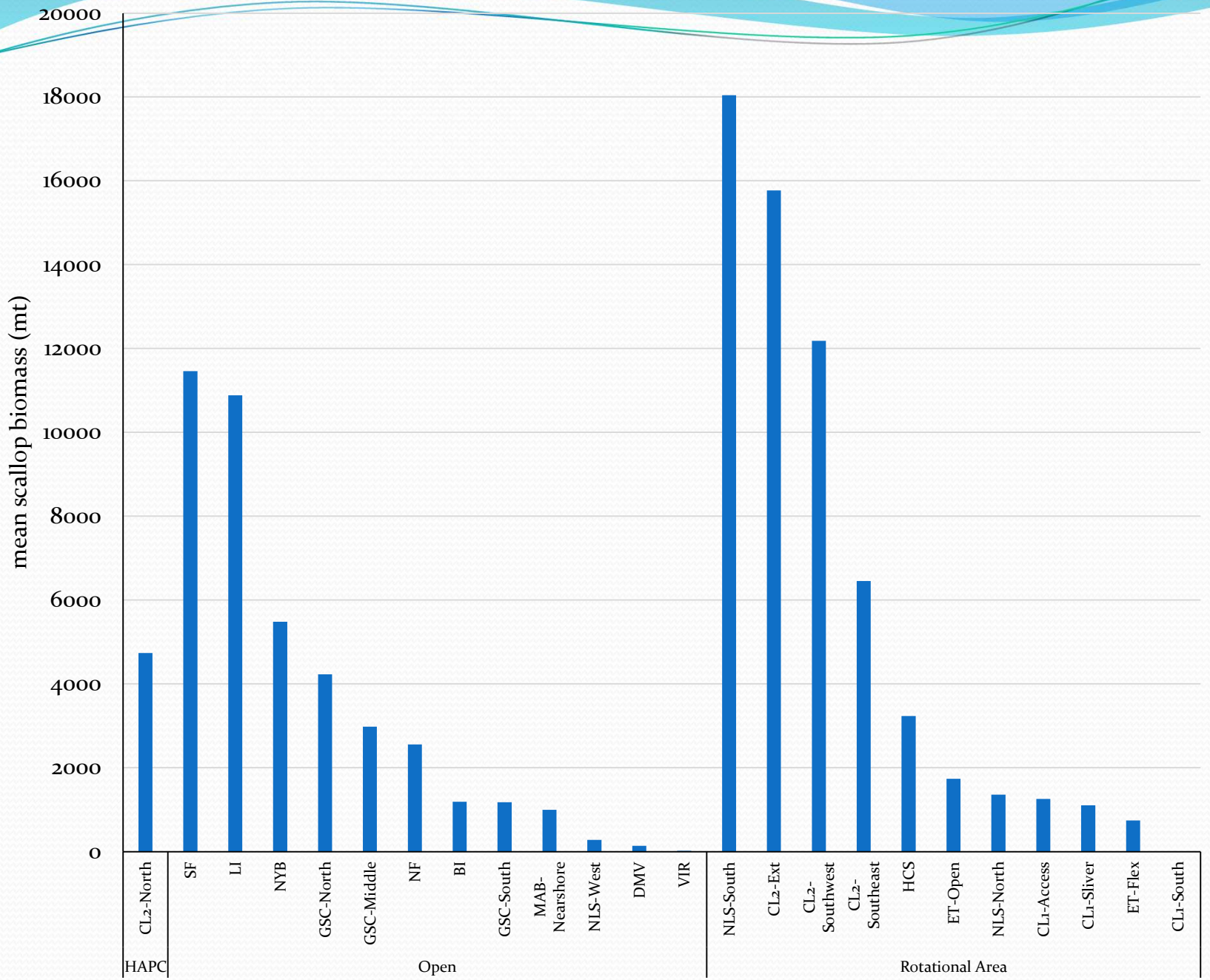
Data from Mid-Atlantic

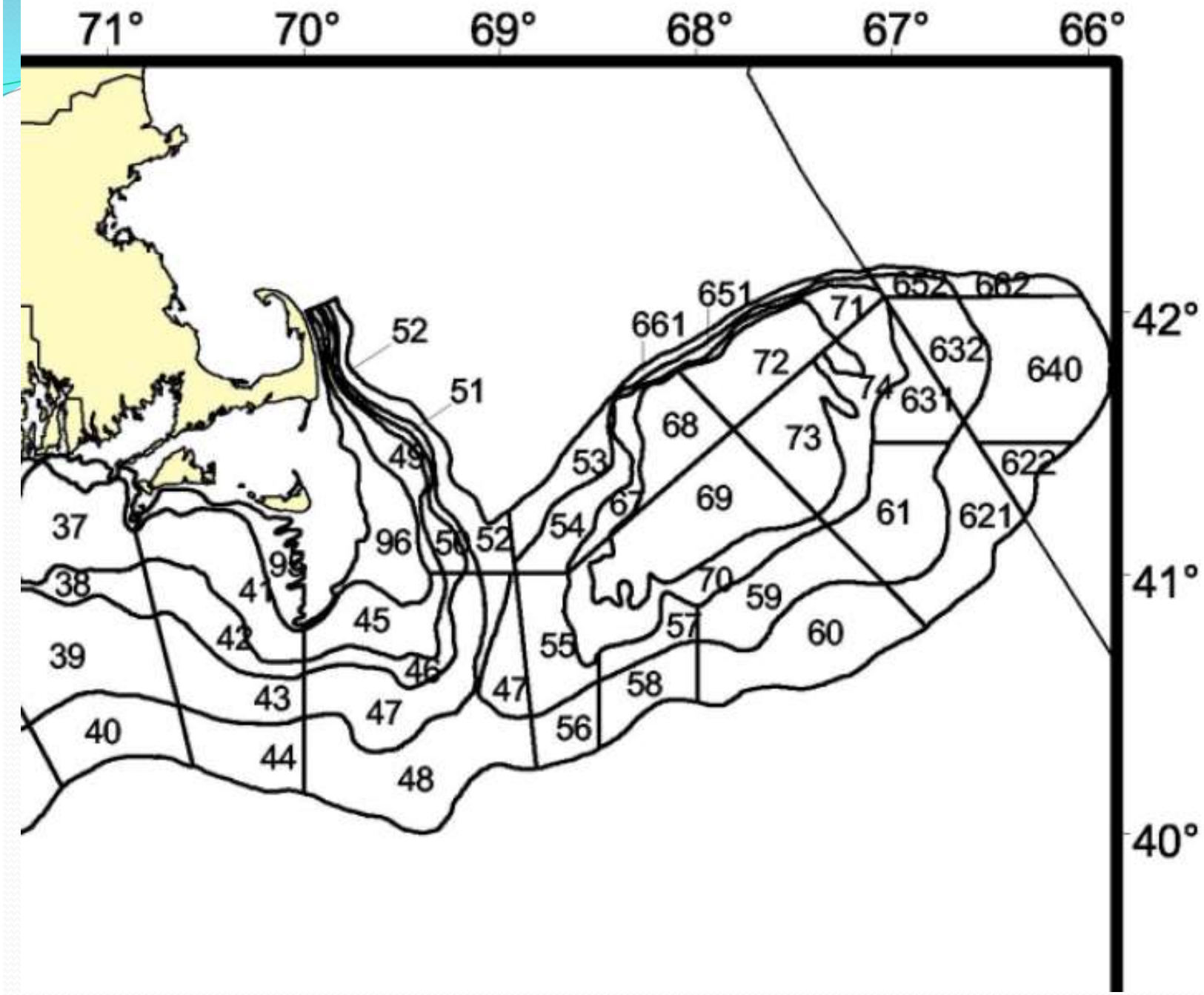
- Data issues? Agreement between surveys?


mean biomass (mt)
mean scallop biomass (mt)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
NLS-South
CL2-Ext
CL2-...
SF
CL2-...
CL2-North
GSC-North
GSC-Middle
NF
NLS-North
CL1-Access
GSC-South
CL1-Sliver
NLS-West
CL1-South
LI
NYB
HCS
ET-Open
BI
MAB-...
ET-Flex
DMV
VIR
GB
MAB
SAMS area/region


mean number (millions)
mean scallop numbers (millions)
1600
1400
1200
1000
800
600
400
200
0
NLS-South
CL2-Ext
SF
CL2-Southwest
CL2-Southeast
CL2-North
GSC-North
NF
GSC-Middle
CL1-Sliver
CL1-Access
GSC-South
NLS-North
NLS-West
CL1-South
LI
NYB
HCS
ET-Open
BI
MAB-Nearshore
ET-Flex
DMV
VIR
GB
MAB
SAMS area/region

mean biomass (mt) for AA/closure/open areas




71°
70°
69°
68°
67°
66°
42°
41°
40°
37
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621
622
631
632
640
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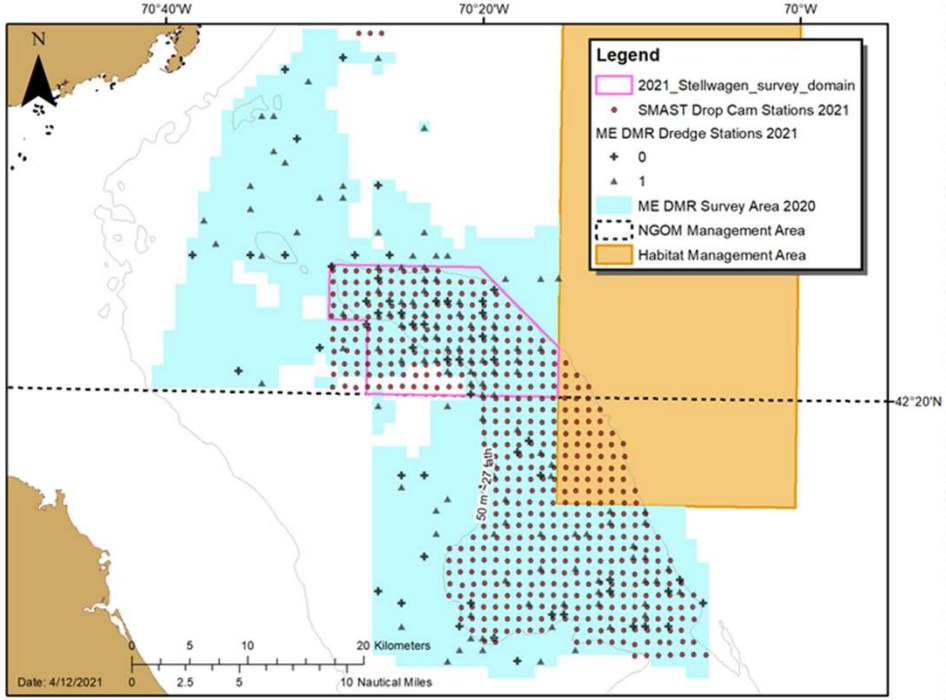
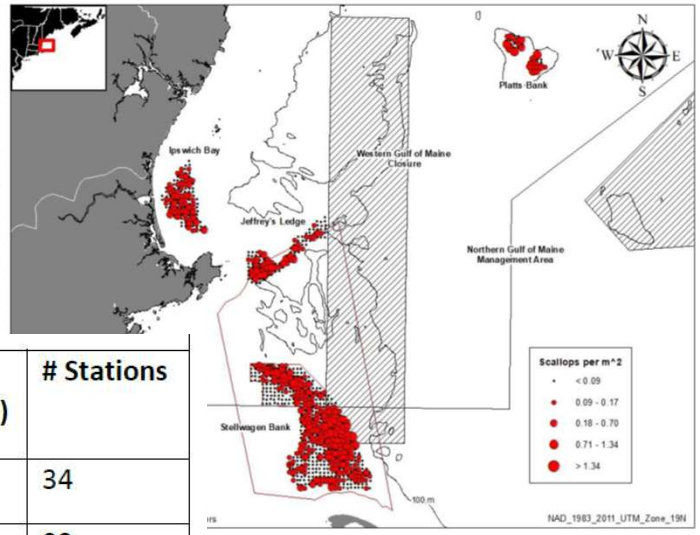
71
72
73
74
96
98

NGOM Estimates

- SMAST and DMR/UMaine survey domains do not overlap in the NGOM.
- SMAST and ME DMR/UMaine developed estimates for an agreed upon area of interest on Stellwagen Bank.



SMAST GOM Survey Data



GOM	NumMil	BmsMT	SE	MeanWt	Avg. Size (mm)	Scallop density (m²)	# Stations
Platts Bank	7	108	24	14.7	97.3	0.22	34
Ipswich Bank	10	143	28	14.7	89.9	0.10	93
Jeffreys Ledge	15	268	48	17.7	96.9	0.14	108
NGOM Stellwagen Bank	112	1,508	501	13.4	88.3	0.66	169
NGOM TOTAL	144	2,026					404
Non-NGOM Stellwagen Bank (Stellwagen South)	31	547	31	17.5	93.9	0.11	291
Non-NGOM WGOM Closure	106	2,308	349	21.7	103.9	1.77	60
Non-NGOM Ipswich Bay (MA State Waters)	3	41	11	12.7	88.1	0.13	25

DMR/UMaine
GOM Survey Data

1.0 2021 SURVEY BIOMASS ESTIMATES

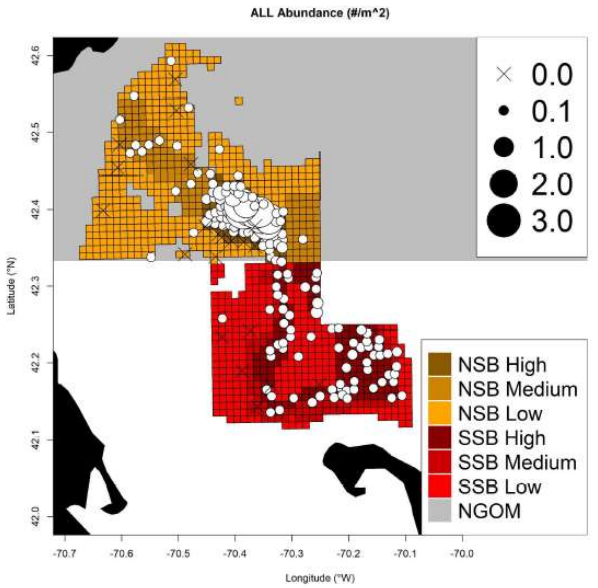
Dredge efficiency = 0.4

Size cutoff for estimates is 40mm

Hart 2020 SH/MW equation

GOM	NumMil	BmsMT	SE	MeanWt (g)	Avg. Size (mm)	Scallop density (g/m^2)	# Tows
NGOM Stellwagen Bank	86.02	1426.76	667.81	21.02	100.53	8.15	76
NGOM TOTAL	86.02	1426.76	667.81	21.02	100.53	8.15	76
Non-NGOM Stellwagen Bank (Stellwagen South)	17.76	341.09	85.97	20.38	98.11	0.65	75

Full Survey Area Total Scallop Abundance 2021:



SH/MW equations for NGOM

- **Proposal for discussion:**
  - For non-Stellwagen areas, SMAST continue to use Hart 2020 equation because this equation incorporated biological data from several areas of the NGOM (2019).
  - For Stellwagen Bank estimate in the NGOM (Area of Interest), use updated DMR/UMaine SH/MW equation. Rationale: Current year data for a specific area, similar Hart 2020.

4.0 SENSITIVITY ANALYSES – STELLWAGEN BANK

Comparison of biomass estimates: 2020 Hart SH/MTW equation and 2021 ME DMR/UMaine SH/MTW equation. Dredge efficiency = 0.4.

	Biomass estimate (metric tons) using: Hart 2020 SH/MW equation	Hart SE	Biomass estimate (metric tons) using: DMR/UMaine 2021 SH/MW equation	DMR/ UMaine SE
NGOM Stellwagen Bank	1426.76	667.81	1474.52	693.17
Non-NGOM Stellwagen Bank (Stellwagen South)	341.09	85.97	355.39	92.02

Dredge efficiency in NGOM-Stellwagen

- **Starting point: Use the mean of available surveys in each SAMS area (no adjustment)**
- **Discussion:** DMR dredge filled at three (3) stations when surveying Stellwagen Bank in the NGOM.
- Is there a specific density at which we can say the dredge fills up and the estimates are not accurate?
  - See next slide.

Estimated Scallop Density in the NGOM Stellwagen Area of Interest

Northern Stellwagen Bank							
GOM	NumMil	BmsMT	SE	MeanWt (g)	Avg. Size (mm)	Scallop density (m²)	# Stations
SMAST DropCam	112	1,508	501	13.4	88.3	0.66	169
ME DMR/UMaine	86	1427	668	21	100.5	8.15 g/m^2	76

Note: Mode of dredge L-F was 90-95mm, measured larger YC, see next slide. High densities are not distributed throughout the area of interest.

ME DMR/UMaine sensitivity analyses for dredge efficiency in GOM area

DMR analysis of dredge efficiency on Stellwagen Bank: Atlantic Sea Scallop abundance (millions) and biomass (metric tons) were estimated at three different dredge efficiencies within the area of interest, as high densities may have impacted gear function. The ME DMR used a dredge efficiency of 0.4 (Kelly, 2006). A dredge efficiency of 0.26 was also considered, as it was considered by the DMR in past surveys. Estimates were also generated at a dredge efficiency of 0.13, as discussed in SARC 65.

	No adjustment 0.4		Reduced efficiency 0.26		Reduced efficiency 0.13	
	NumMill	Biomass MT	NumMill	Biomass MT	NumMill	Biomass MT
NGOM Stellwagen Bank	86.02	1474.52	132.34	2268.49	264.67	4536.99

L-F comparison for NGOM-Stellwagen

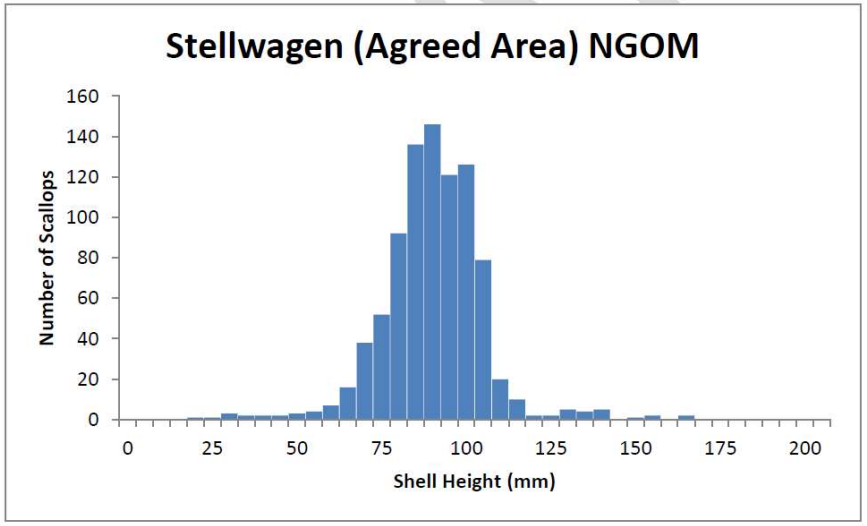
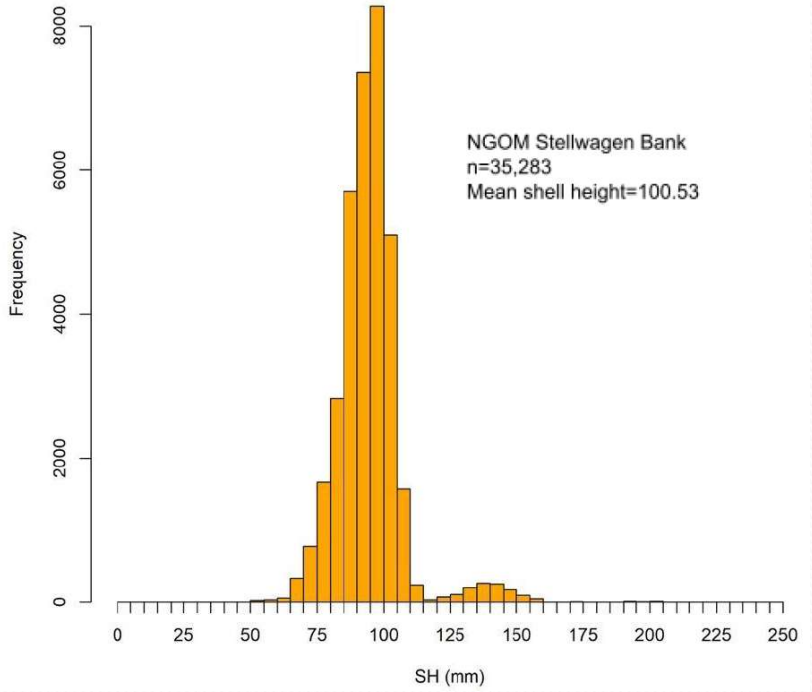
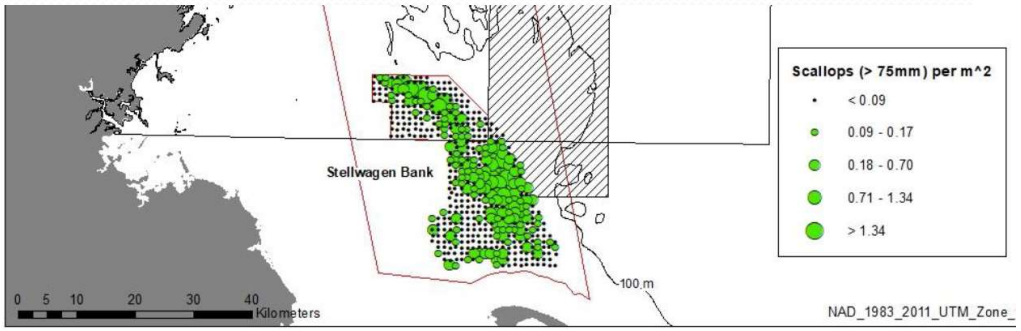


Figure 10. Shell height distribution of scallops on Stellwagen Bank in the agreed upon area within the Northern Gulf of Maine Management area from the SMAST Drop Camera survey. The overall average shell height was 87.7 mm with 884 scallops measured.



NGOM Area of Interest Scallop Abundance Greater Than 75mm:



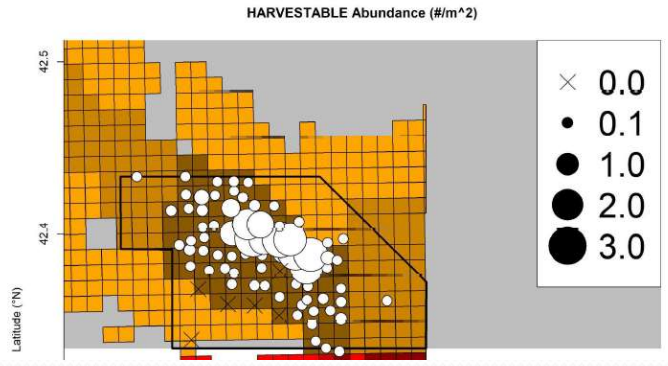


Figure 6. Scallop (> 75 mm) density from the 2021 SMAST Drop Camera survey.

Assumptions for the SAMS model:

Selectivity curves

Growth (L_∞ and K)

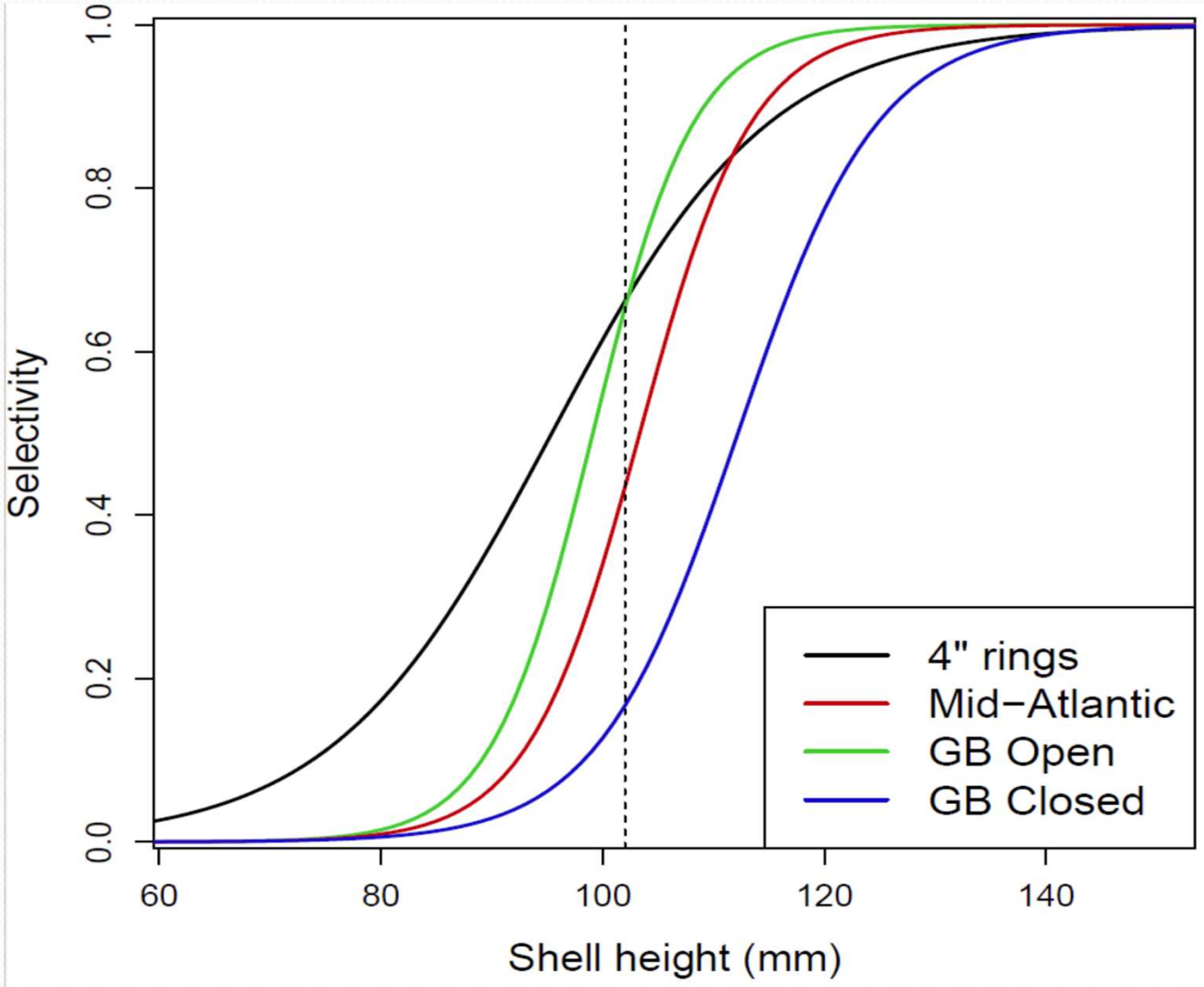
Recruitment assumption

Discrepancy between projections with the surveys?

Was slower than expected growth observed?

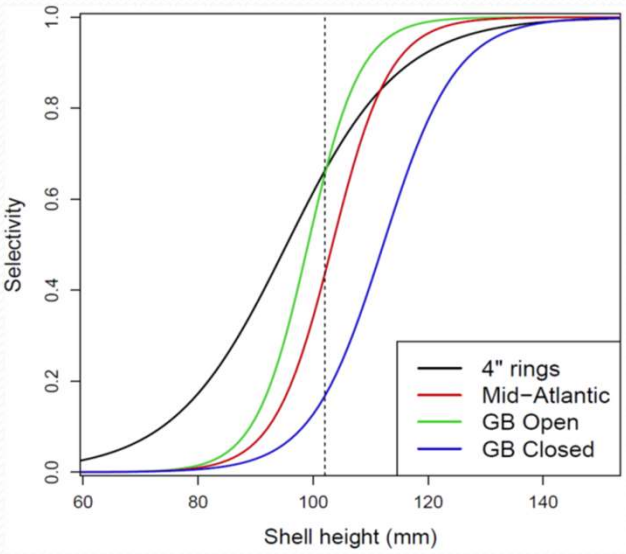
Scaling to different growth stanzas?

Selectivity Curves



Selectivity Curves

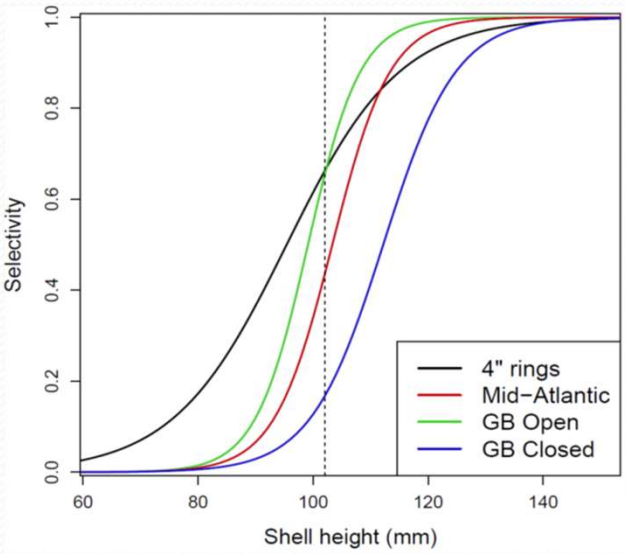
- For 2022 Exploitable Biomass, used in SAMS



- In 2020, the PDT recommended applying the Georges Bank Open selectivity curve in the Nantucket Lightship-South-deep area to select a larger proportion of the 9-year-old animals in this area that are have already recruited to the fishery but are not growing normally.
- SAMS model projections of exploitable biomass are based on selectivity curves estimated from the CASA model, which account for gear selectivity (i.e. 4” ring) and fishery selectivity (i.e. targeting larger scallops).

Selectivity Curves

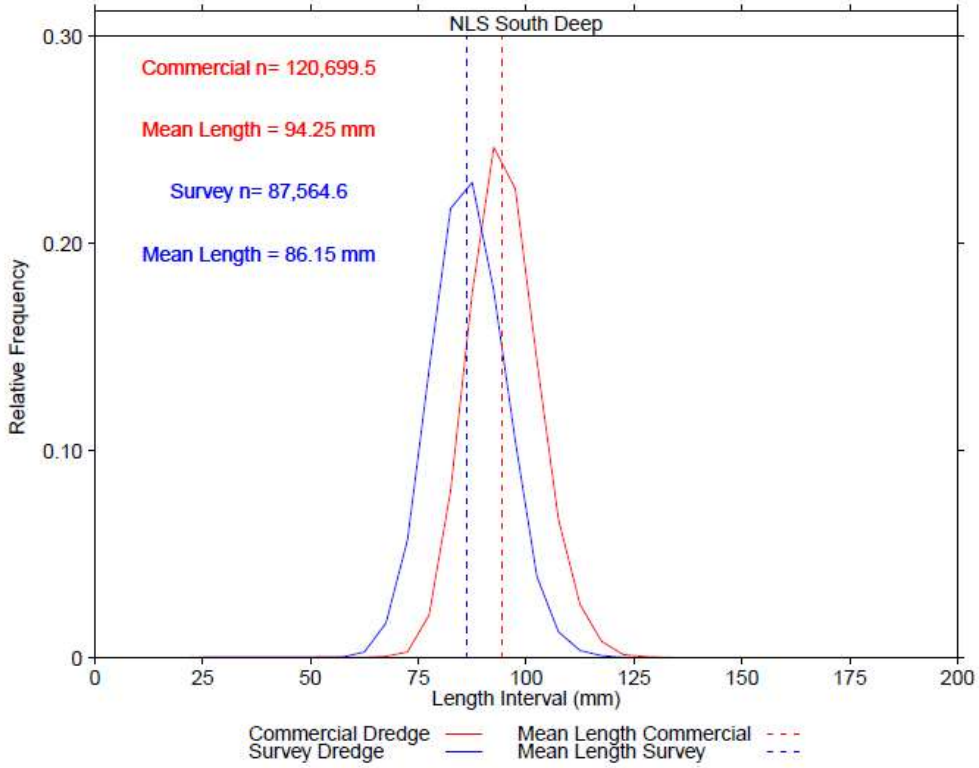
- For 2021 Exploitable Biomass, used in SAMS



- Does the PDT recommend using different selectivity curves for the NLS-South? Used GB Open Curve for NLS-South in Framework 32 and Framework 33. (Proposal: Stick with GB Open)
  - Other areas?
- This results in more exploitable biomass, higher OFL, ABC.

Growth (L∞ and K)

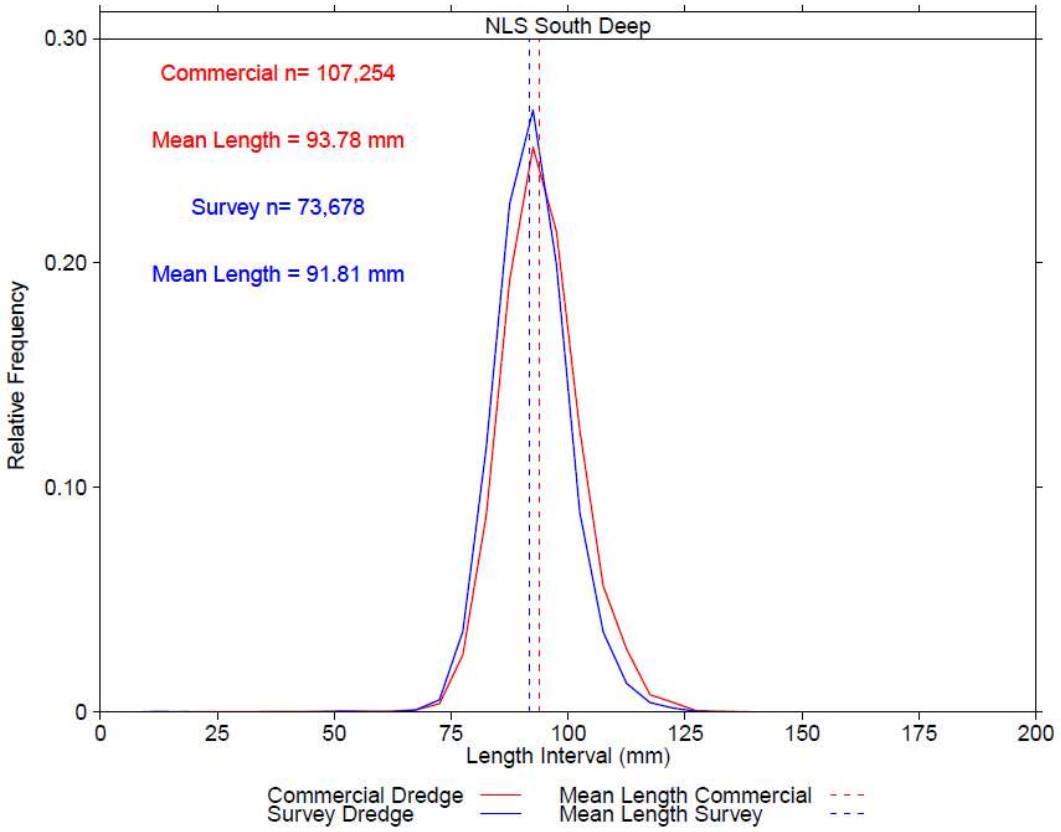
- Changed growth for NLS areas in the past.
- SARC 65 set the L∞ of scallops in the NLS-S-deep at 110 mm. *Is 110 the right number? 10 yo in 2021.*
  - VIMS L-F analysis for NLS-South area next Tuesday



SAMS_Area	Length	Commercial	Survey
NLS_South_Deep	57.5	40.0	25.0
NLS_South_Deep	62.5	26.0	244.0
NLS_South_Deep	67.5	80.0	1,460.0
NLS_South_Deep	72.5	335.0	4,973.0
NLS_South_Deep	77.5	2,477.0	12,156.0
NLS_South_Deep	82.5	9,739.0	18,997.0
NLS_South_Deep	87.5	21,242.0	20,095.0
NLS_South_Deep	92.5	29,743.0	15,520.0
NLS_South_Deep	97.5	27,324.0	9,160.0
NLS_South_Deep	102.5	17,310.0	3,432.0
NLS_South_Deep	107.5	8,064.0	1,095.0
NLS_South_Deep	112.5	3,097.0	304.0
NLS_South_Deep	117.5	957.0	87.0
NLS_South_Deep	122.5	182.0	15.0
NLS_South_Deep	127.5	64.0	1.0
NLS_South_Deep	132.5	18.0	0.0
NLS_South_Deep	137.5	1.0	0.0

Growth (L∞ and K)

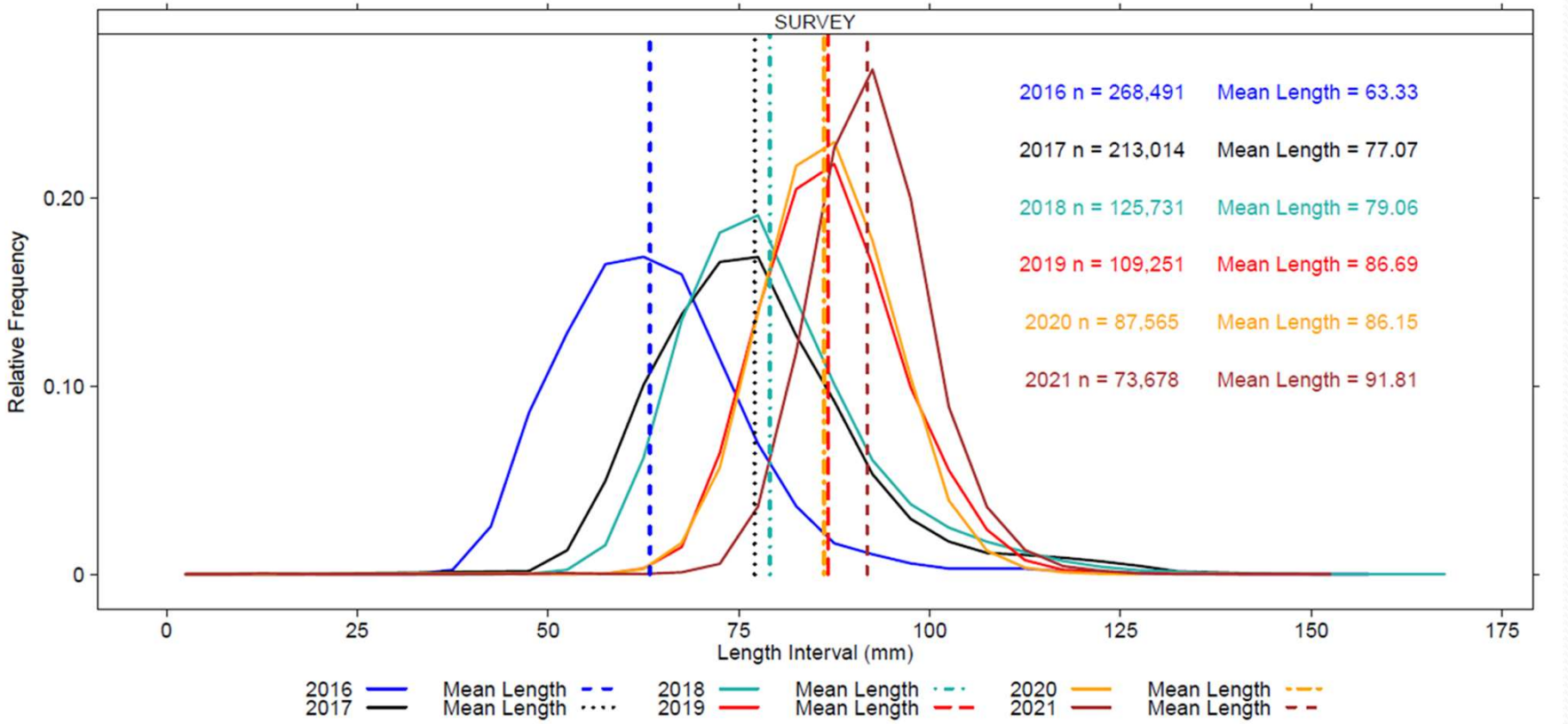
- Changed growth for NLS areas in the past.
- SARC 65 set the L∞ of scallops in the NLS-S-deep at 110 mm. *Is 110 the right number? 10 yo in 2021.*



SAMS_Area	Length	Commercial	Survey
NLS_South_Deep	7.5	0	3
NLS_South_Deep	12.5	0	25
NLS_South_Deep	17.5	0	11
NLS_South_Deep	22.5	0	4
NLS_South_Deep	42.5	0	1
NLS_South_Deep	52.5	0	39
NLS_South_Deep	57.5	0	14
NLS_South_Deep	62.5	54	11
NLS_South_Deep	67.5	110	76
NLS_South_Deep	72.5	407	407
NLS_South_Deep	77.5	2,743	2,655
NLS_South_Deep	82.5	9,402	8,676
NLS_South_Deep	87.5	20,644	16,687
NLS_South_Deep	92.5	26,983	19,756
NLS_South_Deep	97.5	22,964	14,698
NLS_South_Deep	102.5	13,458	6,550
NLS_South_Deep	107.5	6,038	2,633
NLS_South_Deep	112.5	3,016	947
NLS_South_Deep	117.5	833	316
NLS_South_Deep	122.5	464	133
NLS_South_Deep	127.5	63	29
NLS_South_Deep	132.5	52	5
NLS_South_Deep	137.5	18	1
NLS_South_Deep	142.5	3	0
NLS_South_Deep	147.5	1	0
NLS_South_Deep	152.5	0	1

Growth (L∞ and K)

- Changed growth for NLS areas in the past.
- SARC 65 set the L∞ of scallops in the NLS-S-deep at 110 mm. *Is 110 the right number? 10 yo in 2021.*



Part 2: Outlook

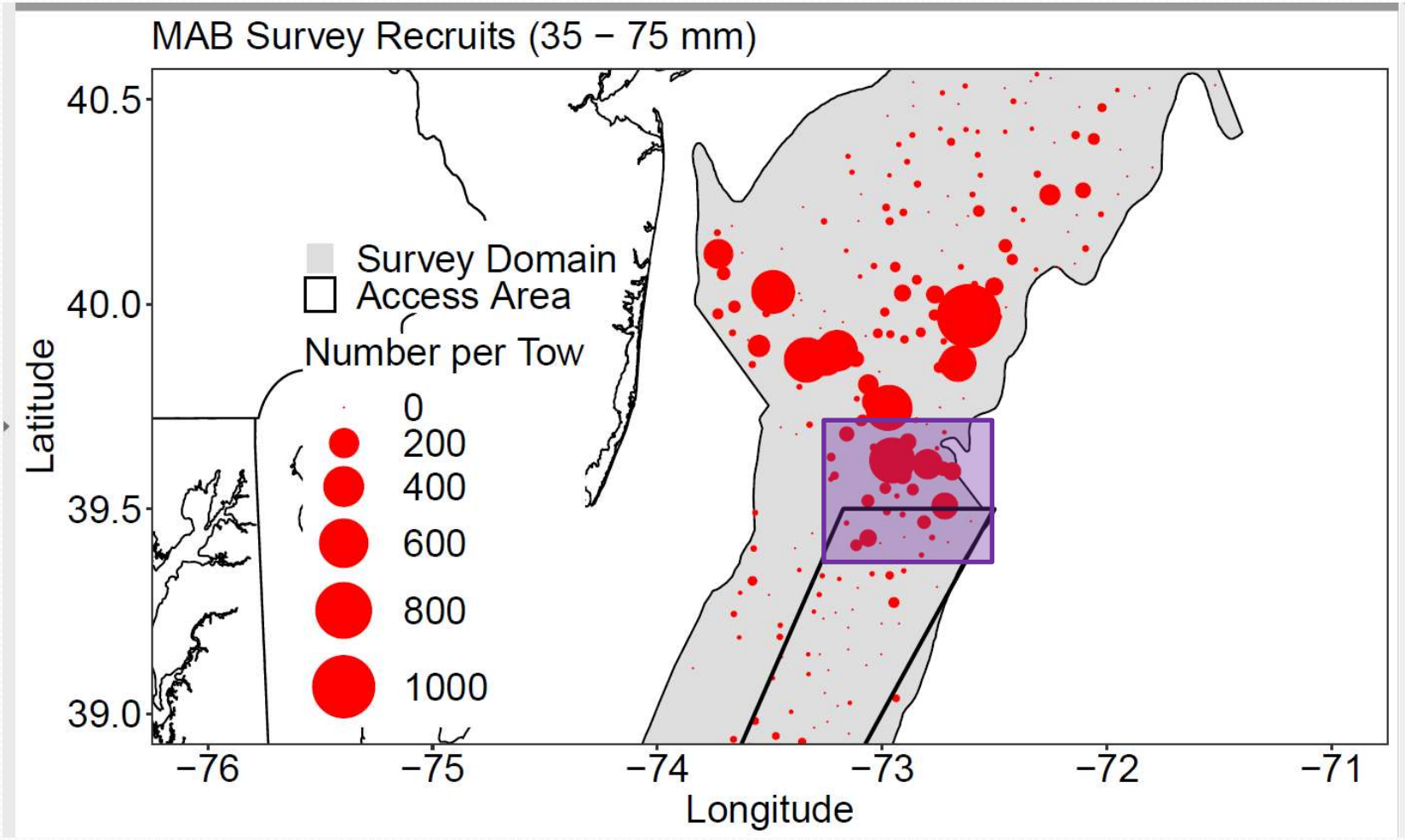
- PDT input:

Run idea to start us off...

- 1.5 CAII (SW & Ext combined) @ 18,000lbs
- 1 NLS-S @ 18,000lbs
- MAAA becomes open bottom, with a partial closured of NYB and HCS to improve YPR + source/sink
- DAS >24
- Closures in CAII-SE region to protect small scallops and optimize growth
- No FLEXing

Possible closure area?

Closure in the NYB + HCS to improve YPC and foster source/sink relationship between this area and the Elephant Trunk



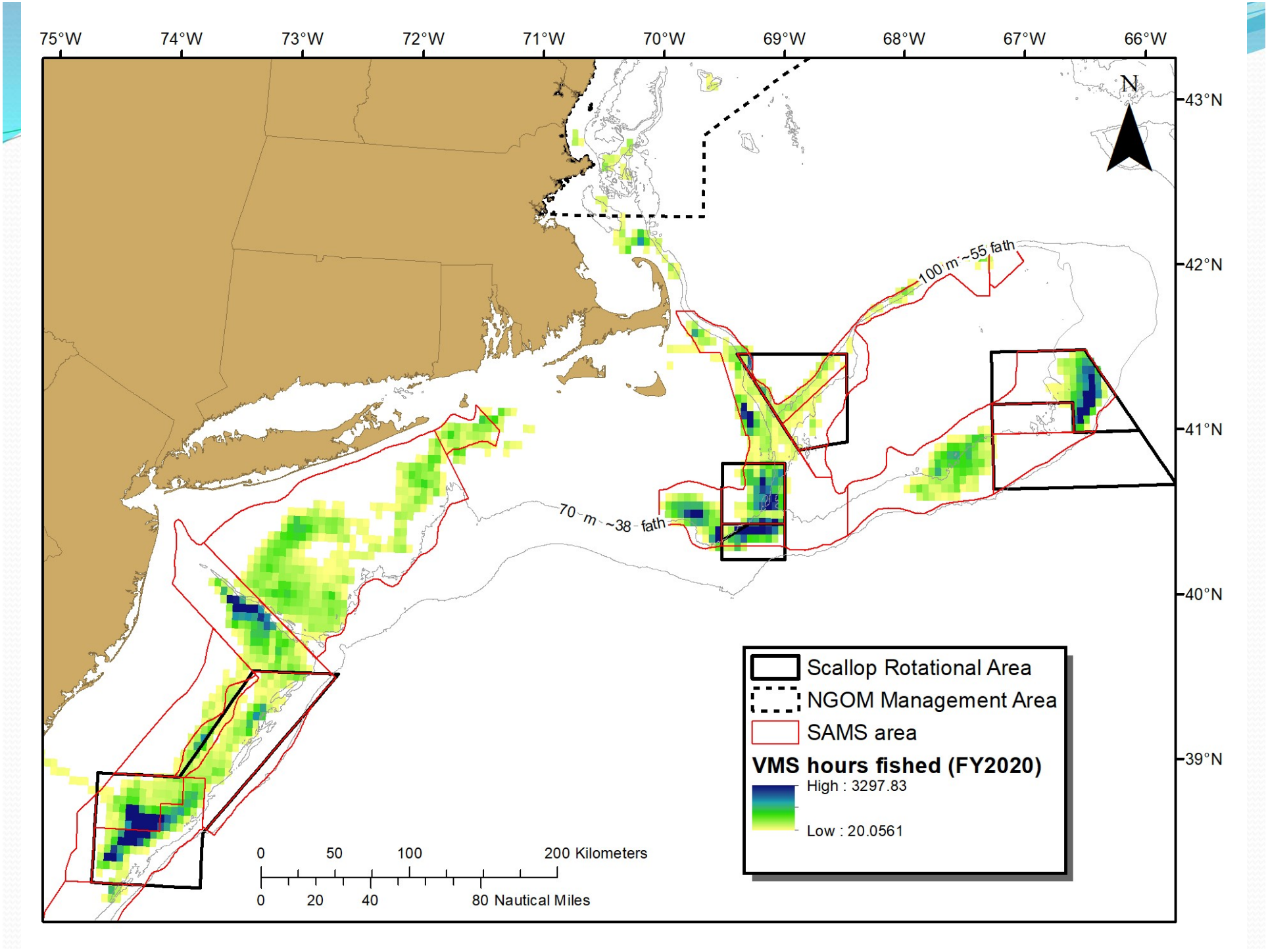
- **Document #3 – Combined Survey Estimates from 2020.**

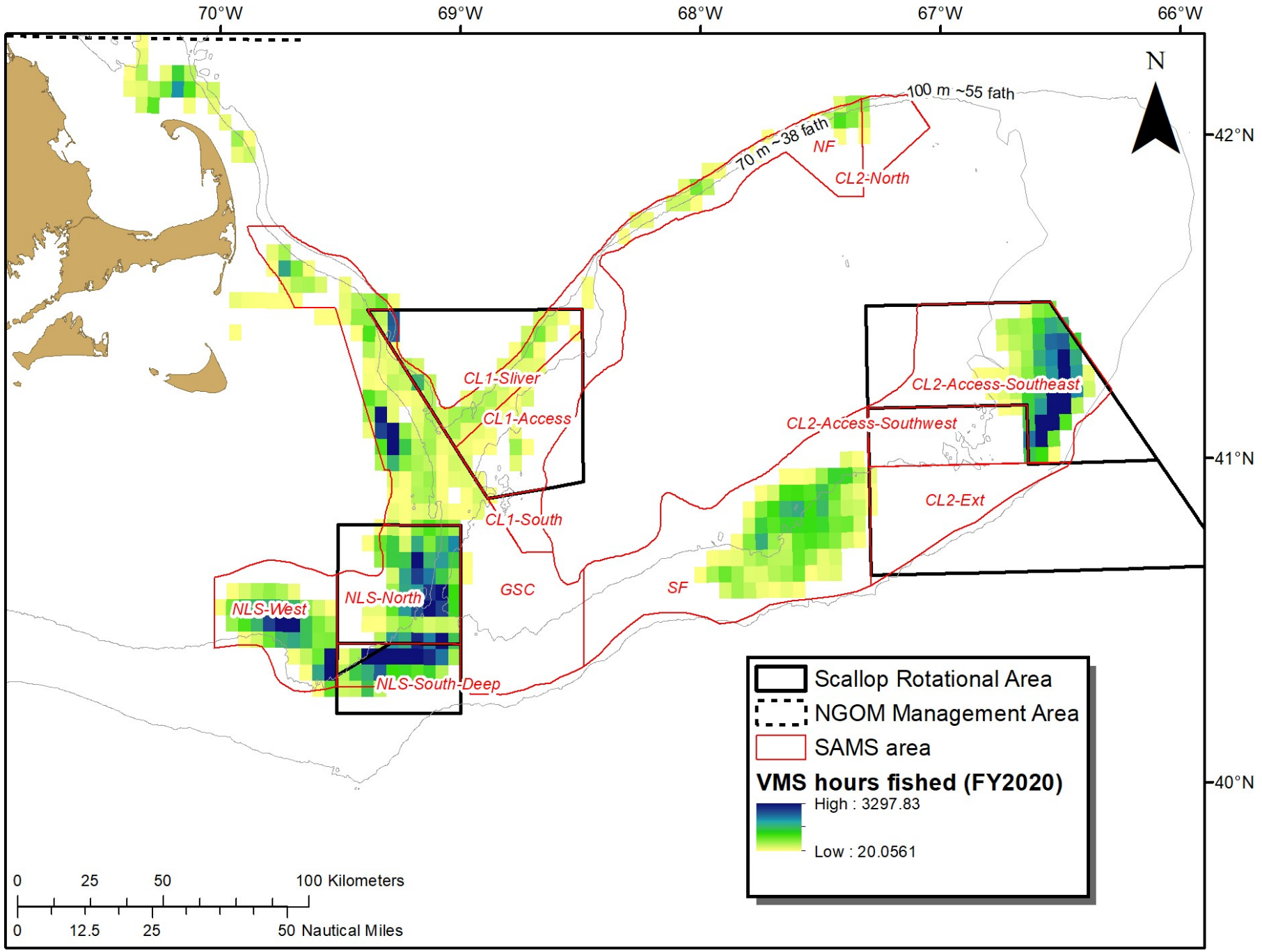
		Dredge				DropCam				Habcam				Mean				F32 Projections		
Region	Subarea	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Bmsmt	%Change	ExpBmsmt
GB	CL1ACC													*52.0*	*829*		*15.9*	829		
GB	CL1NA	60.2	1490	271	24.8									60.2	1490	271	24.8	3300	-54.8%	
GB	CL-2(N)													*301.0*	*6347*		*21.1*	6347		
GB	CL-2SE	370.6	5,185	528.2	14.0	505	5083	842	10.1	406	6718	57	16.5	427.3	5662	332	13.3	14763	-61.6%	
GB	CL-2SW	1079.0	21,357	4722.3	19.8	790	17769	3442	22.5	774.9	14693	354	19.0	881.3	17940	1951	20.4	8385	113.9%	
GB	CL2Ext	913.8	12924	1524.469	14.1	1048	15401	1986	14.7	856	11055	200	12.9	939.3	13127	837	14.0	5965	120.1%	
GB	SF	765.7	6747	124	8.8					884.3	13559	301	15.3	825.0	10153	163	12.3	8820	15.1%	
GB	NLSAccN	44.5	1713	213	38.5	101	3,643	707	36.1					72.8	2678	369	36.8	4619	-42.0%	
GB	NLSAccS-Deep	3613	36047	7705	10.0	2544	33709	6366	13.3	2591	29496	1020	11.4	2916.0	33084	3349	11.3	44995	-26.5%	
GB	NLS-W	11.4	278	46	24.4									11.4	278	46	24.4	3706	-92.5%	
GB	NF													*109.0*	*1434*		*13.2*	1434		
GB	GSC	241.8	6056	851	25.0	329	6077	2917	18.5					285.4	6067	1519	21.3	8056	-24.7%	
GB	GSC-45	0.3	13.00	6.00	43.3									0.3	13	6	43.3			
GB	**TOTAL**	**7100.4**	**91810**	**9227**	**12.9**									**6880.9**	**99101**	**4287**	**14.4**	**111219**	**-10.9%**	
MAB	BI	25.3	809	118	32.0					87.3	1447	143	16.6	56.3	1128	93	20.0	1450	-22.2%	
MAB	LI	294.9	6,151	338	20.9					557	11228	2359	20.2	426.0	8690	1192	20.4	9512	-8.6%	
MAB	NYB	256.4	4007	230	15.6					387.9	6905	924	17.8	322.2	5456	476	16.9	8613	-36.7%	
MAB	MA inshore	10.1	309	46	30.6									10.1	309	46	30.6	1163	-73.4%	
MAB	HCSAA	174.7	4095	233	23.4					301.6	7949	847	26.4	238.2	6022	439	25.3	9393	-35.9%	
MAB	ET Open	265.7	7,811	370	29.4	453	12469	1171	27.6	393	10771	881	27.4	370.4	10350	504	27.9	20145	-48.6%	
MAB	ET Flex	113.9	3,208	283	28.2	262	8143	1127	31.1	242.4	5697	246	23.5	206.0	5683	396	27.6	14990	-62.1%	
MAB	DMV	37.0	352	61	9.5									37.0	352	61	9.5	799	-55.9%	
MAB	VIR	16.1	71	11	4.4									16.1	71	11	4.4	110	-35.5%	
MAB	**TOTAL**	**1194.1**	**26813**	**677**	**22.5**									**1682.2**	**38061**	**1505**	**22.6**	**66175**	**-42.5%**	**0**
TOTAL	**TOTAL**	**8295**	**118623**	**9251**	**14.3**									**8563**	**137161**	**4544**	**16.0**	**177394**	**-22.7%**	**0**

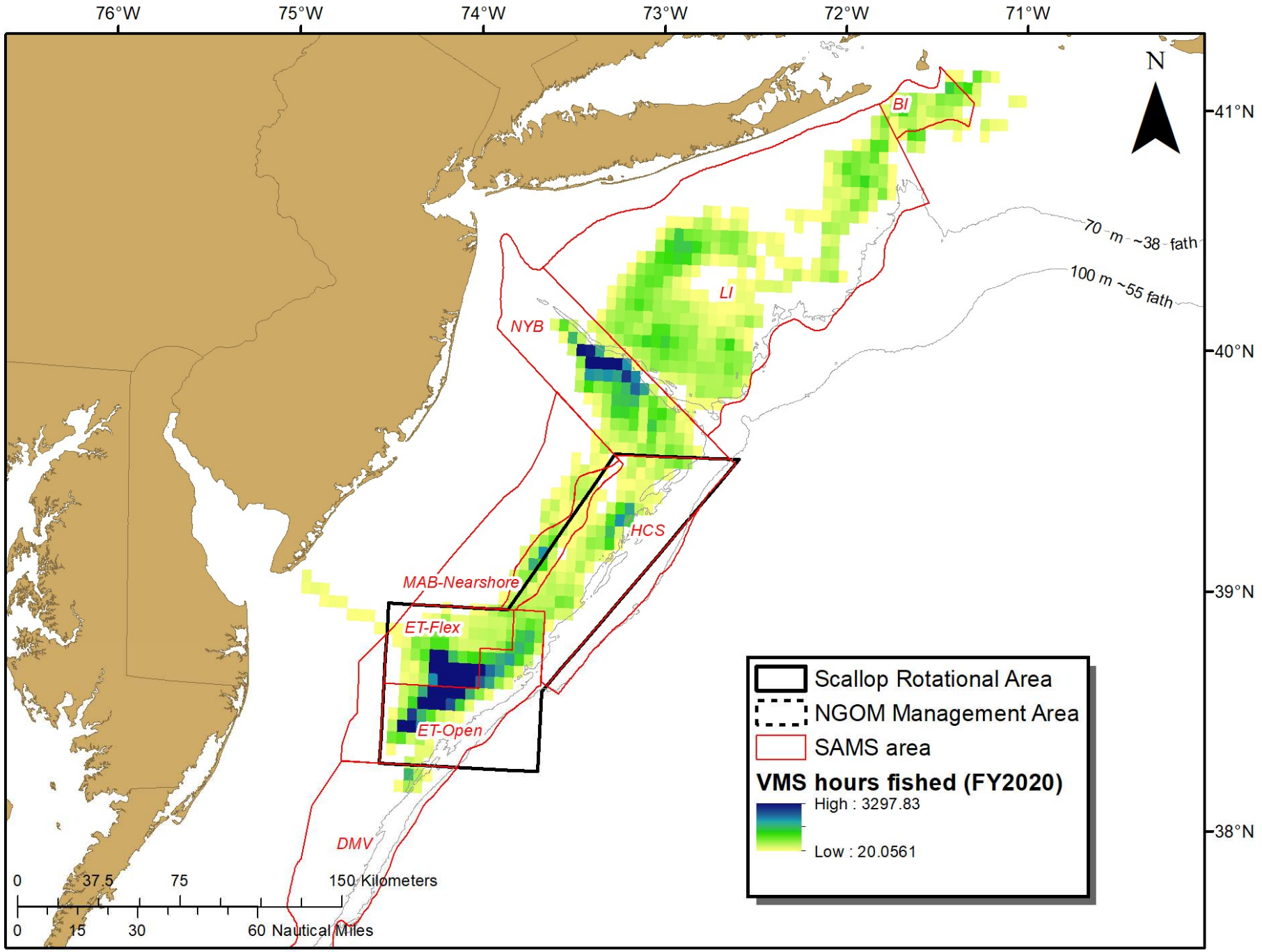
Table 7 - Combined survey estimates for 2019 by SAMS area (September 10, 2019 version).

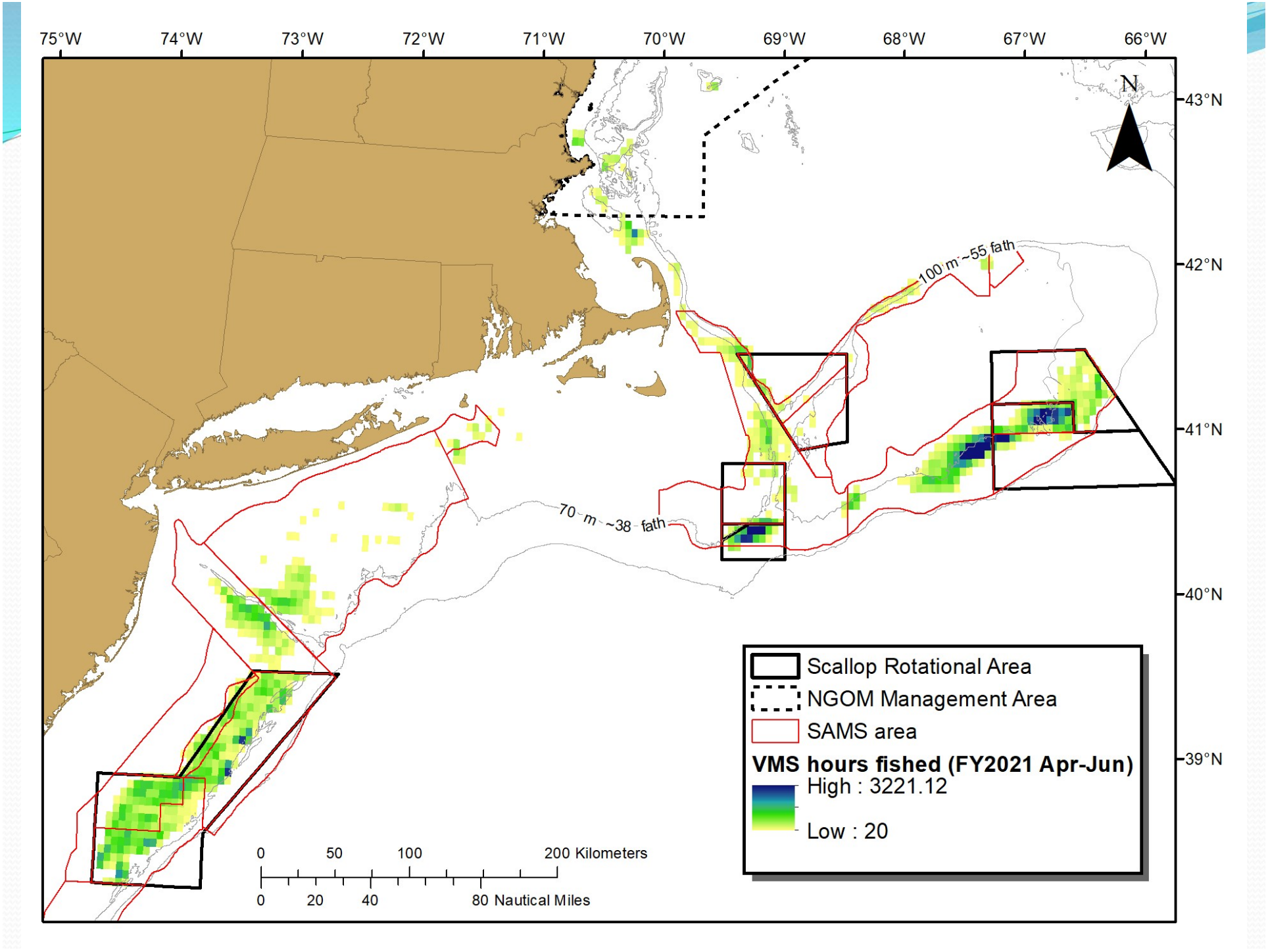
		Dredge				DropCam				Habcam				Mean			
Region	Subarea	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt
GB	CL1ACC	18.4	693	84	35.6	36	1049	203	29					27.1	871	73	32.1
GB	CL1NA	259.0	7857	912	29.5	154	3487	786	23					206.4	5672	401	27.5
GB	CL-2(N)	154.0	5778	2026	37.5	184.1	5,926	1,608	32					169.1	5852	862	34.6
GB	CL-2(S)	1671.0	20,689	1,129	15.4					1035	11710	356	11.3	1353.0	16200	592	12.0
GB	CL2Ext	312.1	5,568	566	17.4					653	6714	117	10.3	482.5	6141	289	12.7
GB	NLSAccN	81.5	3368	210	41.3	122	4,690	696	38.35	71	3066	379	42.9	91.6	3708	273	40.5
GB	NLSAccS-Shallow	117.6	1721	426	14.6	305	4655	3398	15.3	219	3420	9	15.6	213.8	3265	1142	15.3
GB	NLSAccS-Deep	3618.6	36608.8	1182	10.1	4839	49689	8919	10.3	3829	46060	871	12	4095.6	44119	3013	10.8
GB	NLS-W	600.8	10080.4	663	16.7	838	13,438	6,325	16.03	623	12575	3618	20.2	687.4	12031	2439	17.5
GB	NF	91.0	1585	735	17.5	57.2	1,008	372	18					74.1	1297	275	17.5
GB	GSC	296.0	7302	1354	24.7	439	6135	1000	14.0					367.6	6719	561	18.3
GB	GSC-45	1.7	82.57	29.51	49.5									1.7	83		49.5
GB	SF	686.8	12216.0	2127	17.8					1074	8514	188	7.9	880.4	10365	1068	11.8
GB	**TOTAL**	**7908.4**	**113549**	**3937**	**14.4**									**8650.3**	**116322**	**4391**	**13.4**
MAB	BI	94.9	1,515	254	17.3	47	1076	305	23	37	850	8	22.7	59.8	1147	132	19.2
MAB	LI	407.3	9,079	350	22.4	501	9417	962	19	570	12282	770	21.6	492.7	10259	427	20.8
MAB	NYB	537.8	7425	523	14.8	464	7032	1288	15	487	7091	330	14.6	496.4	7183	476	14.5
MAB	MA inshore	53.4	1265	181	23.7					26	1020	7	39.6	39.7	1143	91	28.8
MAB	HCSAA	380.4	8544	775	22.6	580	10185	783	18	762	18303	2273	24	574.1	12344	842	21.5
MAB	ET Open	592.0	15,105	897	25.8	888	18051	1187	20	634	17215	229	27.1	704.6	16790	502	23.8
MAB	ET Flex	523.6	13,529	1,174	25.5	771	19654	2711	25	778	24357	457	31.3	690.9	19180	996	27.8
MAB	DMV	20.3	203	43	10.5	89	374	111	4	47.0	599	58	12.8	52.2	392	44	7.5
MAB	VIR	4.2	14	1	3.0									4.2	14	1	3.3
MAB	**TOTAL**	**2614.0**	**56679**	**1811**	**21.7**					**3341.0**	**81717**	**2477**	**24.5**	**3114.6**	**68452**	**1546**	**22.0**
TotalOpen		**2505**	**46255**	**2687**	**219**					**2894**	**37070**	**224**	**130**	**2951**	**44741**	**1271**	**204**
TOTAL	**TOTAL**	**10522**	**170228**	**4333**	**16.2**					**3341**	**81717**	**2477**	**24.5**	**11765**	**184774**	**4655**	**15.7**

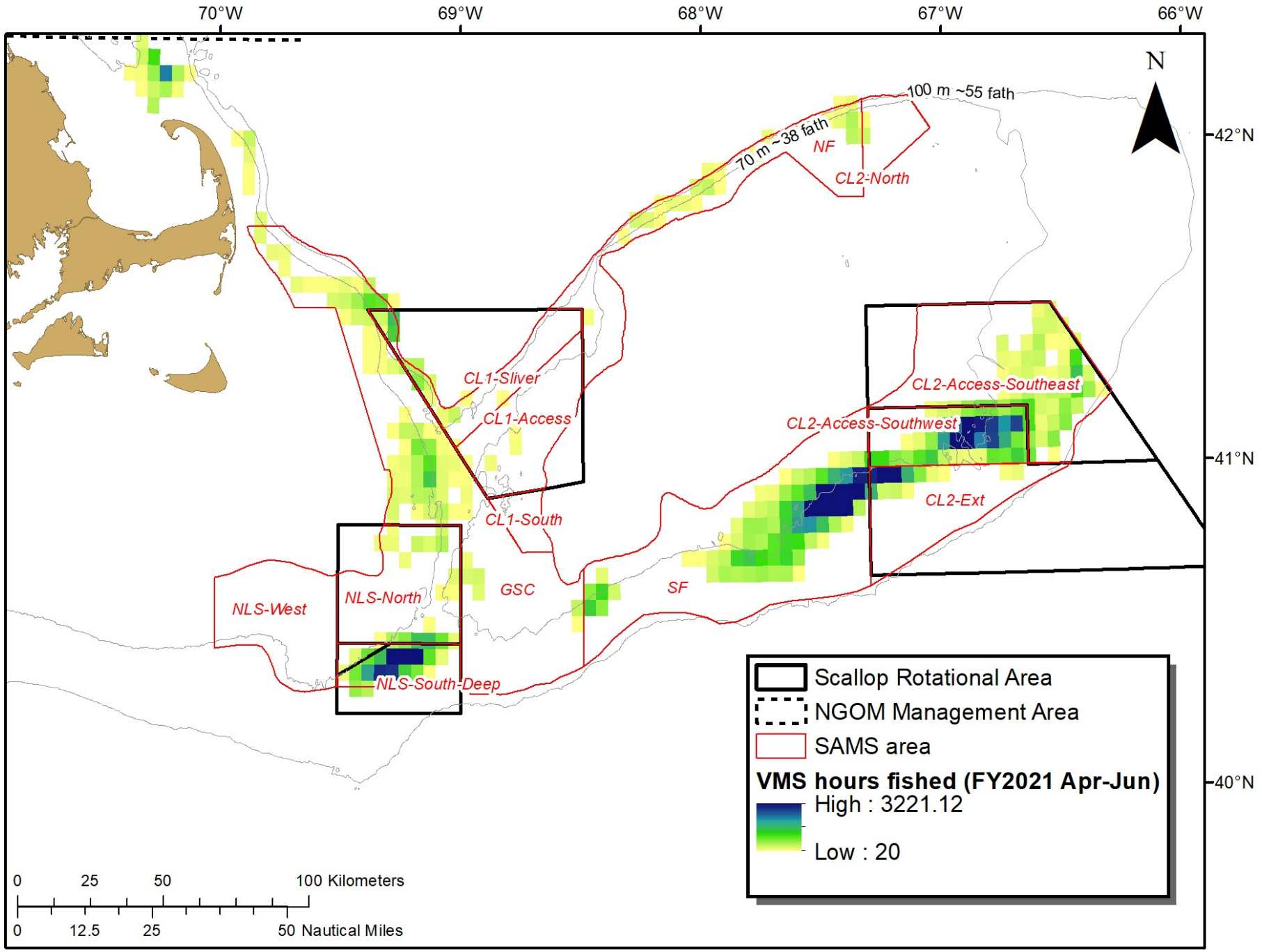
2020 and 2021 VMS Data

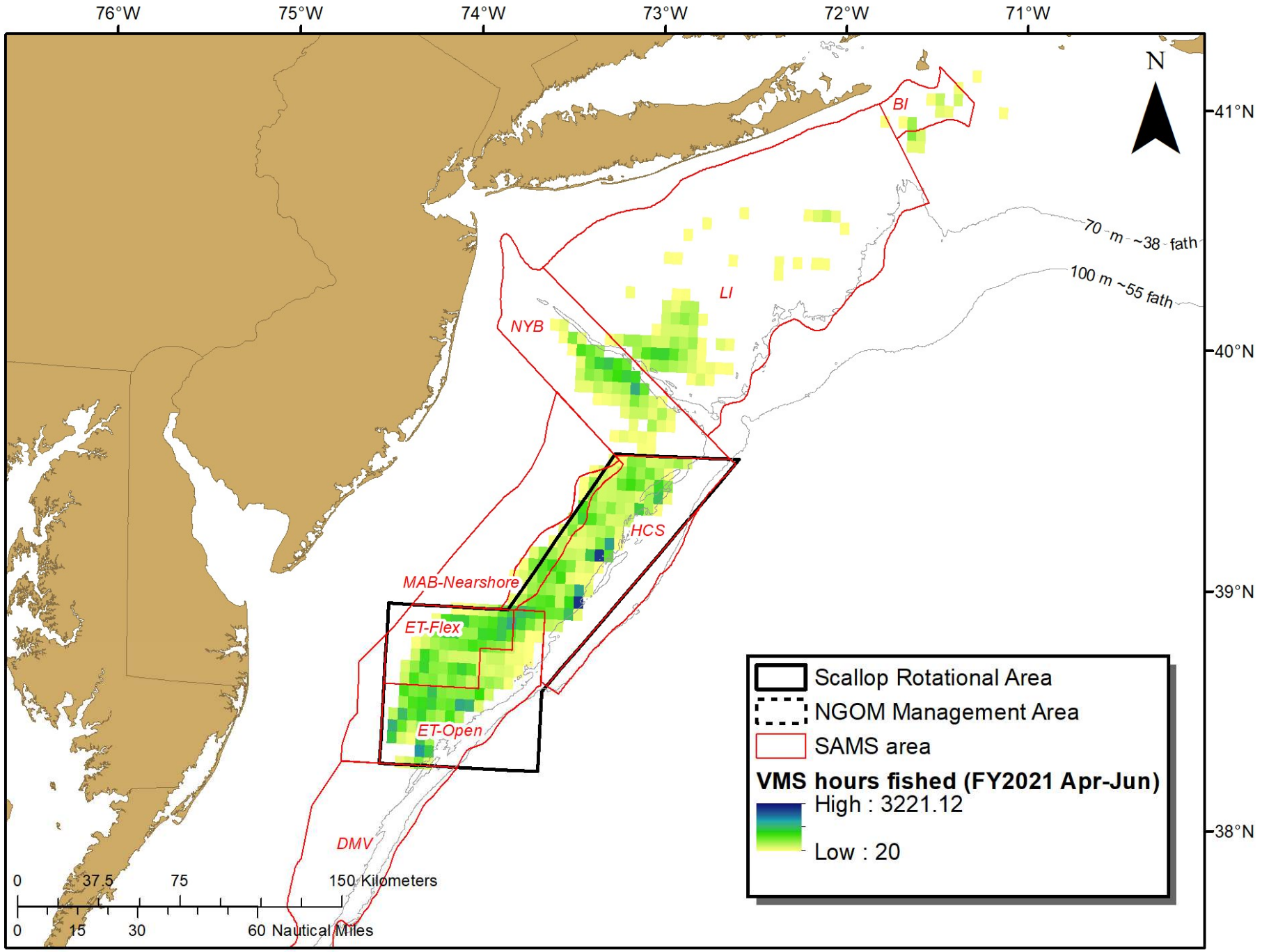

75°W
74°W
73°W
72°W
71°W
70°W
69°W
68°W
67°W
66°W
43°N
42°N
41°N
40°N
39°N
N
100 m ~55 fath
70 m ~38 fath
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2020)
High : 3297.83
Low : 20.0561
0
50
100
200 Kilometers
0
20
40
80 Nautical Miles


70°W
69°W
68°W
67°W
66°W
42°N
41°N
40°N
N
100 m ~55 fath
70 m ~38 fath
NF
CL2-North
CL1-Sliver
CL1-Access
CL1-South
CL2-Access-Southeast
CL2-Access-Southwest
CL2-Ext
NLS-West
NLS-North
NLS-South-Deep
GSC
SF
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2020)
High : 3297.83
Low : 20.0561
0
25
50
100 Kilometers
0
12.5
25
50 Nautical Miles


76°W
75°W
74°W
73°W
72°W
71°W
41°N
40°N
39°N
38°N
N
BI
LI
NYB
HCS
MAB-Nearshore
ET-Flex
ET-Open
DMV
70 m ~38 fath
100 m ~55 fath
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2020)
High : 3297.83
Low : 20.0561
0 37.5 75 150 Kilometers
0 15 30 60 Nautical Miles


75°W
74°W
73°W
72°W
71°W
70°W
69°W
68°W
67°W
66°W
43°N
42°N
41°N
40°N
39°N
N
100 m ~55 fath
70 m ~38 fath
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2021 Apr-Jun)
High : 3221.12
Low : 20
0
50
100
200 Kilometers
0
20
40
80 Nautical Miles


70°W
69°W
68°W
67°W
66°W
42°N
41°N
40°N
N
100 m ~55 fath
70 m ~38 fath
NF
CL2-North
CL1-Sliver
CL1-Access
CL1-South
CL2-Access-Southeast
CL2-Access-Southwest
CL2-Ext
NLS-West
NLS-North
NLS-South-Deep
GSC
SF
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2021 Apr-Jun)
High : 3221.12
Low : 20
0 25 50 100 Kilometers
0 12.5 25 50 Nautical Miles


76°W
75°W
74°W
73°W
72°W
71°W
41°N
40°N
39°N
38°N
N
BI
LI
NYB
HCS
MAB-Nearshore
ET-Flex
ET-Open
DMV
70 m ~38 fath
100 m ~55 fath
0 37.5 75 150 Kilometers
0 15 30 60 Nautical Miles
Scallop Rotational Area
NGOM Management Area
SAMS area
VMS hours fished (FY2021 Apr-Jun)
High : 3221.12
Low : 20