New England Fishery Management Council
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DRAFT MEETING SUMMARY

Scallop PDT Meeting

Conference Call

September 5th, 2018

The Scallop PDT met by conference call on September 5th, 2018 to: 1) review and discuss growth of animals in the Nantucket Lightship area, 2) discuss the spatial distribution of multiple cohorts in Closed Area I, 3) review adjusted biomass estimates from the SMAST drop camera survey of Ipswich Bay, 4) review preliminary combined survey estimates and PDT recommendations for specifications, and 6) discuss other business.

MEETING ATTENDANCE: Jonathon Peros (PDT Chair), Sam Asci, Dr. Bill DuPaul, Dr. David Rudders, Dr. Dave Bethoney, Shannah Jaburek, Ben Galuardi, Kevin Kelly, Carl Wilson, Dr. Dvora Hart, Dr. Demet Haksever, Tim Cardiasmenos, Danielle Palmer. Mr. Travis Ford (GARFO) and Ms. Sally Roman were in attendance along with 4 members of the public.

KEY OUTCOMES:

- **2019 Harvest:** The PDT recommends continuing to focus effort in access areas, and to continue to back off effort in open areas for the following reasons:
    1. Animals in Closed Area I, Nantucket Lightship-West, and the Mid-Atlantic access areas will be 6, 7, and 9 years old in 2019, and are ready for harvest.
    2. The majority of recruitment observed in the 2018 surveys is in open areas.
- The PDT plans to continue growth analyses for areas in the Nantucket Lightship because these estimates have short-term management implications.
- The PDT discussed the distribution of two cohorts of harvestable-size animals in Closed Area I, but does not recommend closures as a tool to maximize yield of the smaller year class.

The meeting began at 10:03 am. Jonathon Peros (PDT Chair) welcomed the PDT and members of the public to the meeting and briefly reviewed the agenda.

Growth in the Nantucket Lightship-West

A review of VIMS length-frequency data from the Nantucket Lightship-West suggested slower than expected growth by animals in this area between the 2017 and 2018 surveys. Ms. Sally

Roman (VIMS) presented an analysis of growth in the NLS-W using methods described in Hart and Chute (2009).

Shells were collected at random stations throughout the NLS survey domain in 2016 and were collected systematically in 2017 and 2018 (i.e. every third station). Shells from the NLS-West SAMS area for 2016-2018 were queried from all shells collected from the NLS survey. Mean growth parameters (L∞ and K) were estimated following the methods described in Hart and Chute (2009) using a random intercept model (L∞ only) due to sample size. Scallops less than 40 mm and shells with only two annual ring measurements were excluded. Dr. Hart noted that one increment is not enough to estimate random effects on L∞ or K.

The estimated L∞ value of 119.02 using recent VIMS data is lower than the L∞ of 143.9 estimated for Georges Bank by Hart and Chute (2009), and the L∞ of 151.15 estimated for the NLS in SARC 65 (see Table 1). The mean K value of 0.56 estimated using recent VIMS data is greater than both the K value of 0.427 reported for Georges Bank in Hart and Chute (2009) and the K value of 0.3966 reported for the NLS in SARC 65.

PDT discussion: The PDT noted that growth assumptions in the Nantucket Lightship-West are very important because they have implications for harvest in 2019 (i.e. level of allocation to this area) and the overall estimate of acceptable biological catch (ABC). If growth is overestimated in this area, the ABC for the resource could be overestimated. Conversely, underestimating growth could impact short-term management advice for rotational management. The group noted that growth in all areas of the NLS was considered in the development of Framework 29 and suggested that growth analyses be expanded to include other SAMS area in the Nantucket Lightship.

Observed growth in the Nantucket Lightship has been highly variable in recent years (i.e. not following a typical von Bertalanffy growth curve), meaning there is uncertainty in growth relationships in this area. The PDT also noted that growth rings are delayed a year, meaning that you would see the 2017 growth ring in 2018. It was also noted that SARC 65 estimated L∞ and K for the NLS-S-deep SAMS area separately from the rest of the NLS.

Table 1 – Comparison of mean K and L∞ parameter estimates with standard errors.

	Year	K	SE K	L∞	SE L∞
VIMS 2016-2018 NLS-West	16 – 18	0.56	0.03	119.02	2.36
SARC 65 NLS (Appendix A1, Table A1-2, p.4)	12 – 16	0.3966	0.0055	151.15	4.4
Hart and Chute (2009)		0.427		143.9	

Key Points:

- Growth assumptions for the NLS-West have short-term management implications. It is important to fine-tune estimates of L∞ and K (growth) in this area because these animals are getting older (will be 7 years old in 2019) and represent a large portion of harvestable scallops within Georges Bank access areas.
- Growth relationships are uncertain, and the sample size for areas in the NLS from recent years is small. Additional analysis is warranted to help better understand growth in this area.

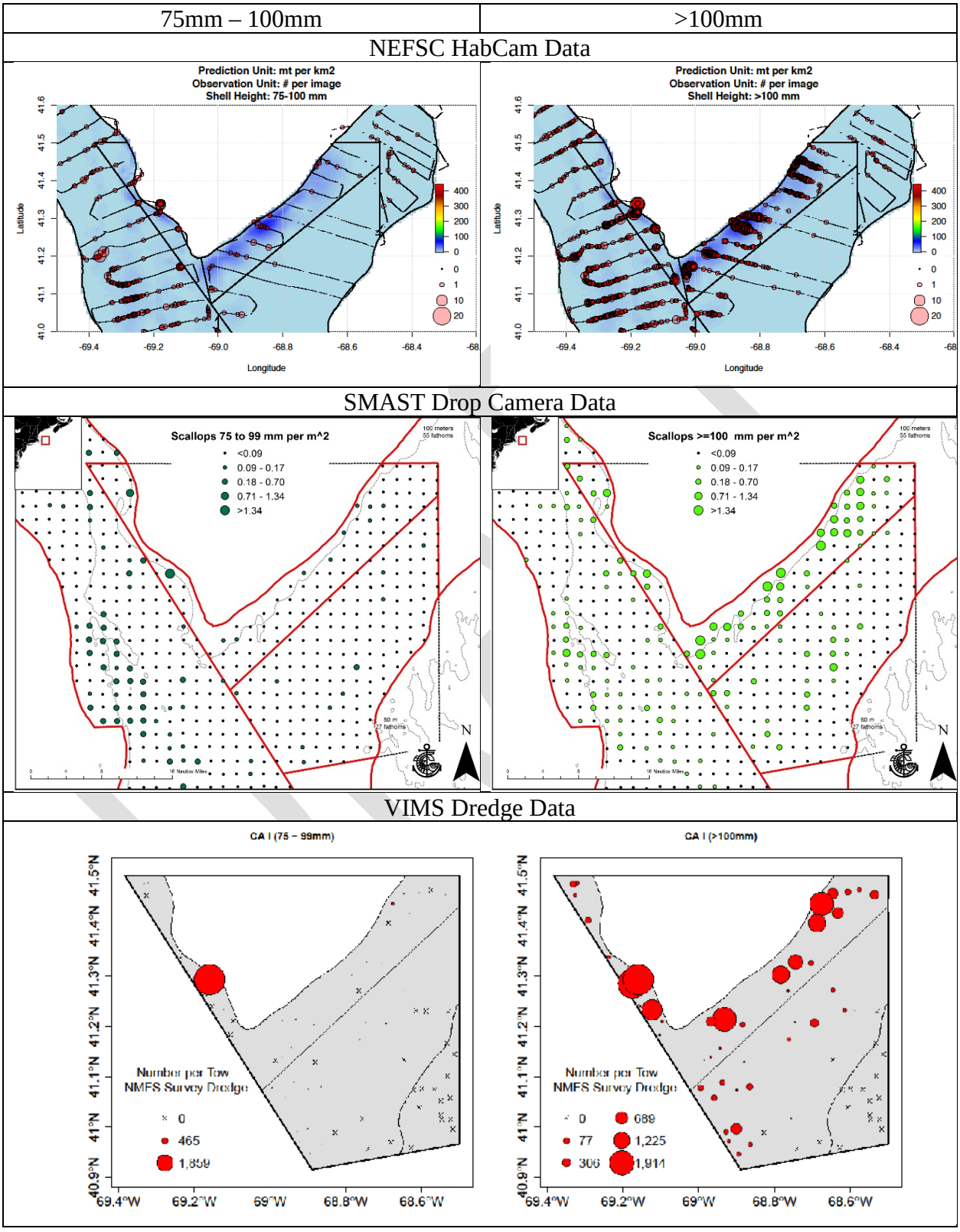
Follow-up:

- VIMS (Dr. Dave Rudders and Sally Roman)
  - Send 2018 NLS-W and NLS-S-deep growth data to NEFSC
  - Look at depth for stations where shells were collected
- NEFSC (Dr. Dvora Hart)
  - Use available data to model growth in NLS areas
  - *Update during PDT call:* For NLS-W, a strong negative year effect appeared to be causing a substantial reduction in L∞. Use VIMS 2018 data from NLS-W and NLS-S-deep to model growth.
    - Potentially include a period effect to encompass increments from 2016-2018, we may be seeing a cohort effect.

Closed Area I – Multiple Cohorts

On August 29th, 2018 the Scallop PDT noted that length-frequency plots suggest that there are two cohorts of animals in Closed Area I, and felt that additional work could help determine is a closure should be considered to maximize yield of the younger year class. To help address this issue, the PDT requested that SMAST, VIMS, and the NEFSC provide additional maps showing the spatial distribution of animals in the 75mm – 100mm size range, and animals larger than 100mm in and around Closed Area I. Length frequency plots for Closed Area I and the South Channel are contained in the survey short reports prepared by SMAST, VIMS, and the NEFSC.

Figure 1 - Spatial Distribution of two cohorts in Closed Area I, binned by animals in the 75mm - 100mm range (left), and animals >100mm (right).



PDT discussion: The PDT noted that juveniles may have better success when they settle near adults, but that scallops can utilize other habitats as well. The animals that are 80mm this year will likely be ~100mm next year. At 100mm, the animals still have growth potential, but are likely recruiting the 4" rings of the dredge. The PDT noted that part of the current CAI access area is geographically distinct from the rest of the access area, particularly the western sliver of CAI-NA-N adjacent to the SCH SAMS area.

Key Points:

- While there is some overlap, the two cohorts observed in the 2018 surveys appear to be in separate areas of CAI.
- The PDT does not support a closure in Closed Area I. The larger animals are predominately in the eastern portion of the CAI-NA-N sliver, while the younger year class is in the western portion of the area.
- In general, 4 year old animals that are around 100mm are susceptible of the 4" rings of the dredge, but still have growth potential.
- The larger of the two cohorts in CAI-NA-N will be 9 years old in 2019, and are being fished in 2018.
- Members of the PDT did not support the consideration of closures for small areas, particularly without a clear plan for how to treat the opening. For example, the western portion of CAI-NA would be too small to become an access area.

Scallop Surveys of the Great South Channel, and new Habitat Management Areas

As an extension of the Closed Area I discussion, GARFO staff pointed out that some of the South Channel SAMS area is overlapped by the Great South Channel Habitat Management Area (GSC HMA). The PDT recommended re-estimating biomass for SCH SAMS area excluding survey data within the GSC HMA. The PDT also discussed excluding data from inside the closure when calculating projected landings because it is not available to the fishery.

Follow-up:

- SMAST and NEFSC remove data points that are within the new GSC HMA, and re-estimate biomass for the SCH SAMS area.
    - SMAST reported on the call that there were 38 stations in the GSC HMA.
- Consider modifying the SAMS boundary so that it does not include portions of the GSC HMA, which is closed to scalloping.
- Council Staff circulate the shape files and coordinates of the GSC HMA.

SMAST estimates of biomass in federal waters of Ipswich Bay

The 2018 SMAST drop camera survey of Ipswich Bay included stations in both state and federal waters. At the August 28/29 meeting, the PDT requested that SMAST re-estimate scallop biomass in the federal waters portion of the Ipswich Bay survey domain. The SMAST stations in

the Gulf of Maine were 1km apart. Biomass and mean meat weight were calculated using the 65th SARC shell-height to meat-weight parameter estimates for Georges Bank open areas.

Figure 2 - 2018 SMAST Drop Camera Survey - Scallop Density per m² in Ipswich Bay.

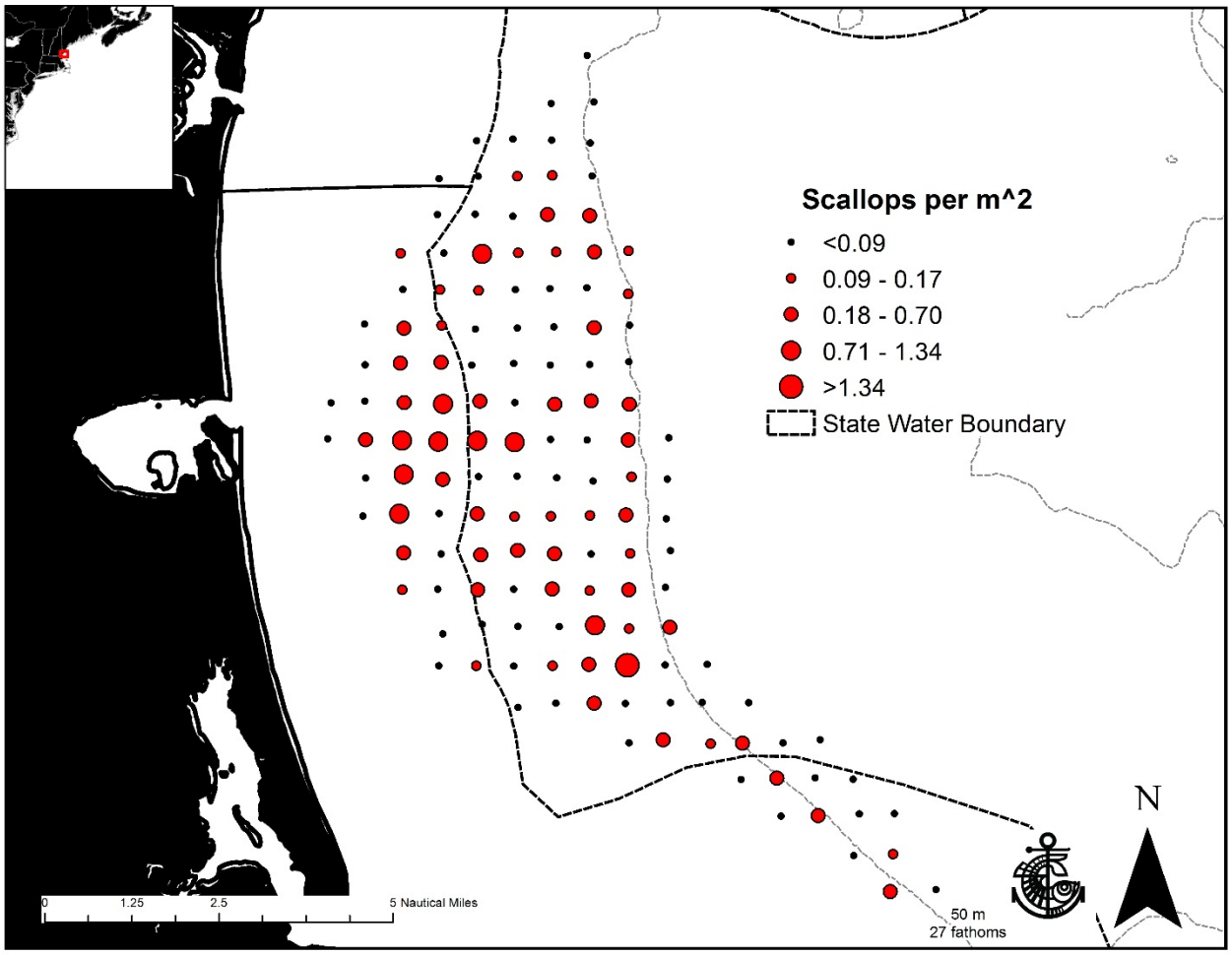


Table 2 - Total Biomass estimates from 2018 SMAST drop camera survey in the Ipswich Bay survey area. Stations were 1 km apart and meat weights were estimated following the Georges Bank 65th SARC shell-height to meat-weight formula for open areas (clop = 0). Biomass estimates were rounded to the nearest 10 tons.

Ipswich Bay	NumMill	BmsMT	SE	MeanWT	Avg. SH (mm)	Sc per m²	Stations
All	21	410	70	19.6	85.3	0.15	140
Ipswich Bay – Federal	13	290	70	21.7	88.6	0.14	96

Key Points:

- The lengths of scallop observed in state and federal waters were very similar.
- The change in biomass (reduction) is driven by reducing the number of stations included in the estimate, not a change in the density of scallops or size of the animals.

- Result of re-estimation: Decline in biomass estimate that could be used in setting 2019 TAC for NGOM (410 mt in the entire survey area, 290 mt in federal waters).

Follow-up:

- The PDT suggests that SMAST communicate results of surveys inside Massachusetts state waters with MA DMF.
- GARFO and Council staff outline the regulations for NGOM fishing inside state waters.

Updated Combined Survey Biomass Estimates

The PDT reviewed version two (v.2) of the combined survey estimates which will be used to initialize the projection model (SAMS). Updates included the application of VIMS 2016-2018 SHMW parameters for the NLS-N, NLS-W, NLS-S-shallow, and NLS-S-deep for the dredge, drop camera, and HabCam biomass estimates. The dredge estimates in the NLS-W and NLS-S-deep were also increased by a factor of three, consistent with a data treatment recommendation from SARC 65. The group noted that the abundance estimates also need to be increased (mean meat weights for the dredge in NLS-W and NLS-S-deep were incorrect in v.2). Dr. Scott Gallagher (WHOI) is continuing to investigate the divergence between the dredge and HabCam v2.2 lengths in the Mid-Atlantic. If an issue is identified, there may be some changes to HabCam estimates that utilize data collected by v2.2. Dr. Hart noted that there was general agreement between the dredge and HabCam v2.2 on eastern Georges Bank. One issue could be that water clarity can impact stereo estimates. Council staff stated they would update the PDT as more information becomes available, and noted that the estimates are subject to change.

Follow-up for v.3 of combined estimates:

- Update the dredge abundance estimates for the NLS-S-deep and NLS-W
- Update HabCam 2018 exploitable biomass estimates.
- Update on investigation of divergence between dredge and HabCam v.2.2 lengths in the Mid-Atlantic.

Outlook for 2019 and 2020 Specifications

The PDT recapped their initial discussion on the outlook for 2019/2020 specifications and discussed several issues in more detail. See Table 3 for a summary of discussion points and recommendations for 2019 rotational management.

Key Points:

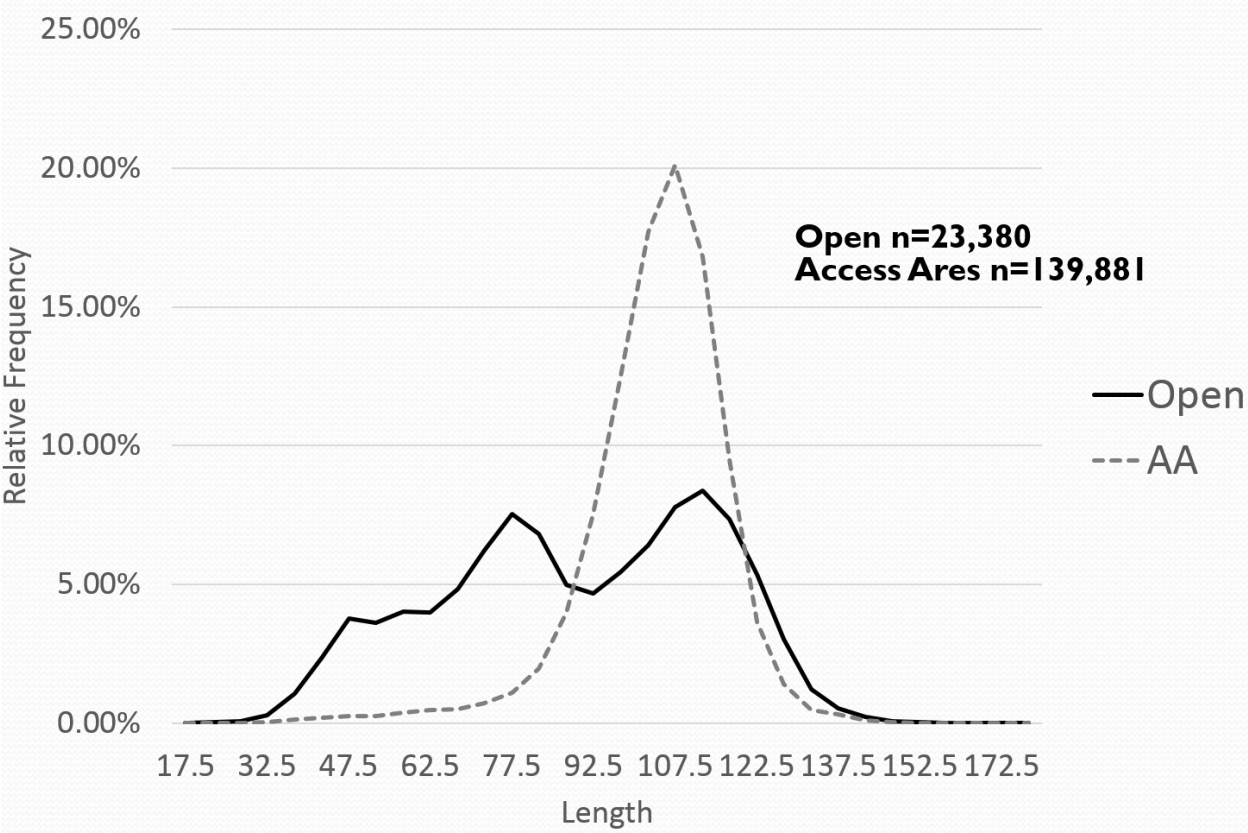
- **2019 Harvest:** The PDT recommends continuing to focus effort in access areas, and to continue to back off effort in open areas for the following reasons:
    1. Animals in Closed Area I, Nantucket Lightship-West, and the Mid-Atlantic access areas will be 6, 7, and 9 years old in 2019, and are ready for harvest.
    2. The majority of recruitment observed in the 2018 surveys is in open areas.

- Mid-Atlantic Access Area: There is one dominant year class in the Mid-Atlantic Access Area (Hudson Canyon and Elephant Trunk) that will be 6 years old in 2019. The 2018 surveys did not detect recruitment in these areas. The PDT discussed the possibility of multiple trips to the MAAA in 2019.
    1. The PDT does not think that the southern portion of the Elephant Trunk (south of 48.5° Latitude) will be fished in 2019 due to meat quality issues.
- There is one dominant year class in the Nantucket Lightship-West and Nantucket Lightship-South that will be 7 years old in 2019. The 2018 surveys did not detect recruitment in these areas.
    1. The NLS-S-shallow is being fished in 2018. This area is not expected to support a full trip in 2019 on its own. However, it could be combined with the NLS-West, or harvest could be delayed.
- There are three year-classes in the NLS-N, and some recruitment was observed in 2018. The PDT does not recommend fishing this area in 2019.
- Small amounts of recruitment were observed in the South Chanel, southeast parts (CAII-S, CAII-ext, SF), Block Island, Long Island, and New York Bight.
- It appears that CAII could support a trip in 2019. However, the 2018 surveys detected three cohorts in this area. The oldest cohort will be five years old in 2019, and have additional growth potential.
    1. Relative to other available access areas (CAI, NLS-West, MAAA), there is less urgency to harvest the scallops in CAII. Animals in those areas will be 9, 7, and 6 in 2019.
- Reference points for will be updated following SARC 65 – the F (fishing mortality) associated with the OLF and ABC/ACL will increase from F=0.48.
- The slow-growing animals in the NLS-S-deep will be 7 years old in 2019. The 2018 surveys detected a reduction in density, and very little growth. Preliminary 2018 survey biomass estimates for this area suggest that there are over 3 billion animals and around 35 thousand metric tons of biomass. The mean weight per animal is around 10g.
    1. PDT Consensus: There is not a biological reason to not harvest these animals.
    2. The PDT has tracked the growth of these animals since the were first detected, and they are not growing normally. The fecundity of these animals is questionable, and the SHMW relationship is smaller than other animals in the NLS that are part of the same 2012 cohort. This suggests that there may be environmental and(or) density dependent factors limiting their potential to reproduce or grow to sizes expected in other areas of the NLS.
    3. If the Council considers recommending harvest of these animals, the PDT noted that short-term changes in crew sizes and trips limits could help to support harvest from this area. The PDT did not support using a smaller ring to aid harvest in the short-term, noting that the commercial dredge with a 4” ring and the survey dredge on the 2018 surveys captured a similar length distribution of animals.

Follow-up:

- Calculate the LA ACT based on SARC 65 reference points.
- VIMS: Provide meat quality data from 2018 survey of the NLS-S-deep area.
- Staff and GARFO: How would harvest of animals in the NLS-S-deep be accounted for in the ACL flowchart?
- Staff: Coordinate with groundfish PDT to obtain bycatch estimates.

Figure 3 - Comparison of scallop length frequencies in access areas and open bottom in the Mid-Atlantic. Source: 2018 VIMS dredge survey



Other Business

The next in-person scallop PDT meeting will be on September 28th, 2018 in Plymouth, MA. The meeting adjourned at 12:20 pm.

References:

Hart, D. R., & Chute, A. S. (2009). Estimating von Bertalanffy growth parameters from growth increment data using a linear mixed-effects model, with an application to the sea scallop Placopecten magellanicus. *ICES Journal of Marine Science*, *66*(10), 2165-2175.

Table 3 - Summary of PDT discussion points and recommendations for potential 2019 rotational management.

Area	**# of cohorts**	**Recruitment?**	**Fished in 2018?**	**Candidate For:**
NLS-N	3	Average	No	Closure. PDT feels that the NLS-North is not ready.
NLS-S Shallow	1	None observed	Yes - 1 trip	Opening if combine with NLS-WEST, or WAIT for FY 2020.
NLS-S Deep	1	None observed	Open, not fished	Not all animals recruited to dredge, but susceptible to capture in high densities
NLS-W	1	None observed	Yes - 2 trips	Multiple trips
CAII-S-AC	3	Some (average?)	No	Potential trip
CAI-NA	2	None observed	Yes - 1 trip	Potential trip
CAI-AC	2	Minimal	Open, some effort	Combine with other areas, open bottom?
MAAA	1	None observed	Yes - 2 trips	Multiple trips

Table 4 - Preliminary Combined Survey Biomass Estimates (version 2). This is NOT the final version and will be updated again. See summary section for additional details.

Sheet1

		Dredge					DropCam					Habcam					Mean			
Region	Subarea	Num	Bmsmt	SE	MeanWt	Ebms	Num	Bmsmt	SE	MeanWt	Ebms	Num	Bmsmt	SE	MeanWt	Ebms	MeanNum	MeanBms	SE	MeanWt
GB	CL1ACC	26.4	1137	138	43.2	1004	82	2700	550	33	2200	31.3	763	7	24.3		46.7	1533	189	32.8
GB	CL1NA	325.0	8889	1432	26.2	5949	358	10850	2150	30	8850	349.7	14786	1869	42.3		344.3	11508	1063	33.4
GB	CL-2(N)	380.2	7461	2927	19.6	5053						131.6	3025	243	23.0		255.9	5243	1469	20.5
GB	CL-2(S)	344.3	8875	688	25.8	6165						248.5	7128	112	28.7		296.4	8001	348	27.0
GB	CL2Ext	375.2	7230	688	19.3	4434						336.1	8086	144	24.1		355.7	7658	351	21.5
GB	NLSAccN	107.7	3614	192	33.6	3267	127	3855	602	30.3	3178	115.3	3585	20	31.1		116.7	3685	211	31.6
GB	NLSAccS-Shallow	196.3	2111	426	10.8	1377	330	4120	2122	12.5	2131	393.2	4964	59	12.6		306.5	3732	722	12.2
GB	NLSAccS-Deep	1247.9	30963	935	24.8	2460	5442	40709	7596	7.5	7882	3742.0	31785	1289	8.5		3477.3	34485	2587	9.9
GB	NLS-W	798.4	44790	1806	56.1	108	3482	58521	12549	16.8	29792	2237.1	41155	4443	18.4		2172.5	48155	4478	22.2
GB	NLSExt	4.2	137	13	32.3	12592	93	2188	1836	23.5	1385	12.5	274	30	21.9		36.6	866	612	23.7
GB	NF	46.4	502	312	10.8	372						51.2	1119	294	21.9		48.8	810	215	16.6
GB	SCH	648.6	9453	2153	14.6	5449	458	6804	630	14.9	3817	364.8	9365	288	25.7		490.5	8541	754	17.4
GB	SCH-45											3.3	110	0	33.9		3.3	110		33.9
GB	SF	274.4	4403	513	16.0	2698						315.7	7027	108	22.3		295.1	5715	262	19.4
GB	TOTAL	4775.0	129565	4576	27.1	50928						8332.4	133171	5017	16.0		8246.2	140044	4802	17.0
MAB	BI	217.8	2572	244	23.7	928						52.8	407	5	7.7		135.3	1490	122	11.0
MAB	LI	428.2	8813	471	13.4	6122						746.2	8838	1364	11.8		587.2	8826	722	15.0
MAB	NYB	512.7	6667	771	28.9	3197						259.4	2539	162	9.8		386.0	4603	394	11.9
MAB	MA inshore	50.4	931	170	45.8	596						65.6	481	1	7.3		58.0	706	85	12.2
MAB	HCSAA	786.6	13529	853	15.8	7596						563.2	7867	310	14.0		674.9	10698	454	15.9
MAB	ET Open	714.7	15126	710	11.7	10544						730.2	10272	426	14.1		722.5	12699	414	17.6
MAB	ET Flex	887.6	18018	1197	16.6	11546						996.7	21264	1826	21.3		942.2	19641	1091	20.8
MAB	DMV	63.0	1150	161	35.0	772						51.5	1098	49	21.3		57.3	1124	84	19.6
MAB	VIR	65.7	86	19	55.7	0											65.7	86	19	1.3
MAB	TOTAL	3726.9	66891	1896	17.9	41300						3465.4	52766	2345	15.2		3629.0	59871	1508	16.5
TOTAL	TOTAL	8501.9	196456	4953	23.1	92227						######	185937	5539	15.8		11875.2	199915	3715	16.8