



New England Fishery Management Council

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DRAFT – In Progress
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) [CFF](#), P1.d) WHOI, P1.e) NEFSC; P2) [SARC 65 Summary Presentation](#); P3) [VIMS Growth Presentation](#); P4) [VIMS Nematode Presentation](#); P5) [CFF 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](#).

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 $F_{MSY} = 0.64$. Estimates 2017 biomass was 380,389 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 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 CL1-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 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 and was likely why 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.

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 on 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. 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.
- 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 norther 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 findings from the 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. Key takeaway points from the presentation and PDT discussion were:

- HabCam tows were paired with NEFSC dredge tows and VIMS dredge tows in a high-density area of the ET.
- Estimates from NEFSC dredge tows were mostly consistent with estimates from VIMS dredge tows that were in close proximity. However, a comparison of NEFSC/VIMS dredge estimates with HabCam estimates suggested a reduction in dredge efficiency at densities of 0.1 m² or greater.
- These findings suggested that inflating dredge estimates by a multiple of three may be higher than necessary in the sampled area of the ET. The group felt that more investigation was needed on the topic of dredge efficiency in high density areas.
- The PDT notes that combined biomass estimates in high density areas were very similar if dredge estimates were inflated by a multiple of 3 or if they were removed. To this point, the argument for inflating dredge estimates by three is that this method was based on a time series of data, not just an empirical comparison. Some were hesitant to continue inflating the dredge estimates by three; however, the overall feeling was that it is better to use the most available information as opposed to removing it when estimating combined survey estimates.

- The PDT supported inflating dredge estimates by a multiple of three in NLS-W and NLS-S-deep, with no change to dredge data treatment in NLS-S-shallow.

Nematode Prevalence in the Mid-Atlantic

Dave Rudders presented VIMS survey findings from 2015 to 2018 relative to nematode prevalence in the Mid-Atlantic. 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.
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Update on Gray Meat Distribution

Susan Inglis (SMAST) presented preliminary results from the 2017-2018 SMAST grey meat scallop survey in Closed Area I. 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 this area aim to better understand how grey meat infected scallops change over time (i.e. in size and severity), and to inform the size range of scallops that are most susceptible to infection.
- Gray meat scallops are infected with a two-host parasite, where scallops are the intermediate host and waved whelks are the primary host.
- 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. The group also felt that there may be a relationship between grey meat infection and deeper, cooler water.

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.