



New England Fishery Management Council

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MEETING SUMMARY **Scallop PDT** **Coonamessett Inn, Falmouth, MA** **August 29th-30th, 2017**

The Scallop PDT met on August 28th and 29th, 2018 Falmouth, MA to: (1) review results of SARC 65 – 2018 Scallop Benchmark Assessment, (2) review 2018 scallop survey results, (3) discuss survey data treatment, (4) discuss next steps for FW30 specifications and timing, (5) review relevant data for developing 2019/2020 specifications, (6) review updated LAGC IFQ trip limit analyses addressing PDT tasking from Committee, (7) review Framework 30 management measures and action plan, (8) discuss recommendations for 2019 Council priorities for Scallop FMP, and (9) discuss any other business.

MEETING ATTENDANCE: Jonathon Peros (PDT Chair), Sam Asci, Dr. David Rudders, Dr. Dvora Hart, Dr. Demet Haksever, Dr. Bill DuPaul, Danielle Palmer, Dr. Cate O’Keefe, Tim Cardiasmenos, Kevin Kelly, Shannah Jaburek, Benjamin Galuardi, and Dr. Dave Bethoney. Vincent Balzano, Chair of the Scallop Committee attended day 1 of the meeting, along with representatives of each survey group. There were approximately 30 members of the public present in the audience each day.

MEETING MATERIALS:

Doc.1) [Meeting Agenda](#); Doc.2) [SARC 65 Assessment Summary Report](#); *Scallop Survey results—Short Reports*: Doc.3a) [VIMS](#), Doc.3b) [SMAST](#), Doc.3c) [CFF](#), Doc.3d) [WHOI](#), Doc.3f) [NEFSC](#); Doc.4) [Draft preliminary combined biomass estimates for 2018](#); *Information on Survey Data Treatment*: Doc.5a) [VIMS SH/MW Analysis for ET and NL survey areas](#), Doc.5b) [VIMS Length Frequency Distributions for the ET and NL survey areas](#), Doc.5c) [Recap of survey group call, July 16, 2018](#); Doc.6) [Scallop VMS data by SAMS area \(April 2018 – July 2018\)](#); Doc.7) *LPUE and landings/price data by market grade*; *Kept and Discard Information from NEFOP Observer Program*: Doc.8a) [Scallop Meat Quality](#), Doc.8b) [Kept and discarded scallops by area/component](#); Doc.9a) [Framework 30 Action Plan](#); *LAGC IFQ Trip Limits*: Doc.10a) [Scenario Analyses of Possession Limits for the LAGC IFQ fishery](#), Doc.10b) [Summary points of preliminary impacts](#), Doc.10c) [LAGC IFQ vessel baseline restrictions](#), Doc.10d) [Information on LAGC IFQ crew size](#), Doc.10e) [Summary of trip cost model](#); Doc.11) [Draft 2018 Scallop Work Priorities and potential 2019 research priorities](#); and Doc.12) [Final PDT Meeting Summary, July 25, 2018](#).

PRESENTATIONS:

Scallop Survey Presentations: P1.a) [VIMS](#), P1.b) [SMAST](#), P1.c) [CFE](#), P1.d) WHOI, P1.e) NEFSC; P2) [SARC 65 Summary Presentation](#); P3) [VIMS Growth Presentation](#); P4) [VIMS Nematode Presentation](#); P5) [CFE Scallop disease presentation](#); P6) [SMAST Grey Meat Survey](#).

BACKGROUND AND SUPPORTING INFORMATION:

B1) [Link to LAGC IFQ program review webpage](#); B2) [LAGC IFQ Trip Limit Discussion Document](#); B3) [PDT memo to SSC re: FW29 OFL and ABC, October 7, 2017](#); B4) [Projected Exploitable Biomass for FY 2018 and 2019 from FW29](#); and B5) [SARC 65 – Appendix 2: Shell Height/Meat Weight Equations](#).

KEY OUTCOMES:

- The PDT reviewed key findings from the 2018 scallop benchmark assessment (SARC 65) including updated reference points, SHMW parameters, and data treatment recommendations for dredge data in high density areas.
- The PDT reviewed the results of 2018 scallop surveys and began an initial discussion of potential 2019/2020 specifications. While the overall biomass estimate increased from 2017 to 2018, the 2018 surveys did not detect strong signs of incoming recruitment.
- The PDT recommended using shell-height meat-weight (SHMW) parameter estimates from SARC 65 for all SAMS areas, except the NLS-S-shallow, NLS-S-deep, NLS-W, and NLS-N. In these areas, the PDT recommends using SHMW parameters developed using data from the 2016-2018 VIMS survey to more accurately characterize the anomalous slow growth of animals in the NLS-S-deep, and observed difference in growth between other NLS SAMS areas.
- The PDT discussed survey dredge efficiency in high density areas. After reviewing survey results and analyses prepared by Dr. Hart for SARC 65, the PDT recommended that dredge data be increased by a multiple of three (i.e. consistent with a recommendation from SARC 65).
- The PDT reviewed analysis addressing Committee tasking re: impacts of modifying the LAGC IFQ possession limit, as well as other supporting information around this work priority.
- The PDT discussed candidate 2019 work priorities for the Scallop FMP.

The meeting began at 10:15 am. Council staff welcomed the PDT and members of the audience to the meeting and reviewed agenda items for the two day meeting.

Review Results of SARC 65—2018 Scallop Benchmark Assessment

Dr. Dvora Hart (NEFSC), lead scallop stock assessment scientist, reviewed highlights from the 2018 Scallop Benchmark Assessment. The 2018 assessment included four meetings of the stock assessment working group between February and May, and results were presented to the stock assessment review committee (SARC) in June. Updated methods and key findings from the assessment included:

- Shell height to meat weight (SHMW) and growth relationships appear to have been increasing since the mid 1990s. The increase in SHMW was likely a result of a fishing

effect, in that reduced fishing mortality over time has increased the number of larger scallop meats in the population.

- TOR-1: Landings by area have been higher in recent years and the Mid-Atlantic has been the dominant region relative to Georges Bank. LPUE (mt meats landed per 24-hour day with gear in the water) and fishing effort (24-hour days with gear in the water) have been increasing in recent years for all regions.
- TOR-2: Stratified mean biomass has been increasing relative to the entire dredge survey time series. Divergence was seen between the dredge and optical survey biomass estimates since 2014, likely due to incredibly high density areas causing a reduction in dredge estimates. The assessment assumed dredge estimates in high density areas were roughly a third of actual biomass based on comparisons with optical estimates over the time series.
- TOR-5: Similar to the 2014 assessment, Catch At Size Analysis (CASA) models were run for Georges Bank Open, Georges Bank Closed, and the Mid-Atlantic. Unlike previous assessments, SARC 65 methods assumed that natural mortality (M) varied by year; in the Mid-Atlantic and Georges Bank Open models juvenile M was variable, while M was variable at all sizes in the Georges Bank Closed model.
- Observed and estimated abundance/biomass, estimated recruitment, natural mortality, and estimated abundance at shell height were presented for each model (i.e. GB Closed, GB Open, Mid-Atlantic).
 - GB Closed: Observed abundance/biomass generally agree with estimates from CASA, with some variation in recent years. A spike in M in 2010-2011 corresponded with die offs of scallops observed in CAI and the northern part of CAII.
 - GB Open: This model was most problematic of the three, but contributes the least to overall biomass. Observed abundance/biomass from survey efforts have been estimating above CASA in recent years, suggesting the model is not totally capturing all mortality that is occurring in this region (though it is difficult to say whether the unaccounted mortality is F or M).
 - Mid-Atlantic: This model also appeared to be unable to account for all mortality occurring. Large recruitment classes were seen in 2002 and 2014 and large spikes in M were seen in 2003 and 2014, suggesting that increased mortality may be associated with large year classes and that there may be a density dependent dynamic between juvenile biomass and M .
- Combined GB Closed, GB Open, and Mid-Atlantic models: fully recruited fishing mortality has decreased since 2000 to an all time low most recently and fully recruited biomass is at its highest point in the time series. Excluding the slow growing animals in the deep water portion of NLS-S (i.e. “Peter Pans”), scallop biomass in 2017 was estimated to be 317,334 mt meats (roughly 700 million pounds) and fishing mortality was estimated to be 0.12.
- TOR-6: Reference points were estimated using the SYM model. The most recent period of data was used to estimate yield and biomass per recruit in meat weight, and stock-recruit curves were estimated using recruitment and spawning stock biomass estimates from CASA model runs. Age of recruitment for the purposes of the reference point models was set to three years old (previous assessments used two years old).

- MSY, F_{MSY} , and B_{MSY} estimates are given as a distribution, not as a point estimate. Estimates appeared to be uncertain for Georges Bank, and more so for Mid-Atlantic. The proposed SARC 65 reference points (i.e. median of all SYM runs) were: $B_{MSY} = B_{TARGET} = 116,766$ mt meats, $B_{THRESHOLD} = 58,383$ mt meats, and $F_{MSY} = 0.64$. Estimated 2017 biomass was 317,334 mt meats (excluding slow growing scallops in the deep water portion of NLS-S SAMS). Estimated fishing mortality in 2017 was 0.12.
- Based on SARC 65 updated reference points, the stock is neither overfished nor is overfishing occurring.
- The SARC 65 panel was supportive of investigating the use of gonad weight as the metric of reference points in the future (as opposed to meat weight).

PDT discussion points:

- SHMW parameter estimates from SARC 65 appeared to be very similar to estimates from previous assessments; however, it is worth using the most recent estimates as they include more data and because changes in SHMW happen very slowly over time.
- The increase in B_{MSY} is more likely attributed to changes in mortality and fishery selectivity as opposed to changes in growth.
- The only time series that has consistently sampled gonad weight is the NEFSC dredge survey. It was noted that there is limited data on seasonal gonad weight trends (unlike SHMW relationships).
- An industry member present in the audience suggested that fishery selectivity changes seasonally, using the Mid-Atlantic as an example. Dr. Hart agreed, and noted that it may be worthwhile for the Council to consider seasonal management to achieve optimum yield.

VIMS Dredge Survey of Mid-Atlantic, NLS, CAI, and CAII

Sally Roman presented relevant information and key findings regarding the 2018 VIMS dredge survey of the Mid-Atlantic Bight (MAB), Nantucket Lightship (NLS), Closed Area I (CAI), and Closed Area II (CAII):

- The MAB survey domain was the same as previous years. The CAII and NLS survey domains were mostly similar as previous years, except for fewer stations being assigned to the southern portion of the NLS extension.
- Area swept biomass estimates were derived for each SAMS area using Yochum and DuPaul (2008) dredge selectivity parameters and length-weight parameters from SARC 65.
- At least 15 scallops per station were sampled to inform shell height to meat weight relationships and meat quality observations. SHMW workups were used to estimate expanded length frequencies and included in a mixed effects model that estimates SHMW relationships for each SAMS area.
 - A trend of increasing meat weight at length was seen in the MAB SAMS areas; predicted relationships were similar to estimates for the MAB in 2017.
 - SHMW relationships were significantly different for all SAMS areas in the NLS.
 - A greater relationship was seen in the southern CAI SAMS area relative to the north.

- SHMW curves from the SF and CAII-S-EXT SAMS were lower than CAII-S-AC (i.e. the traditional CAII access area).
- Key points from L-F plots by SAMS area were:
 - Some recruitment was seen in BI, LI, NYB, and NYB-Inshore. The recruits seen in DMV were observed last year and are minimal in number relative to the other MAB SAMS areas.
 - Some recruitment was seen in NLS-N along with the same three year classes observed in the 2017 survey. No recruitment was evident in other NLS SAMS areas. The slow growing animals in NLS-S-Deep did not seem to grow over the past year. Minimal growth was seen in NLS-AC-W relative to last year.
 - Some recruitment was seen in all the CAI and CAII SAMS areas and mean length was around 100 mm.
- In the MAB, the majority of adult biomass was observed in the Elephant Trunk and Hudson Canyon. In the NLS, “Peter Pan” scallops in the deep water of NLS-S made up the majority of recruit biomass observed (i.e. 35-75 mm), while the majority of adult biomass was found in the NLS-W and shallow portion of the NLS-S. In CAI, one station along the western edge of CLI-AC-N made up almost all of observed recruit biomass, while larger animals were seen along the CAI ‘sliver’. In CAII, both recruit and adult biomass was spread across the open area of the SF/CAII-ext SAMS areas and the eastern part of CAII-S-AC.
- A comparison of SARC 65 and VIMS 2016-2018 SHMW parameters indicated that the SARC 65 parameters yielded higher biomass and average meat weight estimates.

PDT discussion points:

- It was suggested that SHMW estimates in the NLS-S were different from the previous year because an additional year of data was included in analysis, and because the 2017 and 2018 survey coverage included slow growing animals in NLS-S-deep more so than the 2016 survey.
- The group reiterated that no recruitment was evident in DMV, and that the commercial dredge caught zero scallops in the VIR SAMS area (i.e. south of DMV).

2018 SMAST Drop Camera Survey Results

Dave Bethoney of the University of Massachusetts Dartmouth School for Marine Science and Technology (SMAST) presented methods and key findings from the 2018 SMAST drop camera survey of the NLS, CAI, Great South Channel, and the Gulf of Maine:

- SMAST estimates of abundance, biomass, mean meat weight, and mean shell height were based on quadrat still images from the high-resolution digital still camera. SARC 65 SHMW parameter estimates were used in biomass and mean meat weight calculations.
- Some pre-recruits (<35 mm) and recruits (35-75 mm) were observed in the northern part of the SCH and in between CAI and NLS. Some recruit sized animals were also seen in NLS-W and in the deep water of NLS-S; however, these animals were observed in previous years as well.
- There was a bimodal size distribution of scallops seen in the SCH SAMS area indicating two year classes being present.

- There was a decrease of density mean SH in the NLS-N compared to the 2017 survey estimates.
- It was suggested that the difference in coverage and timing of surveys relative to fishing effort was likely driving differences seen in biomass estimates between survey groups.
- The Gulf of Maine survey was conducted on a 0.5 nmi² grid and covered Stellwagen Bank, southern Jeffreys Ledge, Ipswich Bay, and Platts Bank. Estimates were calculated using SARC 65 SHMW parameters for Georges Bank open areas.
 - Some smaller scallops were observed on Jeffreys Ledge. Most of the adult biomass was concentrated on Stellwagen Bank and in Ipswich Bay. SMAST coverage did not include stations in the deeper water along the edge of Stellwagen Bank where most NGOM fishing occurred in April and May.
 - Some of the Ipswich Bay stations overlapped with state waters; the biomass estimate included these stations.

PDT discussion points:

- A decline in density was seen in the NLS-S between 2017 and 2018. The NLS-S area estimate was driven by the large biomass of slow growing scallops in the NLS-S-deep.
- The group supported SMAST re-estimating biomass for Ipswich Bay including stations only in federal water.

2018 WHOI Survey of the NF, CAII HAPC, and MAB (HabCam v2)

Scott Gallagher presented key findings from the Woods Hole Oceanographic Institute (WHOI) HabCam survey of the Northern Flank, Closed Area II HAPC, and Mid-Atlantic Bight:

- A rebuilt HabCam v2 was used for the WHOI survey, which now has identical electronics as HabCam v4 (NEFSC) and HabCam v3 (CFF) and can be used as a backup for either system.
- Approximately 3 million images were collected throughout the survey and around 200,000 images were annotated (~ 1:15 annotation rate). Roughly 50% of collected images were annotated at sea, while the remainder were annotated in the lab.
- Biomass was calculated using SARC 65 SHMW equations for Georges Bank and the Mid-Atlantic respectively. Abundance, expanded number at length, and biomass were estimated for each SAMS area. Biomass by SAMS area estimates were kriged using depth as a covariate.
- NYB SAMS estimates were split into three areas due to the northern most area being thickly settled. HCS also appeared to be well populated.
- The HabCam track in ET-Flex did not cover the highest density portion of the area that other surveys observed, which could be one reason length biomass estimates were so different from other surveys.
- The NF SAMS area was very patch in terms of exploitable scallops, but some were observed adjacent to CL2-NA-N. The density of larger, older animals in CL2-NA-N seemed to have decreased since the 2017 survey suggesting some mortality. Some recruits were seen in CL2-NA-N.

PDT discussion points:

- WHOI used a different geostatistical method than NEFSC to estimate biomass by SAMS area. Therefore, WHOI estimates will serve only as a sensitivity to the final NEFSC estimates (i.e. which include WHOI HabCam data).
- WHOI did not reassemble estimates for NYB SAMS after splitting the area into three different parts; however, it was noted that SAMS estimates are additive and that the three separate estimates for NYB could be summed.
- The PDT noted the WHOI HabCam v2.2 length estimates appeared to be systematically lower than the dredge lengths in the Mid-Atlantic and requested further investigation of this issue.

2018 CFF Survey of the NLS (HabCam v3)

Jason Claremont presented key findings from the Coonamessett Farm Foundation (CFF) HabCam v3 survey of the Nantucket Lightship:

- HabCam was towed between 4.5 to 5 kts at a target altitude of 1.7 to 1.9 m throughout the NLS survey domain. Roughly 2.9 million images were collected, of which 7,143 were annotated (~1:400 annotation rate).
- The survey did not observe many prerecruits (< 35 mm) in the survey area but did see some higher densities of 35-75 mm animals in NLS-S-deep (i.e. mostly made up of 60-70 mm slow growing “Peter Pan” scallops that were observed in previous years). Animals 75 mm and larger were most dense in the NLS-W and NLS-S-shallow.
- Growth in the NLS-W appeared to be far slower than expected between the 2017 and 2018 surveys, possibly due to some density dependent dynamic occurring. A similar trend was also apparent in other NLS SAMS areas.
- There appeared to be an increase of sea stars and predation interactions in the NLS compared to previous years, which could be an explanatory factor when discussing fluxes of natural mortality in this area.

PDT discussion points:

- It was suggested that the timing of the CFF survey in NLS-W relative to fishing effort could be contributing to the seemingly slow growth observed between the 2017 and 2018 surveys; however, others felt that slow growth in the NLS-W was more likely due to density dependent factors due to the incredibly high biomass of animals in the area.
- Relative density estimates seemed to have decreased in the NLS-S-deep between the 2017 and 2018 surveys, suggesting there may be some mortality occurring in this area in the absence of fishing.

2018 NEFSC Dredge and HabCam Survey

Dvora Hart (Northeast Fisheries Science Center) presented key findings from the 2018 NEFSC dredge and HabCam (v4) surveys of Georges Bank and the Mid-Atlantic:

- 117 dredge stations were completed on GB and HabCam tracks covered most of GB and the DMV SAMS area.
- Some paired-tow experimental work was also done in the ET to further investigate dredge efficiency in high density areas.
- Collectively, HabCam surveys on Georges Bank in 2018 by NEFSC, CFF, and WHOI resulted in the best coverage of the time series.
- The dredge survey observed both prerecruits (< 35 mm) and recruits (35-75 mm) in the SCH and in the Northern Edge. An older cohort was also observed in the SCH which will likely be harvestable size in 2019.
- The larger animals (> 75 mm) in the NLS-ext were observed concurrently with fishing effort, although the NEFSC dredge survey completed stations in this area before most other survey groups.
- Scallops were also observed at survey stations north of the SCH SAMS boundary (i.e. outside of SAMS area boundary, but within shellfish survey strata).

Survey Data Treatment

Scallop Fishery VMS Effort, April-July 2018

Sam Asci (Council staff) presented information on the spatial distribution of fishing effort thus far in FY2018 relative to SAMS area boundaries. VMS pings from the LA and LAGC IFQ components in April through June of 2018 were aggregated by 3 nmi squares. A speed filter of 2 to 5 kts was applied to isolate fishing activity. Then, total VMS hours were summed by SAMS area using the zonal statistics spatial analyst tool in ArcMap 10.5. Key takeaway points from the presentation and PDT discussion included:

- The majority of effort between April and July 2018 was in Georges Bank SAMS areas (65%), specifically in open areas within the CAII-ext and Southeast Parts (SF SAMS area).
- Most Mid-Atlantic effort was directed in open areas with the LI and NYB SAMS areas, while effort in the MAAA was concentrated in HCS and along the northeast border of the ET-Flex SAMS areas. There was very little/no fishing in Delmarva for the third year in a row.
- In the NLS-S access area, over 90% of effort was directed in NLS-S-shallow. Roughly 75% of effort in Closed Area I access area occurred in the northern area which was formerly an EFH closure (i.e. CL1-NA-N SAMS area).
- Fishing outside of SAMS boundaries occurred north of Provincetown, inside the NGOM, and in waters along the southeast border of BI SAMS.
- Very little effort was seen in the SCH SAMS area, and no effort was seen in DMV or NF.

L-F and SHMW Relationships in the ET and NLS

Sally Roman (VIMS) presented details on length frequencies and estimated SHMW relationships in the ET and NLS due to unusual growth patterns observed in high density areas in recent years.

Key takeaway points from the presentation and PDT discussion were:

- Predicted SHMW relationships for the Mid-Atlantic SAMS areas did not indicate that growth in the high-density portion of ET-Flex was significantly lower than the rest of the SAMS area. Growth in the high-density part of ET-Flex also appeared to be consistent with ET-Open and other Mid-Atlantic SAMS areas.
- A comparison of predicted SHMW relationships in NLS SAMS areas indicated that growth in NLS-S-deep was significantly lower than the other areas.
- The PDT agreed that SAMS projections for the NLS-S-deep, NLS-S-shallow, NLS-AC-N, and NLS-W should use VIMS 2016-2018 SHMW parameter estimates, and that SARC 65 SHMW parameter estimates should be used for NLS-ext.

Dredge Efficiency

Dvora Hart (NEFSC) presented information regarding the on-going paired tow experiment conducted in the ET in 2018 to inform treatment of dredge biomass estimates in high-density areas when combining estimates from all survey groups:

- The NEFSC dredge surveyed 19 stations in the ET. 17 of these stations were paired with VIMS dredge survey stations. HabCam survey tracks in the experimental area yielded roughly 18,700 images.
- At the paired dredge stations, estimates from the 15-minute tows done by VIMS were compared to estimates from the 10-minute tows done by the NEFSC dredge survey. Biomass estimates at the paired tow stations were compared to HabCam estimates.
- Preliminary findings from the comparison work did not suggest biomass estimates from 15-minute tows vs 10-minute tows in high density areas to be significantly different.
- No final results were presented at this meeting, and the PDT plans to follow-up on this analysis at a later date.

Nematode Prevalence in the Mid-Atlantic

Dave Rudders presented VIMS survey findings from 2015 to 2018 relative to nematode prevalence in the Mid-Atlantic. VIMS has tracked nematode prevalence in this area for the last four years, focusing on the range of infected scallops and the intensity of infestation (how many lesions). Takeaway points from the presentation and PDT discussion include:

- Nematodes prevalence was initially heaviest in the far southern range of the fishery, specifically in DMV and the southern part of the ET. The spatial extent expanded slightly north in 2016 and appeared to be contracted in 2017 relative to 2016. The 2018 survey suggests nematode distribution was very similar to what was observed in 2016, except with some sporadic occurrences being observed farther north (i.e. in NYB and LI SAMS).
- When considering the spatial extent of nematodes and recent fishing effort, it appears that meat quality is impacting fishing behavior (i.e. vessels are avoiding areas with high nematode prevalence).

- Elevated fishing mortality due to high discards and the redistribution of effort are important points to remember when considering fishery specifications in areas with high nematode persistence. It was suggested that allocating fishery effort based on ‘effective biomass’ (i.e. biomass that is likely to be fished) may be appropriate when moving forward.

Update on Gray Meat Distribution

Susan Inglis (SMAST) presented preliminary results from the 2017-2018 SMAST grey meat scallop survey in Closed Area I. Dr. Inglis’ work was supported through the Scallop RSA and Staltonstall-Kennedy awards. Takeaway points from the presentation and PDT discussion include:

- There was a large outbreak of gray meat scallops in Closed Area I observed in 2011. SMAST survey efforts in Closed Area I aim to better understand how grey meat infection of animals in this area changed over time (i.e. in size and severity), and to inform the size range of scallops that are most susceptible to infection.
- Dr. Inglis suggested that gray meat scallops are infected with a two-host parasite, where scallops are the intermediate host and waved whelks are the primary host.
- Some grey meats were observed mostly in the central part of the traditional CAI AA in 2017, whereas in 2018 the most dense aggregations were found in deeper water of the northeast corner of the access area (i.e. ‘sliver’).
- The PDT noted that the area with highest grey meat prevalence in 2018 was also fished heavily since the start of FY2018.

Nematode and Grey Meats from Observer Data

Lacy from the Northeast Fishery Observer Program (NEFOP) presented a summary of observer data on kept/discarded scallops infected with nematodes or grey meats. Key takeaway points from the presentation and PDT discussion were:

- In 2016, observer protocol has integrated the collection of meat quality data, specifically records of nematode and grey meat prevalence. Since distinguishing an infected vs. not infected scallop can be difficult, observers are instructed to take pictures of suspected nematodes/grey meats to verify accuracy.
- Records indicate that some vessels fishing in the MAAA have landed scallops infected with nematodes, amounting to a total of 4,600 lbs since 2016.
- Since 2016, only two trips have recorded grey meat observations on Georges Bank. It was suggested that grey meats are usually discarded in the shucking house, meaning its possible that some grey meats could have gone unsampled.

DAY 2

Discard and Kept Data from Observer Program

Tyler Staples of the Northeast Fisheries Observer Program presented aggregate scallop discard and kept data from observed scallop trips in fishing years 2016-2018 (2018 data updated through June). Key points from the presentation and PDT discussion were:

- A relatively higher scallop discard rate observed on Georges Bank open trips in 2018 were likely driven by data points from NLS-ext, which was opened through FW29 after several years of closure.
- There appeared to be minimal discarding in the NLS-W and NLS-S access areas in 2018.
- Very little discarding was observed in CAI, though vessels did appear to be targeting larger scallops in the area.
- In the MAAA, average SH of kept scallops seemed to decrease in 2018 relative to 2016. This is likely due to the very strong 2013 YC recruiting into the fishery.
- A member of the audience felt it worthwhile to compare NEFOP records with CFF seasonal bycatch survey records to see how consistent they are.

Figure 1 - Scallop Discard to Kept Ratios by access and open areas for LA and LAGC IFQ components.

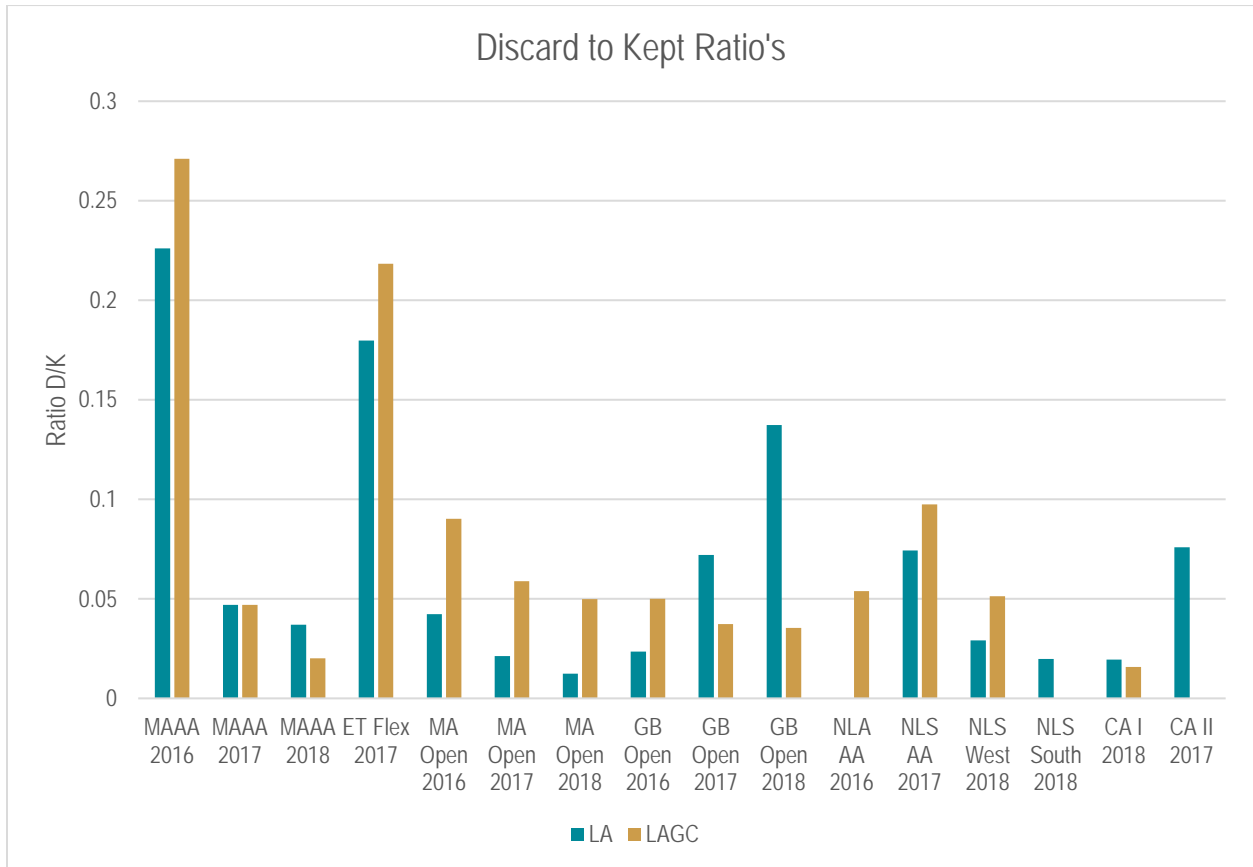


Figure 2 - Comparison of 2016 - 2018 kept and discarded scallops in the Mid-Atlantic Open (LA only)

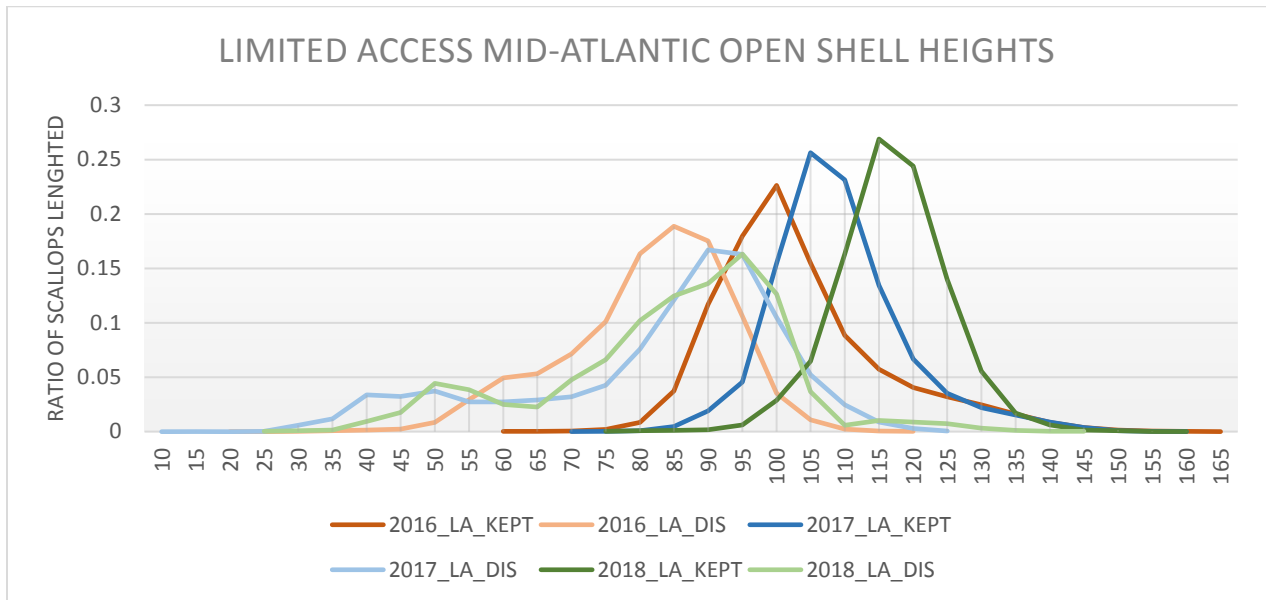
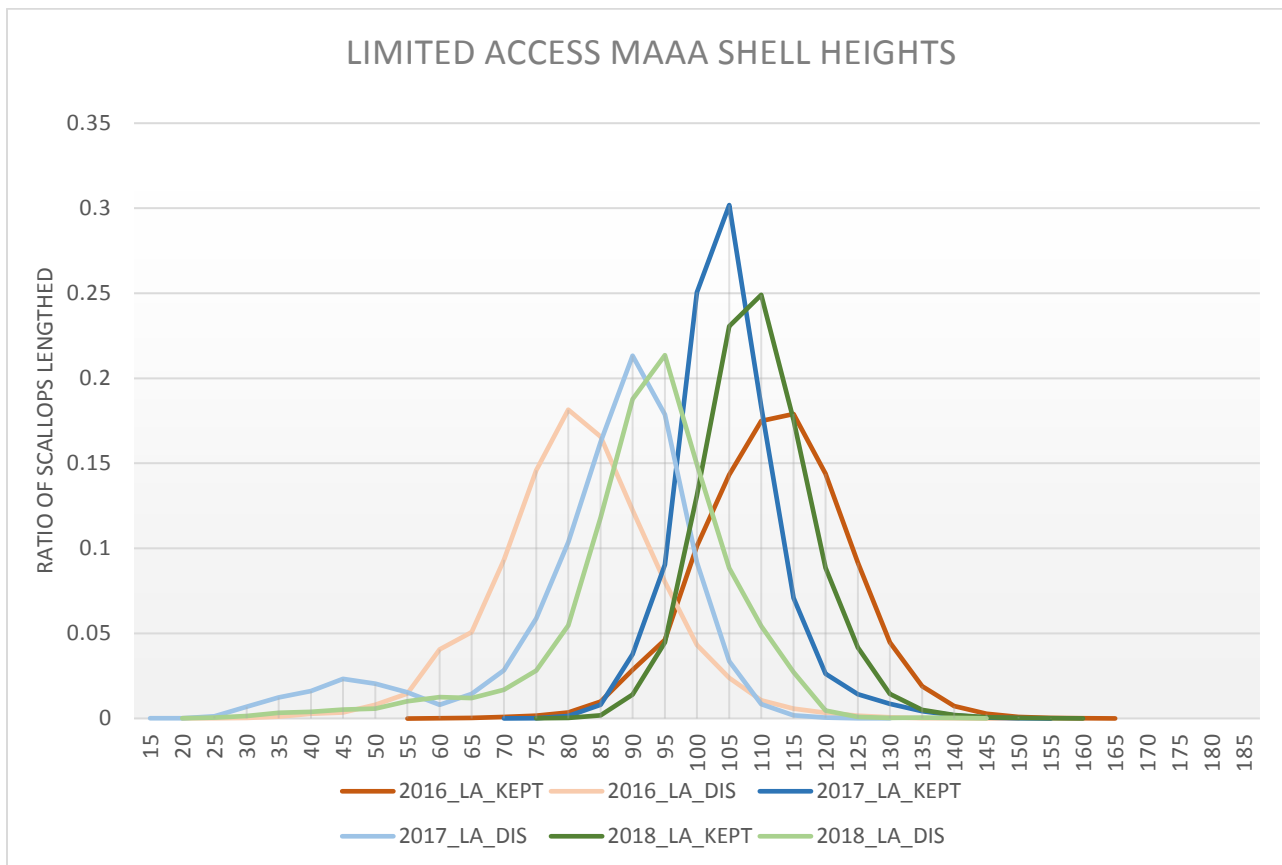


Figure 3- Comparison of 2016 - 2018 kept and discarded scallops in the Mid-Atlantic Access Area (LA only)



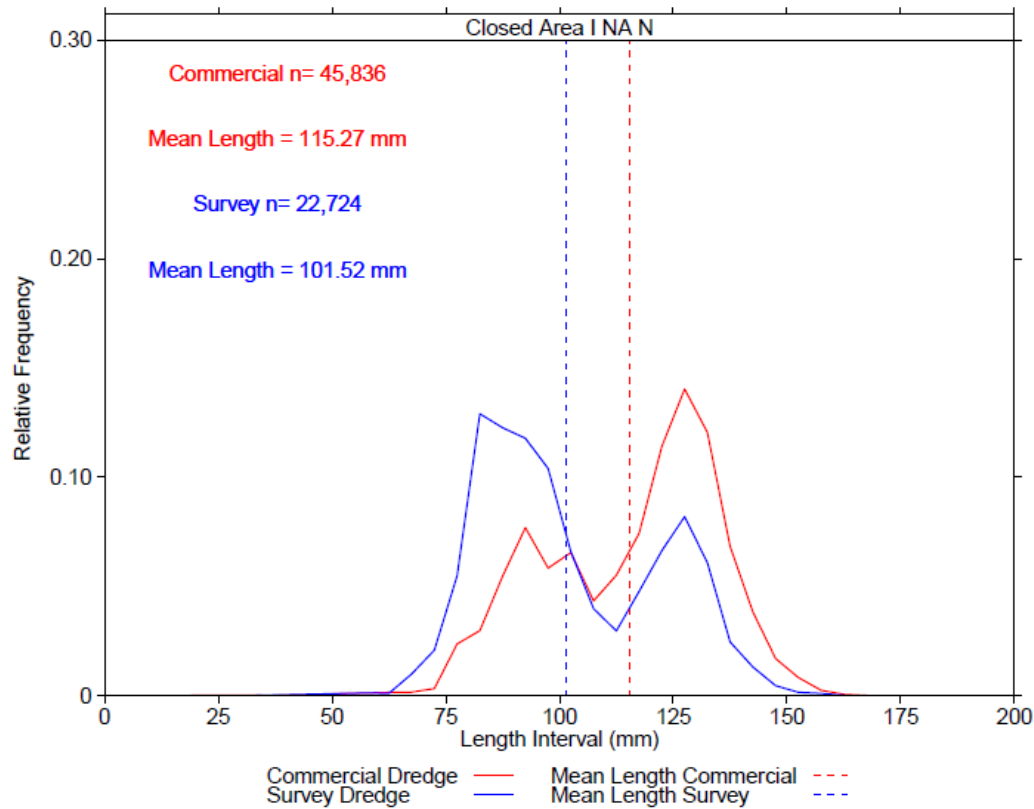
Review of Survey Data Treatment Decisions

The PDT continued discussion from Day 1 on how to treat survey data and provided initial input on potential spatial management options in 2019. Discussion points and input are summarized by rotational area here.

Closed Area I

- Minimal recruitment was observed in 2018 survey efforts.
- The majority of animals observed in the 2018 surveys were in the “sliver”, which is also where most of CAI fishing has occurred thus far in FY2018.
- Market grades reported from CAI thus far in FY2018 have been mostly U10s, U12s, and 10/20s.
- Two cohorts were observed in 2018 (Figure 1), the larger of which will be 9 years old and the younger will be 4 years old in 2019.
 - There was some discussion of potentially closing part of CAI in 2019 to relieve the younger year class of scallops in the area. This was flagged as a follow up item; however, the majority of the PDT did not support a closure in CAI.
- CAI AA can likely support a full-time trip in FY2019.

Figure 4. Relative length frequencies from the 2018 VIMS survey of CLI-NA-N.



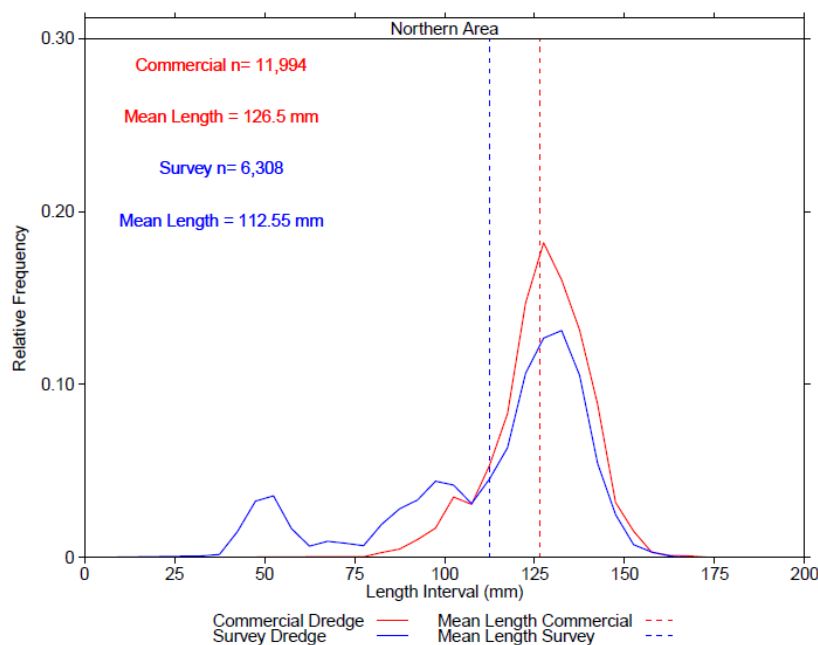
Closed Area II

- CAII AA could support a full-time trip in 2019; however, the PDT feels there is less urgency to fish this area in 2019 relative to other available access areas because:
 - Three cohorts were observed in CAII, the oldest of which will be 5 years old and has additional growth potential if not fished in 2019.
- The PDT acknowledged that the 2019 GB yellowtail sub-ACL may be considerably lower than recent years and recognized that the majority of GB yellowtail bycatch comes from CAII AA.

NLS-N

- The PDT noted that scallops in the NLS-N are typically larger on average than the other NLS rotational areas.
- Three cohorts were observed in the NLS-N in 2018 (Figure 2).
- The NLS-N also seemed to have above average recruitment in 2018 relative to other surveyed areas.
- Due to the greater growth potential for this area and presence of recruits, the PDT identified NLS-N as a candidate closure for FY2019.

Figure 5. Relative length frequencies from the 2018 VIMS survey of NLS-N.



SAMS_Area	Length	Commercial	Survey
NLS_AC_N	32.5	0.0	5.5
NLS_AC_N	37.5	0.0	11.0
NLS_AC_N	42.5	0.0	94.5
NLS_AC_N	47.5	0.0	205.4
NLS_AC_N	52.5	0.0	224.8
NLS_AC_N	57.5	2.8	105.2
NLS_AC_N	62.5	4.8	41.4
NLS_AC_N	67.5	0.0	59.0
NLS_AC_N	72.5	0.0	51.8
NLS_AC_N	77.5	4.6	43.0
NLS_AC_N	82.5	34.1	120.5
NLS_AC_N	87.5	58.1	177.3
NLS_AC_N	92.5	124.2	209.7
NLS_AC_N	97.5	203.9	278.0
NLS_AC_N	102.5	419.1	264.0
NLS_AC_N	107.5	368.1	196.3
NLS_AC_N	112.5	639.4	286.4
NLS_AC_N	117.5	998.7	400.8
NLS_AC_N	122.5	1,764.2	671.4
NLS_AC_N	127.5	2,182.3	799.8
NLS_AC_N	132.5	1,924.6	827.5
NLS_AC_N	137.5	1,576.5	663.9
NLS_AC_N	142.5	1,061.8	342.8
NLS_AC_N	147.5	380.6	156.0
NLS_AC_N	152.5	182.2	46.6
NLS_AC_N	157.5	36.1	19.8
NLS_AC_N	162.5	14.5	5.2
NLS_AC_N	167.5	11.0	1.0
NLS_AC_N	172.5	2.8	0.0

NLS-S-Deep

- Scallops in the NLS-S-deep have continued growing at an abnormally slow rate, have small meats (i.e. 50 count at best), and are not fully recruited to the 4” dredge ring.
- The group noted that “this is about as good as its going to get”. Additional work on fecundity and biological processes of these animals is underway, although it is likely they are not contributing much in terms of reproduction.
- There was a decline in density observed between the 2017 and 2018 SMAST survey of this area, suggesting some mortality was occurring in the absence of fishing. It was also suggested that some density dependence and(or) environmental factors may be driving mortality in the NLS-S-deep.
- The PDT felt that there is no biological reason not to harvest these animals and that AP input would help guide development on the best way to harvest them.

NLS-W

- Two full time trips were allocated to the NLS-W in FY2018. Fishing thus far in FY2018 has been reportedly good in the NLS-W, with landings being mostly U10s and 10/20 count.
- This area is dominated by one large year class with a mean SH of roughly 100 mm. Animals will be 7 years old in 2019.
- Very little growth was observed between the 2017 and 2018 survey effort in the NLS-W. It was suggested that VIMS shell height data from the NLS-W be used to develop a specific growth equation for this area (follow-up item for September 5th PDT call).
- Due to the extraordinarily high biomass of harvestable scallops observed in the 2018 surveys, the PDT identified the NLS-W as a candidate area for multiple trips in FY2019.

NLS-S-Shallow

- The NLS-S was allocated one full-time trip in FY2018. Essentially all effort to date has been concentrated in the shallow (i.e. < 70 m depth) portion of the access area, with landings being mostly U10s and 10/20 count.
- The PDT noted that this area may not be able to support a trip in FY2019, and that it either be combined with the NLS-W to facilitate access in FY2019, or be closed along with NLS-N until 2020.

MAAA

- Concentrations of scallops in the MAAA continue to be infected with nematodes and appear to be driving fishing behavior in terms of where effort is directed. No effort was reported south of the ET-Flex thus far in FY2018.

- The 2018 biomass estimate for the unfished southern part of ET-Open was 5,460 mt, roughly 53% of total biomass in ET-Open.
- Not much recruitment was evident in the MAAA in 2018 and the large year class of animals dominating the area will be 6 years old in 2019.
- The PDT felt that the MAAA was a candidate area for multiple trips in FY2019.

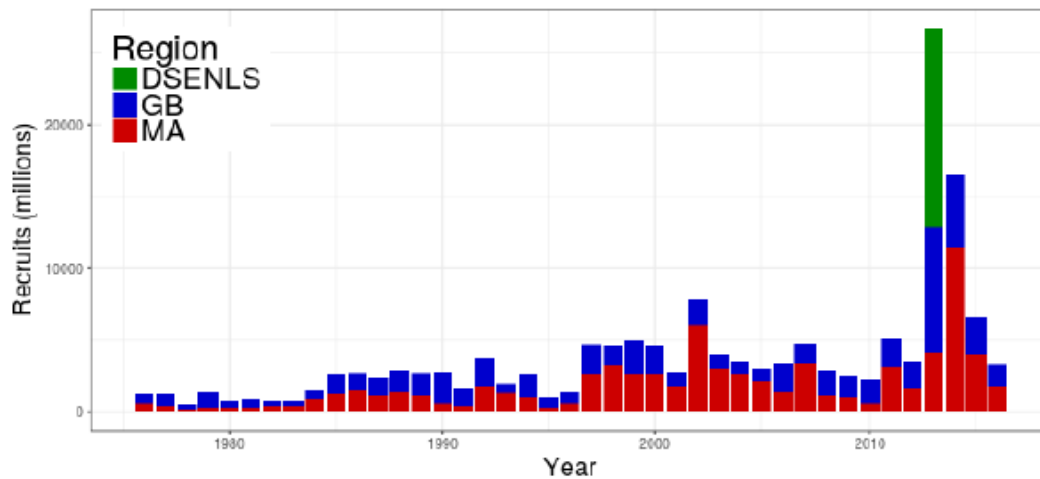
Delmarva

- An order of magnitude reduction in biomass was observed between the 2016 and 2018 surveys of DMV.
- The recruits observed in this area in 2017 were not observed again in 2018.
- There has not been any fishing in DMV for several years and the area was not included in the bounds of the MAAA in FY2018.
- DMV is at the southern extent of the range; the downward trend in recent years suggests some environmental factors may be impacting the success of animals in this area.
 - The PDT does not expect fishing to occur in DMV in the future unless something changes.

Thoughts on Recruitment

- No signs of strong recruitment were observed in the 2018 surveys.
- The small pulses of recruitment that were observed were found in SCH, BI, CAII-N. There were also varying indicators of recruitment in LI and NYB between the dredge and HabCam surveys.
- A member of the public noted that sand dollars are predators of juvenile scallops, and that the WHOI HabCam survey reported higher densities of sand dollars than previous years. It was suggested that sand dollars may be an indication of spat predation.
- The PDT acknowledged that recent years have not followed the massive recruitment event seen in 2012 and 2013 (Figure 3), but that 2018 recruitment seemed rather typical and even slightly better compared to the long-term trend.

Figure 6. Sea scallop recruitment (age 1) by region, 1975-2016. Regions are: Mid-Atlantic (MA, red), Georges Bank (GB, blue) and the deep-water, southeast corner of Nantucket Lightship Closed Area (DSENLs, green) (source: Figure A5 from SARC 65 report).



Thoughts on FY2019 DAS and AA Trips

- The majority of exploitable biomass is within rotational areas that are dominated by the large year class of animals that will be 7-9 years old in FY2019. The recruitment that was observed was seen in open areas.
 - In light of this, The PDT recommended that effort continue to be focused in access areas, and that open area DAS continue to be allocated at a conservative level.
- In addition to the updated SARC 65 reference points, the PDT recommended using $F = 0.48$ (i.e. SARC 59 reference point) as a sensitivity when running the SAMS model with other FY2019 specification alternatives.

2019 NGOM Management Discussion

- A member of the PDT suggested that Jeffreys Ledge could be a candidate closure due to the large pulse of recruitment observed by the 2018 SMAST survey.
 - The PDT noted that rotational closures there may not be possible under the current management measures in place for the NGOM.
 - Many felt that vessels would not fish Jeffreys due to the minimal level of adult scallops observed there relative to the recruits.
- The 2018 survey saw low densities on Platts Bank suggesting this area may not be targeted heavily in FY2019.
- The PDT felt that Stellwagen Bank and Ipswich Bay would likely be the focus of most NGOM fishing in FY2019 due to the higher densities observed there.

- The PDT recommended using updated data to project exploitable biomass for each area surveyed in 2018 and basing the FY2019 NGOM TAC on areas that are most likely to be fished (i.e. the same approach used to set the FY2018 NGOM TAC).

LAGC IFQ Possession Limit Discussion

Council staff outlined presentation topics to be discussed by the PDT re: on-going analysis addressing potential impacts of modifying the LAGC IFQ possession limit. The following sections summarize key findings and PDT discussion points by topic.

Summary of Trip Variable Cost Model

- Updated observer data (1997-2017) were used in the trip variable cost model to estimate trip cost for LA, LA/LAGC IFQ combo, LAGC IFQ, and LAGC NGOM vessels from 2010 to 2017.
- The dependent variable used in the estimation model was FFIWOS (i.e. fuel, food, ice, water, oil, supplies). Independent variables included: vessel length, horsepower, crew size, fuel price, and a dummy variable for LAGC IFQ and small dredge vessels.
- The regression model explained roughly 79% of variation in trip cost.
- Fuel price was the main driver for trip cost, making up roughly 75% of total trip variable cost.
- Trip costs for LAGC IFQ vessels followed a similar trend seen for LA vessels but at a reduced magnitude. Generally, trip cost per day peaked in 2011, decreased to the series low between 2015 and 2016, and appears to be increasing slightly in 2017.
- LAGC IFQ vessel trip cost per day was roughly 35% of LA vessels.
- The PDT recalled reviewing fuel price trends at their last meeting and felt it important to highlight the recent increase of fuel prices to the Committee.

Active LAGC IFQ Crew Size (FY2010-FY2017)

- LAGC IFQ vessels are not held to a crew size limit.
- The majority of active LAGC IFQ vessels had 3 or 4-person crews between FY2010 and FY2017.
- Average vessel size appeared to be correlated with crew size (i.e. smaller vessels had smaller crews, larger vessels had larger crews).
- The PDT noted that an incremental increase of the possession limit (i.e. to 800 lbs) probably would not increase average crew size, but that a larger increase (i.e. to 1,200 lbs) might.

Baseline Restrictions in LAGC IFQ Fishery

- Vessel replacement and(or) upgrade restrictions apply to all limited access fisheries within NEFMC/MAFMC jurisdiction, except for limited access American lobster permits, NEMS Handgear A permits, and LAGC IFQ permits.
- Vessel replacements and(or) upgrades may not exceed 10% of the vessel baseline length and 20% of the vessel baseline horsepower. The baseline specifications refer to the length and horsepower of a vessel when it was first issued a limited access permit.

- LAGC IFQ permits are not held to baseline restrictions, unless associated with a permit suite that has other limited access permits with baseline restrictions.
- Table 1 displays the number of LAGC IFQ permits currently limited by vessel baseline restrictions. Roughly half of all LAGC IFQ permits are subject to vessel baseline restrictions.
- The PDT expressed interest in knowing how many active LAGC IFQ vessels are subject to vessel baseline restrictions.

Table 1. The number of LAGC IFQ permits currently limited by vessel baseline restrictions in other fisheries. Data includes all active, inactive, and CPH permits.

LAGC IFQ with baseline limiting permit	LAGC IFQ without baseline limiting permit (i.e. LAGC only or w/Lobster)	Total
168	134	302
56%	44%	

Considerations of Modifying the LAGC IFQ Possession Limit

- Council staff presented broader potential impacts from changing the possession limit to be considered in addition to economic impact analysis. These supporting considerations included potential impacts on the scallop resource, essential fish habitat, protected resources, and non-target species.
- Modifying the possession limit reduces that number of trips needed to land quota, but would not change overall allocations, landings, or rotational management.
- The range of the LAGC IFQ fishery could expand at a higher trip limit, but not to areas that aren't already fished by the LA component.
- Vessels would continue targeting areas with high-LPUE, meaning area swept would not be expected to increase at a higher possession limit. This indicates little change would be expected in terms of impact on the resource, EFH, protected resources, and non-target species relative to the 600-pound trip limit.
- Overall, the LAGC component makes up 5.5% of the entire fishery, meaning that any impact from changing the possession limit could be expected to be minimal relative to the fishery as a whole.

Economic Impacts of Modifying the LAGC IFQ Trip Limit

- Dr. Demet Haksever presented updated simulation analysis that incorporated PDT input from the July 25th meeting.
- NEFOP data from observed LAGC IFQ trips were used to update the simulation assumptions of trip length for access area and open area trips.

- Trip length was a combination of transit time and time spent fishing. Simulation analysis assumed that fishing time increases proportionally with an increase in the trip limit, but that transit time remains the same.
- Other assumptions used in simulation analysis included:
 - Average vessel landings from open areas were 59% of the total, access areas landings were 41% of the total (average in 2016 and 2017)
 - Access area trip length = 0.94 days or 22.5 hours at 600 lb. Of the total access area trip length, steam time=0.4 days or 9.6 hours, and total fishing time (TFT) = 0.54 days or 12.9 hours.
 - Open area trip length =1.08 days or 26.47 hours. Of the total open area trip length, steam time =0.25 days, and total fishing time = 0.85 days.
 - Leased pounds are distributed in the same proportion of open and access area landings.
 - Overall lease price was the weighted average of corresponding percentage distribution of landings by area (59% from open and 49% from access areas, the average of 2017 fishing year data).
 - Total landings from all areas for an average vessel were assumed to be 30,000 lb. Trip costs were assumed to be \$589 per day at sea.
 - Fixed costs were assumed to be \$43,870 per year, maintenance and repair costs were assumed to be \$20,330 per year, for a total of \$64,200.
 - Maintenance and repair costs are assumed to be a function of annual day-at-sea spent by each boat, which is equivalent to trip length*number of trips. While trip length increases at higher trip limits relative to 600 lb., the number of trips decline as possession limit increases. As a result, annual day-at-sea, thus maintenance and repair costs, are lower at higher possession limits compared to 600 lb. trip limit: by about 8% lower at 800 lb. 12% lower at 1000 lb. and 15% lower at 1200 trip limit.
 - Scenarios were projected for two different average ex-vessel price scallop price per lb., \$9 and \$12, as well as for varying degrees of leasing, including at 0%, 12.5%, 37.5%, 62.5% and 87.5% corresponding to mid-points of ratios of net leasing to landings using a quartile grouping.
 - Crew shares and vessel profits were estimated using two different lay systems: a) the vessel share is 48% of gross, the crew share is 52% of gross, and crew pays for trip and lease costs; and b) the vessel share is 48% of gross, the crew share is 52% of gross, and the vessel owner and crew share lease costs.
- Key findings from simulation analysis included:
 - The potential impacts of an increased trip limit are not expected to be uniform across vessels, crew, and vessel owners.
 - Vessels that do not lease would be expected to benefit from an increased trip limit in all cases, because trip and maintenance/repair costs decline at higher trip limits.
 - The permit owners who lease out their quota are expected to benefit from an increase in trip limits due to the increase in lease prices in all scenarios.

- At higher trip limits, the impacts on active vessels would vary with the productivity of the areas fished with the leased quota, the price of scallops, steam and fishing time, trip costs, savings in maintenance and repair costs, and the crew lay formula.
- Net revenue at a higher trip limit depends on how much lease price increases (and associated lease cost), the savings gained from reduced annual trip costs (due to fewer DAS needed to fish quota at higher trip limit), and the proportion of total landings from leased quota.
- If the increase in lease price is low (for \$9 scenario), those that lease a relatively small proportion of their landings (such as 37.5% or less) could have an increase in the net revenue and crew shares regardless of the vessel lay system. This is because the savings in trip costs will outweigh the increase in lease costs at those levels as annual number of trips and as steam time spent for fishing decline at higher possession limits.
- However, if lease price increase is high (as in \$12 scenario), net revenue net of lease prices and crew shares could decline even if a vessel leases 37.5% of their landings.
- For vessels that lease a significant proportion of their landings, vessel shares would remain constant if crew pays the lease and would decline if vessel pays half of the lease for possession limits 800 lb. or higher compared to the 600 lb. limit. However, profits could increase if less time at sea and lower number of trips lowers the maintenance and repair costs for vessels that are not in the top leasing groups.
- An increase in trip costs per day-at-sea (such as due to increase in fuel prices) would increase the benefits of higher trip limits and(or) reduce the loss from the increase in lease prices. For example, a 20% increase in trip costs per DAS leads to larger savings in the trip costs at higher trip limits and increases crew shares for vessels that lease in 50% or less of total landings. Crew shares could decline at higher possession limits for vessels that lease more than 50% of total landings.
- In general, all scenario analyses show that profits would increase if crew pays the lease costs and could decline for top leasing groups if vessel owner pays half of the lease despite the decline in maintenance and repair costs.
- Crew shares could increase except for the top leasing group for \$12 scenario if lease costs are shared by the vessel owner and crew receives the trip cost savings according to the lay system. If lease costs increase significantly, this increase could outweigh the savings in trip costs for vessels.
- If a trip limit increase were implemented only for access areas, the direction of the results would be similar to the simulations provided for the open areas. However, lease prices increase less in this case.
- Simulation analysis was also conducted using 2017 data to estimate aggregate economic impacts on the LAGC IFQ fishery as a whole at varying possession limits. Key findings from the aggregate impact analysis include:

- At higher trip limits, vessel profits could increase for all lease groups if the crew pays lease costs. However, if crew and vessel owner share the lease costs, profits could decline for vessels that lease more than 50% of total landings.
- If an increase in lease price reduces crew shares below what could be earned in alternative occupations (i.e. opportunity costs of labor), either the crew lay formula would need to adjust, or the demand for leased quota would decrease, meaning the magnitude of increased lease prices may not be as great in some cases.
- The analysis was based on conservative assumptions of changes in total fishing time and trip length at varying trip limits. If vessel owners upgrade their gear and the capacity of the vessel to catch more scallops at each tow, trip lengths and trip costs per lb. of scallops could be lower than estimated here, which could lead to a higher increase in lease prices.
- If the lease price increases for each trip limit is higher than estimated, the magnitude of costs and benefits would be greater than estimated here.
- If the decline in maintenance and repair costs is overestimated, the change in profits will be lower.

PDT discussion points:

- The PDT agreed that increasing the trip limit from 600 lbs would benefit some participants, while negatively impacting others in the LAGC IFQ fishery, and that the magnitude of positive/negative impacts depends on the trip limit (i.e. incremental trip limit increase = lower impact, notable trip limit increase = greater impact), ex-vessel price, and the proportion of total landings that a vessel leases in.
- The PDT highlighted that the demographic that makes up the majority of the active LAGC IFQ fleet (i.e. vessels and crews that lease-in 50% or more of total landings) could be the most negatively impacted by an increased possession limit.
- Some industry members present in the audience felt that increasing total fishing time proportionally with the trip limit was overestimating how trip length (and trip cost) might change. The PDT acknowledged this may be the case for certain situations where fishing conditions are optimal but noted a goal of simulation analysis was to encompass the range of fishing conditions experienced by all active vessels.
- Simulation analysis is not able to account for vessels that are paying back a bank loan used to purchase quota because these financial records are not available. An industry member noted that, in recent years, typical loan payments for purchased quota closely tracked with lease costs per pound in the open lease market. It was also suggested that early in FY2018, it was cheaper to lease quota than to finance it.
- The PDT supported the methods used and interpretation of findings re: analysis of modifying the LAGC IFQ possession limit, and felt it was ready for review by the AP and Committee at their September 13-14th, 2018 meeting.

Review Draft Action Plan for Framework 30

Council staff reviewed the scope and objectives of Framework 30 to the Scallop FMP. At present, FW30 will include measures for: 1) fishery specifications for fishing year 2019, default measures for fishing year 2020; and 2) standard default measures. It was noted that anticipated alternatives to be included in FW30 do not address each 2018 work priority identified by the Council.

The objectives for FW30 include: set specifications including ABC/ACLs, DAS, access area allocations for LA and LAGC, hard-TAC for NGOM management area, target-TAC for LAGC incidental catch and set-asides for the observer and research programs for fishing year 2019 and default specifications for fishing year 2020. Consider modifying access area boundaries, consistent with partial approval of OHA2. Develop standard default measures that would streamline the specifications process by reducing the number of alternatives contained in each specifications process.

There were no questions of PDT discussion on this agenda item.

Discuss Recommendations for 2019 Council priorities for Scallop FMP

Council staff reviewed the list of current work priorities and opened discussion to the PDT on potential 2019 work priorities. Key points from PDT discussion included:

- Regarding the 2018 work priority “Modifying access area to be consistent with OHA2”, the PDT acknowledged that AA boundaries were adapted as much as possible within the legacy closure areas following the approval of OHA2 in FW29. The PDT supported a broader assessment of rotational management and evaluation of the current access area boundaries relative to the rotational management criteria developed in Amendment 10.
 - The timing of such an assessment should consider future RSA survey coverage and awards to ensure the appropriate survey data is available.
- The PDT recommended that measures to address DAS and IFQ carryover be included on the list of potential 2019 work priorities.
- The PDT and members of the audience supported removing “gear modifications to protect small scallops” from the list of potential 2019 priorities.
- The PDT discussed “adjustments to the scallop industry funded observer program (NGOM coverage, etc.)” as a potential 2019 work priority.
 - The group noted that addressing the lack of monitoring in the NGOM management area fits in with the on-going NGOM multi-year priority and would most likely be considered in an Amendment action.
 - Many variables go into estimating observer compensation rates, meaning adjusting observer coverage would probably require a look at the observer set-aside.
 - The PDT identified electronic monitoring (EM) as a reasonable option for the NGOM fishery.

- The PDT requested that GARFO provide in-season estimates of scallop fishery flatfish bycatch on a more frequent basis. These estimates are necessary when projecting next year's flatfish bycatch for specification alternatives.

Other Business

No other business was discussed. The meeting adjourned at 3:59 PM.