



New England Fishery Management Council

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DRAFT MEETING SUMMARY

Scallop PDT Meeting Hotel 1620, Plymouth, MA September 28, 2018

The Scallop PDT met in Plymouth, MA on September 28th, 2018 to: 1) review and discuss updates to 2018 scallop survey biomass estimates, 2) review and discuss preliminary OFL and ABC estimates for FY 2019 and FY 2020 (default), including growth parameters for slow growing animals in the Nantucket Lightship West, 3) review Scallop Committee and Council tasking for potential spatial management in FW30, and 4) address other issues to be considered in FW30, such as measures to reduce fishery impacts, NGOM TAC considerations, and recent flatfish bycatch.

MEETING ATTENDANCE: Jonathon Peros (PDT Chair), Sam Asci, Dr. David Rudders, Shannah Jaburek, Ben Galuardi, Kevin Kelly, Carl Wilson, Dr. Dvora Hart, Dr. Demet Haksever, Chad Keith, Dr. Cate O’Keefe, and Mr. Vincent Balzano (Scallop Committee Chair). Three members of the public attended this meeting.

KEY OUTCOMES:

- The PDT recommended additional updates to the combined survey biomass estimates for 2018. Specifically, correcting the abundance estimates for the dredge survey in the Nantucket Lightship.
- In the NLS-West:
 1. The PDT recommends reducing the L_{∞} (maximum length) and k (growth) estimates for projecting biomass in 2019 to reflect the slow growth observed between the 2017 and 2018 surveys.
 2. The PDT recommends adjusting the fishery selectivity curve applied to the NLS-West. The current fishery selectivity in GB Closed selects for larger animals and does not capture the ~100 mm animals (majority of biomass in the area) that are already in the fishery.
- The PDT recommends further examination the 2019 NLS-S-deep exploitable biomass estimate.

- **PDT SAMS Run Recommendation:** The PDT recommends continuing to focus effort in access areas, and to continue to back off effort in open areas and proposed the following SAMS run:
 1. Seven Full-Time Limited Access AA trips with 15,000 lb trip limits in the following areas:
 - 1 trip in Closed Area I Access Area
 - 3 trips in the Nantucket Lightship West Access Area
 - 3 trips in the Mid-Atlantic Access Area
 2. Set the open area DAS equal to a fishing mortality rate of $F=0.25$.

The meeting began at 9:43 am. Jonathon Peros (PDT Chair) welcomed the PDT and members of the public to the meeting and briefly reviewed the agenda.

1. Update WHOI HabCam V2.2 estimates

At the August 28, 2018 meeting, the PDT noted that WHOI length data appeared to be systematically lower than other length estimates in the Mid-Atlantic. WHOI HabCam data from EGB and MA cruises were updated after a coding/software issue was discovered. The shell heights in pixels were being multiplied by mm/pixel factor twice, which added a small random error since the mm/pixel value is close to 1. The net impact of correcting this error is that HabCam lengths increased, and now more closely align with VIMS dredge data. In some instances (BI, LI, NYB, HCS), the biomass estimates increased by a factor of approximately two.

HabCam estimates were re-run by the NEFSC using CFF and NEFSC data, as well as updated WHOI data. Because of some random partitioning of data in the modeling process (KRIG+GAM) some updated estimates are slightly different than what was presented originally, even though same data were used. The PDT reviewed a side-by-side comparison of the initial HabCam estimates in the Mid-Atlantic, as well as the updated estimates and the VIMS dredge data.

PDT Discussion:

- The dredge survey provides direct measurements of scallops, which is a reason to continue dredge surveys of the resource.
- The PDT noted that some of the updated/corrected HabCam biomass estimates are now higher than the dredge. The group also noted a divergence in average meat weights for the dredge and HabCam in some areas. There were not many scallops sampled in some of the open Mid-Atlantic SAMS areas, and if the distribution is patchy the difference could be explained as different size classes being observed. In the ET-Flex SAMS area there was a 7g difference between the dredge and HabCam (HabCam is higher than the dredge). Again, random variation could be one reason for this difference between the surveys.
- Updated length-frequency plots of the HCS SAMS area suggest that there may be some recruitment in this area, though the dominant cohort will be six years old in 2019.

Follow-up:

- Council Staff: Follow-up with Scott Gallagher on the HabCam coding issue and check to see if there were any potential coding issues with the 2016 (HabCam v.4) and 2017 (HabCam v.5) estimates from WHOI on Eastern Georges Bank.
- Continue to investigate additional ways of combining survey estimates (ex: GeoSAMS).
- Pursue the re-stratification of the shellfish survey strata to better capture the scallop resource. Stratification was identified as a reason why the dredge may have missed an area off Long Island where HabCam observed scallops.

Table 1 - Updated 2018 HabCam survey biomass estimates

SAMS4D	NumMil	BmsMT	BmsMTSE	MeanWt	AvgSize	NumPerM2	NumAnnotated
CL1ACC	31	796	8	25.5	135.8	0.03	1768
CL1NA	353	14843	2089	42.1	137.1	0.32	4016
CL-2(N)	154	5400	341	35.1	114.3	0.35	10288
CL-2(S)	260	7125	907	27.4	102.8	0.08	4709
CL2Ext	332	7956	1131	24	101.2	0.21	2598
NLSAccN	112	3585	17	32	120.6	0.1	1904
NLSAccS- Shallow	374	4964	36	13.3	94.9	1.29	507
NLSAccS- Deep	3686	31790	1681	8.6	78.4	5.04	1220
NLS-W	2262	41155	2568	18.2	99.3	1.55	2156
NLSExt	13	321	20	24.7	102.2	0.03	625
NF	57	1466	200	25.8	83.8	0.03	24603
SCH	363	9302	254	25.6	105.1	0.08	16385
SCH-45	3	96	0	34	86.3	0.02	258
SF	297	7048	887	23.7	93.8	0.07	5768
BI	61	942	36	15.4	87.5	0.08	3466
LI	827	20597	3383	24.9	100.6	0.06	41748
NYB	354	5779	148	16.3	92.6	0.07	18830
MA inshore	86	766	3	8.9	77.7	0.02	20212
HCSAA	583	13109	923	22.5	109.2	0.13	23962
ET Open	776	17936	716	23.1	117.5	0.29	26263
ET Flex	1013	27486	1682	27.1	117.3	0.56	25794
DMV	50	1168	70	23.2	106.2	0.01	10741

Figure 1 - Comparison of HabCam (left) and dredge (right) length frequency plots for Hudson Canyon South SAMS area. Note that there may be some recruitment in the HCS SAMS area.

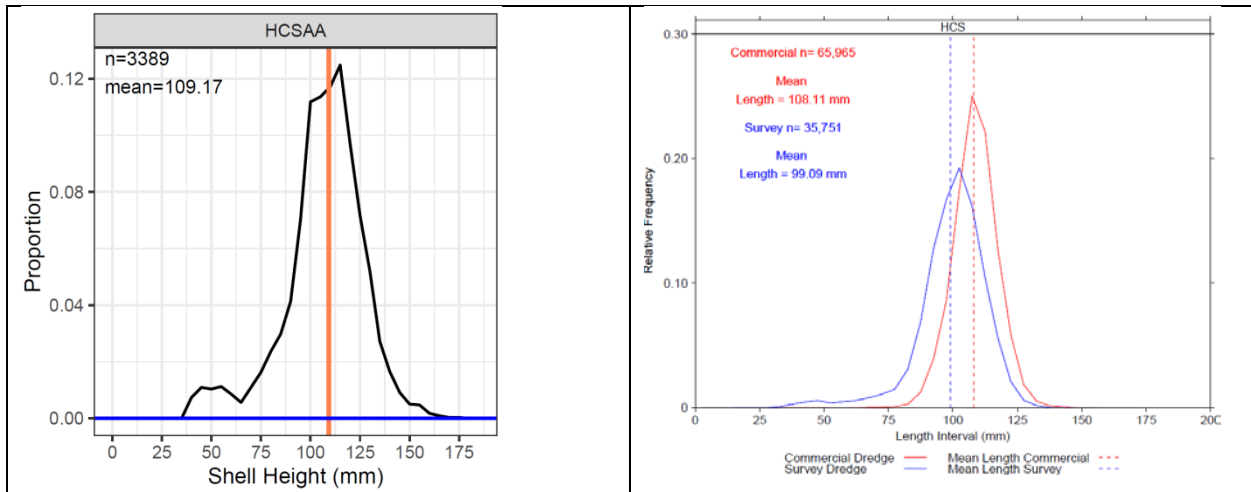
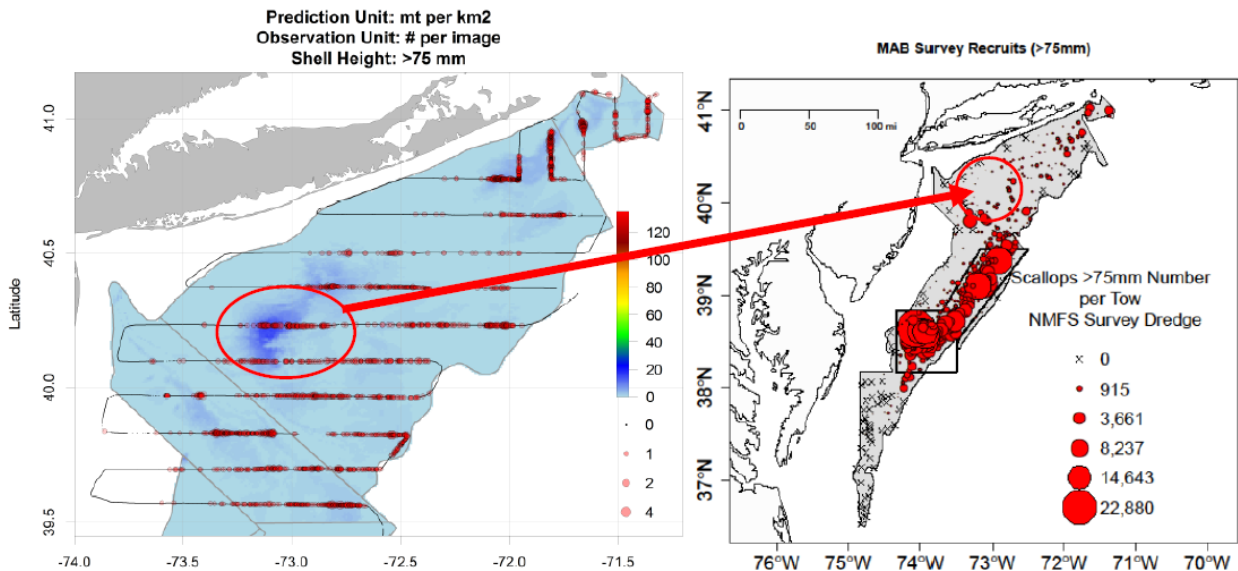


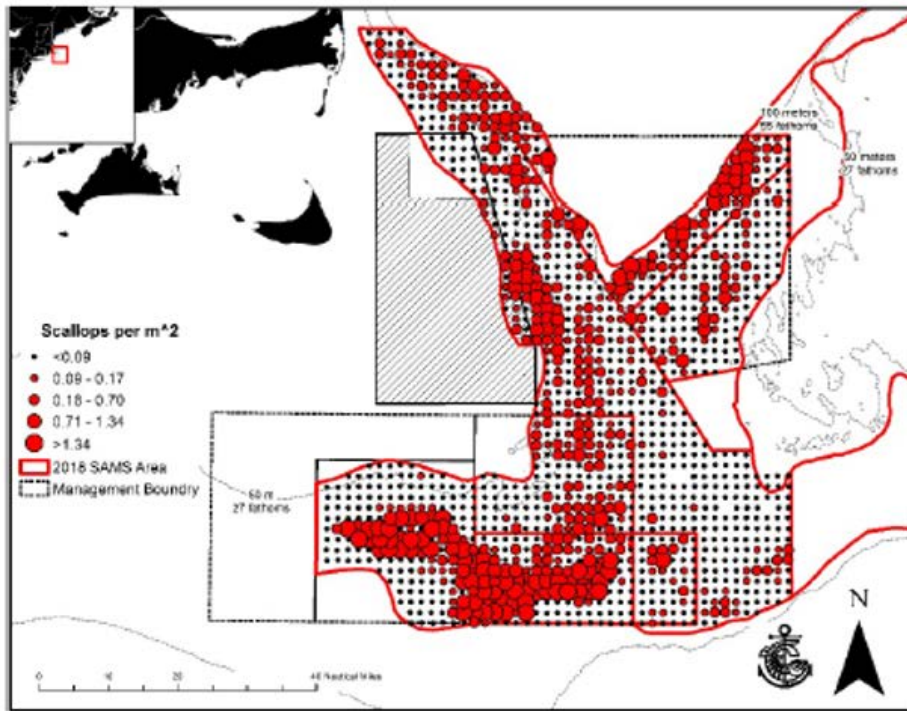
Figure 2 - Spatial distribution of HabCam (left) and dredge (right) surveys in the Mid-Atlantic. The red circles and arrows indicate an area of Long Island (LI) where scallops were observed in the HabCam, but not surveyed by the dredge.



2. Updated Great South Channel Survey Estimates

On Sept. 5, 2018 the PDT noted that there is overlap between the Great South Channel (GSC) Habitat Management Area (HMA) and the South Channel (SCH) SAMS area. The PDT recommended re-estimating biomass for the 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. SMAST updated their estimate prior to the meeting, which showed a 650 mt change in overall biomass (6,800 mt \rightarrow 8,150 mt). This change (650mt) is equal to SE of the initial estimate.

Figure 3 –Scallop density per m² at 2018 SMAST drop camera survey stations on Georges Bank based on digital still camera observations. Forty stations were within the Great South Channel HMA.



PDT Discussion:

- Dr. Hart explained that the NEFSC had updated the HabCam estimate for this area to exclude the survey track that fell within the overlapping portion of the GSC HMA and SCH SAMS boundary. The HabCam survey did not see a lot of scallops inside the HMA.
- The HabCam estimate within the habitat area was 233 mt. This estimate is lower than the SMAST estimate and is likely a function of where the survey work occurred.
- There were no dredge survey tows within this area in 2018.

Follow-up:

- Update the 2018 combined survey estimates with revised estimate for South Channel SAMS area (complete).
- Update the SAMS boundary shapefile to reflect the exclusion of the HMA.

3.Updated Combined Biomass Estimates for 2018 Surveys

The group reviewed data treatment decisions from earlier meetings, which included using the 2016-2018 scallop SH/MW data from VIMS in areas of the Nantucket Lightship. In NLS-S-deep and NLS-W SAMS areas, the PDT has recommended increasing the dredge biomass and abundance estimates by a factor of three. The group noted that while the biomass estimates for the dredge in NLS have been updated, the abundance estimates still need to be increased to account for reduced dredge efficiency in high density areas. This was causing the mean weight (g) estimates to be artificially high in the NLS-S-deep and NLS-West. Dr. Hart reiterated that the

updated version of the combined biomass reflects the updated SAMS area boundary in the South Channel (SCH), which excludes areas that overlap with the new Great South Channel HMA.

This year, scallop projections by SAMS area for 2019 were provided with the 2018 biomass estimates (Table 7). The percent change column from 2018 to 2019 applies to estimates of biomass, not exploitable biomass. Current fishing year (2018) removals need to be accounted for when running the SAMS model. This year, Dr. Hart used VMS data provided by GARFO and Council staff to apportion open area removals. As data is only available through the first few months of the fishing year, some judgement needs to be made about where fishing may occur during the remaining months of the fishing year. The PDT felt that it is unlikely that a substantial amount of open area fishing will occur in the CAII-ext later this winter.

Follow-up:

- Update the 2018 combined survey estimates with abundance estimates from the dredge survey in the NLS-West and NLS-S-deep. Review mean MWT (g) estimates for in these areas.

Table 2 - Updated biomass and abundance estimates for NLS-W and NLS-S-deep, which have been increase by a factor of 3 to account for reduced dredge efficiency.

Total biomass (mt and number) for the survey dredge, increased by a factor of 3.			
SAMS Area	Total Biomass (mt)	SE Biomass (mt)	Total Number
NLS_AC_S_DEEP	30,962.64	935.42	3,743,754,886.50
NLS_West	44,789.67	1,806.32	2,395,219,713.30

4. Scallop Growth and Selectivity in the Nantucket Lightship West Area.

Dr. Hart presented work on scallop growth in the Nantucket Lightship West SAMS area. Only 59 shells have been aged from the area, and all are part of the 2012 year class. These were modeled by:

$$\text{ring2} \sim \text{ring1} + \text{lat} \text{ with random effect on the intercept only.}$$

The random effect accounts for variation between individuals. Dr. Hart explained that there were only enough data to do this for the intercept. Random effects are on L_{∞} and K , and are allowed to vary in the model. These estimates were applied at the mean scallop-weighted latitude in the area (based on the HabCam model), giving mean $L_{\infty} = 119:1$ and $K = 0.487$. By comparison, the estimates in SARC-65 for NLS-W were $L_{\infty} = 146.8$ and $K = 0.432$. Dr. Hart explained that the new NLS-West growth parameters were used in the SAMS model when calculating the OFL and ABC for 2019 and 2020.

PDT Discussion:

The PDT again noted the lack of growth between 2017 and 2018 surveys and felt that the length-frequency plots from survey data (mean ~100 mm) were consistent with an L_{∞} of 119 mm as these scallops will be 7 years old in 2019. In other words, if L_{∞} is 145 mm, a 6 year old animal should not be 100 mm. The group did note that a lack of growth does not mean that the

animals will not continue to grow in subsequent years. Food availability is a major driver of growth in these high-density areas.

Later in the meeting, the PDT noted that while the 2019 projection of biomass is around 40,000 mt in the NLS-West, the projection of exploitable biomass is 8,301 mt (roughly 20% of the total biomass). Dr. Hart explained that the GB CLOSED selectivity curve was being used to calculate exploitable biomass for all access areas on Georges Bank, and that this curve is shifted to the right to account for the fishery selecting larger animals. Applying this to the NLS-West with a reduced L_{∞} results in a lower estimate of exploitable biomass. The PDT recommended using the GB OPEN curve to select a larger proportion of these slow growing animals that are already being harvested by the fishery.

Table 3 - Comparison of Growth Parameters in the Nantucket Lightship Area.

	Year	K	SE K	L_{∞}	SE L_{∞}
NEFSC analysis for NLS-West, Sept. 28, 2018		0.487		119.1	
VIMS 2016-2018 NLS-West, Sept. 5, 2018	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	

PDT Recommendations and Follow-up:

- Reduce the L_{∞} in the Nantucket Lightship West to 119.1 and use $K = 0.487$.
- Run SAMS with SARC 65 L_{∞} and K values as a sensitivity.
- In the NLS-West, apply the GB OPEN selectivity curve to account for the majority of harvestable animals being ~100 mm (i.e. smaller than what the fishery typically selects in GB access areas) in 2019 and beyond.

5. Reference Point Updates

Scallop biological reference points were updated in SARC 65 (2018). Council staff explained that updated reference points values would be used to calculate OFL and ABC values for Framework 30. In the Scallop FMP, the OFL is set equal to F_{MSY} which was calculated to be $F=0.64$. The ABC/ACL is the F rate associated with a 25% chance of exceeding the OFL ($F=0.51$). The LA ACT, which accounts for management uncertainty, is set at a 25% probability of exceeding the ABC.

Table 4 - Comparison of SARC 59 and SARC 65 OFL and ABC F values.

	Definition in Scallop FMP	SARC 50 (2010)	SARC 59 (2014)	SARC 65 (2018)
OFL	F_{MSY}	F=0.38	F=0.48	F=0.64
ABC=ACL	25% probability of exceeding the OFL	F=0.32	F=0.38	F=0.51
LA ACT	25% probability of exceeding the ABC	F=0.28	F=0.34	TBD
B_{MSY}	B_{TARGET}	125,358 mt	96,480 mt	116,766 mt
$1/2 B_{MSY}$	$B_{THRESHOLD}$	62,679 mt	48,240 mt	58,383 mt
MSY		24,975 mt	23,798 mt	46,531 mt
Estimated Biomass	(40+mm shell height)	129,700 mt	132,561 mt	317,334 mt*
Overfished?	$B < B_{THRESHOLD}$	No	No	No
Overfishing?	$F < F_{THRESHOLD}=F_{MSY}$	No	No	No
*SARC 65 estimate of 2017 biomass including the small, slow growing scallops (“Peter Pans”) in the NLS-S-deep was 380,389 mt.				

PDT Discussion:

- The PDT noted that the F_{MSY} values have increased in the last two assessments, and it is now set at F=0.64.
- The PDT notes that F_{MSY} is less stable as it increases. The yield-per-recruit curve had kept values relatively conservative in the Mid-Atlantic, however that was not the case in the most recent benchmark. There is considerable uncertainty around the Stock-Recruit relationship.
- Scallops are managed using rotational management, and fishery allocations are derived from projected landings associated with spatial management. In recent years, the annual projection landings (APL) have been far below the OFL and ABC, such that these values are not constraining.

Follow-up:

- Staff to review language in Amendment 15 regarding the LA ACT, and work with Dr. Hart on calculating the new F value for FW30.

6. FY 2019 and FY 2020 OFL and ABC Estimates

Dr. Hart presented preliminary OFL and ABC values to the PDT, noting that they would need to be re-done based on the PDT’s earlier recommendations. The group notes that discard and incidental mortality estimates were updated in SARC 65. Discards are assumed at 11% of the biomass (0.11 on Georges Bank, .06 in the Mid-Atlantic).

Follow-up:

- Run SAMS model at F=0.64 to calculate the OFL, and F=0.51 for the ABC, and provide estimates of discards.

7. Review of Committee and Council 2019 SAMS Run Tasking

Council staff updated the PDT on recent tasking from the Scallop Committee and full Council. The Committee tasked the PDT with three runs, while the Council added a “7 trip” option with access to Closed Area II South Access Area. The runs are shown in Table 5.

PDT Discussion: The PDT noted that the Council tasking included access to Closed Area II, an area that the PDT did not recommend for harvest in 2019. Council staff explained that this run came from the AP, and the rationale presented at the Council meeting for including this run was to learn more about the potential yellowtail bycatch from this area. There are enough scallops in CAIIS to support a FT LA trip in 2019, and the PDT anticipates over 6 million pounds of scallop meats to come from Eastern Georges Bank over the next two years (assuming an access area trip is allocated). The group noted that the overall GB YT TAC will be lower in 2019. The scallop fishery is allocated 16% of the US Share of GB YT. Some members of the PDT felt that if the Council wants to allocate a FT LA trip to CAII, there should be enough YT available to scallop fishery to cover anticipated bycatch. The PDT noted the amount of fishing that has occurred in eastern Georges Bank, and felt that if YT continues to be a concern there should be some consideration for how the open areas are fished. There was some discussion about allocating half trips to areas like Closed Area II, though support for this concept was mixed, and GARFO confirmed that the Elephant Trunk-Flex approach used in FW28 was challenging to implement and administer.

The PDT noted that the 2019 exploitable biomass projections for the Mid-Atlantic and the NLS-West (after adjustments to selectivity) suggest that both areas can support multiple trips. Some concern was expressed about taking a full 18,000 lb trip from CAI, though the projection indicates that the area can support a trip there.

A member of the public suggested that it would be helpful to have some economic projections ready for the AP and Committee meetings in October. They also suggested that the Council should work to optimize GB yellowtail allocations in 2019 because it is unclear what the allocations will be next year.

PDT Recommendations and Comments:

- a. If given the choice between fishing open bottom vs. the Mid-Atlantic Access Area, Closed Area I, or the NLS-West Access Area, the PDT supports fishing in access areas. These access areas all have a single dominant cohort that is being fished in 2018.
- b. Keep the NLS-S-shallow closed in 2019, and consider combining this area with the NLS-N in 2020.
- c. The recruitment that was detected in 2018 appears to be in highly productive areas like the South Channel, NLS-N, southeast parts of Georges Bank, Long Island, and the Mid-Atlantic Bight. These are places where scallops tend to grow

quickly (and normally). Reducing F in the open bottom could benefit these animals.

- d. Proposed PDT SAMS Run:
 - i. Set open bottom $F=0.25$
 - ii. 7 FT LA trips at 15,000 lbs per trip.
 - 1. 1 trip in Closed Area I
 - 2. 3 trips in NLS-West
 - 3. 3 trips in MAAA
- e. In FW30 process, consider ways to combine the SAMS outputs to expand the universe of options that are available. For example, use the range of DAS associated with different F rates with different spatial management options.

PDT Follow-Up:

- Look at where RSA compensation fishing has occurred so far this year.
- Provide results of SAMS runs to Demet by October 12, 2018. This would allow enough time to complete economic analyses ahead of the October 23/24 meetings.
- Work to have bycatch estimates ready for the joint AP/CTE meetings in October.
- Council staff and GARFO staff – follow-up on how flatfish bycatch estimates are being stratified for access areas in the NLS.

Table 5 - Overview of PDT tasking to-date for FW30 spatial management

Area	Default Measures	Status Quo	CTE 1	CTE 2	CTE 3	Council 1	PDT 1
Open area F	18 DAS	$F=0.295$	$F=0.295$	$F=0.35$	$F=0.4$	$F=0.3$	$F=0.25$
FT LA trip limit	18,000	18,000	18,000	18,000	18,000	15,000	15,000
CAI	Closed	1 trip + carryover	1 trip	1 trip	1 trip	1 trip	1 trip
CAII	Closed	Closed	Closed	Closed	Closed	1 trip	Closed
NLS-N	Closed	Closed	Closed	Closed	Closed	Closed	Closed
NLS-S	Closed	1 trip	Closed	NLS SW - 3 trips	Closed	Closed	Closed
NLS-W	Closed	2 trips	3 trips		2 trips	3 trips	3 trips
MAAA	1 trip	2 trips	2 trips	2 trips	2 trips	2 trips	3 trips
Total FT trips	1	6	6	6	5	7	7
Total AA lbs. per FT vessel	18k	108k	108k	108k	90k	105k	105k

1. No proposed changes to SAMS boundary areas (Same as FW29).
 - a. MAAA (Mid-Atlantic Access Area) would continue to be Hudson Canyon, Elephant Trunk Open, and Elephant Trunk Flex.
 - b. CAI (Closed Area I) would continue to be the CAI-Acc and CAI-N, the same configuration as the access area in FW29.
2. No proposed changes to open area (open bottom). Same configuration as FW29 open bottom.
3. CTE 2: The NLS-SW access area boundary would include all of the NLS-S (both shallow and deep) and all of the NLS-W.

8. FY2017 Year End Report

Mr. Benjamin Galuardi presented the results of the FY 2017 Scallop Year End report. The Scallop fishery harvested 32% of the OFL, and 52% of the 2017 ABC. The majority of discussion was around how state waters catch is estimated.

PDT Follow-Up:

- The PDT needs to estimate state waters catch for FW30, Council staff provide estimates of catch from recent year end reports.
- Follow-up on data sources for state waters landings estimates. Look at Maine DMR website for recent state-waters catch data.
 - The data used in the GARFO report are only from federal dealers.
- Breakdown of state waters landings by state.

9. NLS-Hatchet

Mr. Chad Keith will provide an update on fisheries occurring inside of the NLS-Hatchet at the next PDT call. The purpose of this discussion is to consider the potential bycatch that could be expected if this area were to re-open to scallop fishing (previously part of a groundfish and habitat closure). Mr. Keith explained that most of the fishing that had occurred in this area were exempted fishing trips which were trying to avoid certain species.

10. Measures to Reduce Fishery Impacts

The goal of this discussion was to identify possible measures in FW30 that could be developed to reduce impacts on the scallop resource or other species, such a flatfish.

PDT Recommendations

- Based on earlier discussions about Georges Bank yellowtail, the PDT recommended considering:
 - A seasonal closure of the CAII-Ext from Aug. 15 – Nov. 15 to reduce impacts on Georges Bank yellowtail flounder.
 - Restricting RSA compensation fishing in CAII and CAII-ext to reduce impacts on Georges Bank yellowtail flounder.
- Consider limiting RSA compensation fishing in CAI.

PDT Follow-up:

- Review observer data from August 1 – 14 and November 16 – 30.
 - Look at d/K ratios during these time periods.
- Review bycatch analysis completed in FW29, prepare update for future PDT meeting.

11. Northern Gulf of Maine

Council staff recapped the approach that the Council used to set the NGOM TAC in 2018 through FW29 and explained that this process was reviewed and approached during the most recent benchmark assessment.

The PDT discussed where the fishery may occur in 2019 based on available survey data. Fishing is likely to occur on Stellwagen Bank, which still holds the largest animals in the four survey areas. The PDT noted that there could be conditions where Ipswich Bay gets fished.

With regard to survey efforts, the group noted that there is a considerable amount of fixed gear in the Gulf of Maine, which can make towing difficult.

PDT Recommendations:

- Model the four survey areas individually (as was done in FW29 for Jeffreys Ledge and Stellwagen)
 - Platts Bank
 - Jeffreys Ledge
 - Ipswich Bay
 - Stellwagen Bank
- Do not fish at or above F_{MSY}
- Consider a range of conservative F_{TARGET} rates, which should be <70% of the Georges Bank reference point for F_{MSY} . Last year the PDT looked at $F=0.15$, $F=0.18$, $F=0.2$.
- SARC 65 document is still in prep; PDT will look at final Georges Bank F_{MSY} reference point when the document is available.
- Consider setting the TAC based on areas where the fishery is likely to be active in 2019. This would be a more conservative approach to TAC setting in the NGOM.

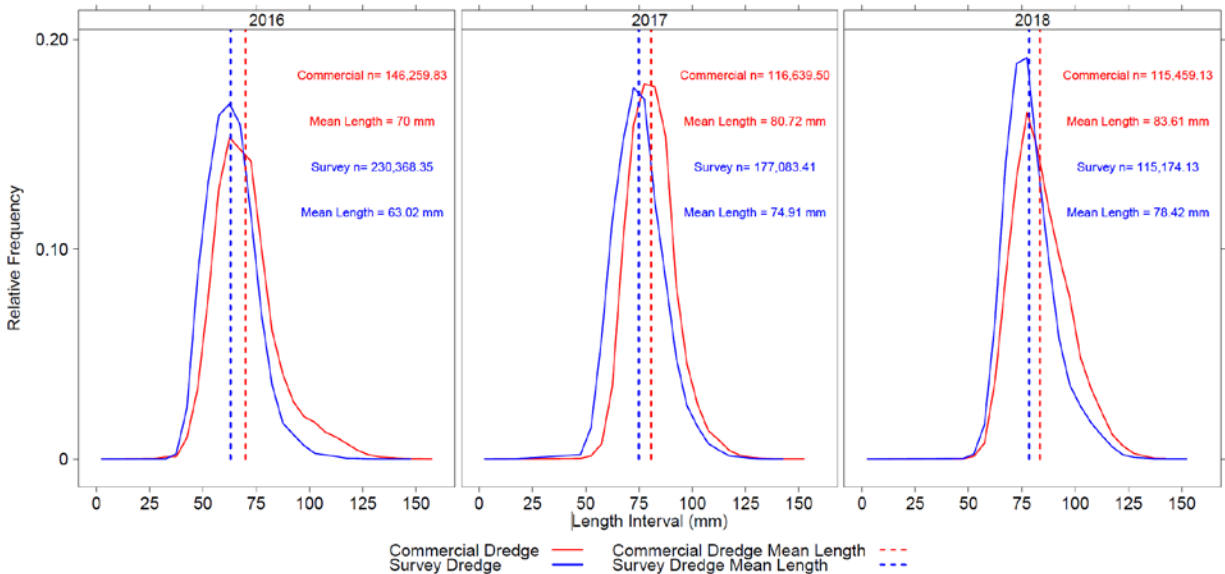
12. NLS-South-deep

The PDT noted that the Council has signaled interest in continuing discussions on how to harvest some of the slow-growing scallops in deep water of the Nantucket Lightship. The PDT has tracked the growth of these animals for several years and spent time during the Aug. 28/29 and Sept. 5 meetings discussing them.

PDT Discussion:

- The PDT was interested in whether or not the commercial dredge (4' ring) captures small scallops. The following plot shows survey and commercial dredge L-F in NLS-S-deep. Note the overlaps in distribution between the survey and commercial drags.

Figure 4 - Length frequency plots from VIMS dredge survey of NLS-S-deep from 2016, 2017, and 2018.



- Considerations:

- This issue has the potential to become very complicated.
 - Aim to do something simple to start.
 - Timing is a concern relative to other priorities, and the age/condition of the animals.
- This area is very close to other access areas. A conservative buffer should be considered around any harvest area.
- These animals were excluded from the CASA models and are not currently in our new reference points.
- They are part of the scallop stock, and are included in the SAMS model.
- There are allocation considerations to the LA and LAGC IFQ.
 - Any allocation should be equitable.
- Could use a VMS declaration code.
- Shell-stocking has pros/cons. If you have shell stock – it is clear what you are doing in terms of enforcement.
- Could think of this as BACI. Should aim to look at the impact.
- The PDT does not support reducing the ring size from 4".
 - Potential workaround: Could consider using a 4" liner and not changing the rings. –

PDT Follow-up:

- Look into how these animals could be accounted for in the ACL flowchart.

Table 6 - Comparison on 2018 Mid-Atlantic survey biomass estimates between HabCam 1 (8/23/18), HabCam 2 (9/28/18), and VIMS dredge (8/1/18).

	Total Num (mil)	Total Biomass (mt)	SE Biomass (mt)	AvgSize (mm)	Density (scal/m ²)	Avg MW (g)
BI						
HabCam 1	53	407	5	71.5	0.07	7.7
HabCam 2	61	942	36	87.5	0.08	15.4
VIMS	218	2,572	244	77.69	0.25	12.01
DMV						
HabCam 1	52	1,098	49	106.2	0.01	21.3
HabCam 2	50	1,168	70	106.2	0.01	23.2
VIMS	63	1,150	161	99.23	0.02	18.53
ET Flex						
HabCam 1	997	21,264	1,826	112.5	0.56	21.3
HabCam 2	1,013	27,486	1,682	117.3	0.56	27.1
VIMS	888	18,018	1,197	104.53	0.76	20.57
ET Open						
HabCam 1	730	10,272	426	101.1	0.27	14.1
HabCam 2	776	17,936	716	117.5	0.29	23.1
VIMS	715	15,126	710	107.18	0.36	21.51
HCSAA						
HabCam 1	563	7,867	310	85	0.13	14
HabCam 2	583	13,109	923	109.2	0.13	22.5
VIMS	787	13,529	853	99.09	0.27	17.28
LI						
HabCam 1	746	8,838	1,364	74.9	0.06	11.8
HabCam 2	827	20,597	3,383	100.6	0.06	24.9
VIMS	428	8,813	471	98.3	0.03	20.62
MA Inshore						
HabCam 1	66	481	1	65.6	0.02	7.3
HabCam 2	86	766	3	77.7	0.02	8.9
VIMS	50	931	170	92.49	0.02	18.58
NYB						
HabCam 1	259	2,539	162	75.8	0.05	9.8
HabCam 2	354	5,779	148	92.6	0.07	16.3
VIMS	513	6,667	771	85.4	0.12	13.37

Table 7 - Preliminary Combined 2018 Survey Biomass Estimates (version 3), with 2019 SAMS run projections by area. This is NOT the final version and will be updated again. See summary section for additional details.

Region	Subarea	Dredge				DropCam				Habcam				Mean				2019 Projections		
		Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Num	Bmsmt	SE	MeanWt	Bmsmt	%Change	ExpBmsmt
GB	CL1ACC	26.4	1137	138	43.2	82	2700	550	33	31.0	796	8	25.5	46.6	1544	189	33.1	1681	8.8%	1013
GB	CL1NA	325.0	8889	1432	26.2	358	10850	2150	30	353.0	14843	2089	42.1	345.4	11527	1107	33.4	7149	-38.0%	6131
GB	CL-2(N)	380.2	7461	2927	19.6					154.0	5400	341	35.1	267.1	6431	1473	24.1	7333	14.0%	4103
GB	CL-2(S)	344.3	8875	688	25.8					260.0	7125	907	27.4	302.2	8000	569	26.5	10129	26.6%	4791
GB	CL2Ext	375.2	7230	688	19.3					332.0	7956	1131	24.0	353.6	7593	662	21.5	6016	-20.8%	4773
GB	NLSAccN	107.7	3607	192	33.5	127	3855	602	30.3	112.0	3585	17	32.0	115.6	3682	211	31.9	4096	11.2%	2555
GB	NLSAccS-Shallo	196.3	2111	426	10.8	330	4120	2122	12.5	374.0	4964	36	13.3	300.1	3732	722	12.4	2747	-26.4%	895
GB	NLSAccS-Deep	1247.9	30963	935	24.8	5442	40709	7596	7.5	3686.0	31790	1681	8.6	3458.6	34487	2612	10.0	37909	9.9%	16084
GB	NLS-W	798.4	44790	1806	56.1	3482	58500	12550	16.8	2262.0	41155	2568	18.2	2180.8	48148	4312	22.1	40062	-16.8%	8301
GB	NLSExt	4.2	137	13	32.3	93	2188	1836	23.5	13.0	321	20	24.7	36.7	882	612	24.0	542	-38.5%	525
GB	NF	46.4	502	312	10.8					57.0	1466	200	25.8	51.7	984	185	19.0	1260	28.1%	908
GB	SCH	648.6	9453	2153	14.6	453	6150	550	13.6	351.0	9130	254	25.6	484.2	8244	746	17.0	12990	57.6%	8052
GB	SCH-45	0.2	7	2	41.1					3.0	96	0	34.0	1.6	52		32.2			
GB	SF	274.4	4403	513	16.0					297.0	7048	887	23.7	285.7	5726	512	20.0	5697	-0.5%	4066
GB	TOTAL	4775.2	129565	4576	27.1					8285.0	135675	4110	16.4	8230.0	141032	5604	17.1	137611	-2.4%	62197
MAB	BI	217.8	2572	244	23.7					61.0	942	36	15.4	139.4	1757	123	12.6	3106	76.8%	1673
MAB	LI	428.2	8813	471	13.4					827.0	20597	3383	24.9	627.6	14705	1708	23.4	13943	-5.2%	8450
MAB	NYB	512.7	6667	771	28.9					354.0	5779	148	16.3	433.4	6223	392	14.4	7365	18.4%	3627
MAB	MA inshore	50.4	931	170	45.8					86.0	766	3	8.9	68.2	849	85	12.4	1124	32.5%	899
MAB	HCSAA	786.6	13529	853	15.8					583.0	13109	923	22.5	684.8	13319	628	19.4	13481	1.2%	7286
MAB	ET Open	714.7	15126	710	11.7					776.0	17936	716	23.1	745.4	16531	504	22.2	22792	37.9%	12941
MAB	ET Flex	887.6	18018	1197	16.6					1013.0	27486	1682	27.1	950.3	22752	1032	23.9	18029	-20.8%	17277
MAB	DMV	63.0	1150	161	35.0					50.0	1168	70	23.2	56.5	1159	88	20.5	1627	40.4%	841
MAB	VIR	65.7	86	19	55.7									65.7	86	19	1.3	301	250.9%	12
MAB	TOTAL	3726.9	66891	1896	17.9					3750.0	87783	3958	23.4	3771.3	77380	2194	20.5	81768	5.7%	53006
TOTAL	TOTAL	8502.1	196456	4953	23.1					12035.0	223458	5706	18.6	12001.3	218412	6018	18.2	219379	0.4%	115203