August 20, 2019

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Scallop Survey Group Call
Tuesday, August 20, 2019
Summary

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<u>**Attendance:**</u> Jonathon Peros & Sam Asci (Council Staff), Dr. Dave Bethoney (SMAST), Ms. Sally Roman & Dr. Dave Rudders (VIMS), Jason Clermont, Dr. Liese Siemann, Tasha O'Hara, Ron Smolowitz (Coonamessett Farm Foundation), Dr. Dvora Hart & Dr. Jui-Han Chang (NEFSC), Mike Kersula (ME DMR) and Cameron Hodgdon (UMaine).

Members of groups who conducted dedicated scallop surveys in 2019 participated in an hour and twenty-minute call on Tuesday, August 20, 2019. The call focused on preparation for the upcoming two-day PDT meeting in Falmouth, MA (August 27th and 28th) at the J. Erik Jonsson Center, 314 Quissett Avenue, Woods Hole, MA 02543. The PDT is meeting in the Clark Carriage House, which is a short walk from the main building.

Key Points:
1. All survey groups met the August 20, 2019 data delivery deadline.
2. After receiving a presentation from Ms. Sally Roman of VIMS, the survey groups agreed to use VIMS 2016-2019 SHMW data for biomass estimates in the NLS that will be included in the 2019 survey short report.
3. Survey groups agreed to provide a comparison of NLS biomass estimates using SARC65 and VIMS 2016-2019 SHMW estimates for the upcoming meeting. (See Table 4)
4. Dredge efficiency in high density areas appears to be an issue again this year, and PDT members on the survey call agreed that using a factor of 3 (SARC 65) would be a reasonable starting point.
5. As in 2018, PDT members suggested that there could be value in considering the selectivity curves applied in some of the NLS SAMS areas.
6. Request that the NEFSC observer program present data on from observed trips in the NLS-S, and NLS-W. (request made earlier this summer, check in on 8/21/19).
7. In the past, both SMAST and CFF have documented predators observed in their optical surveys. These groups agreed to look into this data for the NLS-S-deep, and share it at the September 4, 2019 PDT meeting in New Bedford that will focus on harvest for this area.

Observations from the 2019 Survey Season – Potential for follow-up discussion at 2-day PDT
1. **NLS-West:** Surveys suggest a major downturn in biomass in the NLS-W.
    a. Next steps: Review observer data. Ask advisors about fishing behavior in this area.
2. **NLS-S-deep:** Survey groups have noted growth of these scallops (~90mm in 2019), and VIMS has reported increases in SH/MW. This will also be discussed at the special meeting planned for September 4, 2019.
3. **Recruitment:** Preliminary reports suggest some recruitment was observed on Georges Bank (i.e. nothing remarkable, but better than the last few years).
    a. **Gulf of Maine:** Large amounts of recruitment were observed on Stellwagen Bank in the ME DMR/UMaine dredge survey. The PDT members on the call suggested the PDT discuss management options for this cohort, such as a closure to protect these scallops in the next FW action.
    b. **Southeast Parts and Southern Flank:** NEFSC and VIMS reported observing recruitment in their 2019 dredge surveys in the SF, CAII-ext, and CAII AA. CFF

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also observed pulses of recruitment in this area with HabCam, and noted a patch of recruitment along the boundary between CAII and CAII-ext.
c. **CAII-North/HAPC:** SMAST reported that there is a range of year classes in this area, including some recruitment with larger exploitable scallops.
d. **Great South Channel:** NEFSC and SMAST both reported some recruitment in the GSC, along with larger year classes. The PDT may wish to look at the spatial distribution of recruits vs. exploitable biomass across this SAMS area.
e. **Seed in the Mid-Atlantic:** CFF reported seeing fingernail size seed around the Elephant trunk area (~10mm). This could be a predictor of some strong incoming recruitment in the Mid-Atlantic.

SARC 65 SH/MW Equations (Same from 2018): The SARC 65 benchmark assessment developed new shell-height to meat-weight equations for the Mid-Atlantic and Georges Bank, as well as a separate equation for the slow-growing scallops in the deep water of the Nantucket Lightship area ("Peter Pan scallops", along the 70 meter depth contour).

Survey groups should develop biomass estimates using following the SARC 65 questions:
- NLS-AC-S-Deep: For the potion of the Nantucket Lightship South Access Area that is deeper than 70 meters (NLS-AC-S-Deep SAMS area), survey groups should use the following equation:

$$W = \exp(-11.84 + 3.167 * \ln(\text{shell height}))$$

- Georges Bank and the Mid-Atlantic—Survey groups should use the following equations worked up by Dr. Dave Bethoney and Sally Roman for the rest of Georges Bank and the Mid-Atlantic:

Mid-Atlantic:

$$W = \exp(-9.48 + 2.51 * \ln(\text{shell height}) + -0.1743 + -0.059094 + -0.0033 * \text{depth} + 0.021 * \text{latitude} + -0.031 * \text{Clop} + 0.00525 * (\ln(\text{shell height}) * 21) + -0.000065 * (21 * \text{depth}))$$

Georges Bank:

$$W = \exp(-6.69 + 2.878 * \ln(\text{shell height}) + -0.0073 * \text{depth} + -0.073 * \text{latitude} + 1.28 * \text{Clop} + -0.25 * (\ln(\text{shell height}) * \text{Clop}))$$

Mday is 21
Shell height is in mm
Depth is in m
Latitude is in decimal degrees
Clop covariate is 1 in the former groundfish closed areas or access areas and 0 in the open areas (includes NLS-EXT[1] and CAII-EXT)

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[1] Note that the NLS-EXT SAMS area was dissolved into the GSC SAMS area for 2019.

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VIMS 2016 – 2019 SH/MW Equations: Survey groups also discussed applying finer-scale SH/MW parameters to biomass estimates in the Nantucket Lightship. To develop alternative biomass estimates for Nantucket Lightship areas based on data collected by the VIMS dredge survey, survey groups should use data in Table 2 below. A full SH/MW analysis of the Nantucket Lightship will be included in PDT meeting materials.

*Table 1 - SHMW models for the 2016-19 VIMS NL survey data. Bold variables indicate significance. Model in red was selected as the preferred model. * indicates an interaction term.*

Model	Parameters	K	AICc	Delta_AICc
nl6	~ 1 + shell height * depth **+ latitude** + **SAMS Area**	11	34,269.59	0.00
nl3	~ 1 + **shell height + depth + latitude** + **SAMS Area**	10	34,269.99	0.40
nl2	~ 1 + **shell height + depth** + **SAMS Area**	9	34,272.49	2.90
nl4	~ 1 + **shell height + latitude** + **SAMS Area**	9	34,311.62	42.03
nl5	~ 1 + **shell height** * depth + **SAMS Area**	10	34,314.18	44.59
nl1	~ 1 + **shell height** + **SAMS Area**	8	34,319.07	49.48

Table 2 - Parameter estimates for model nl3 (Table 4 in the 8/19/19 VIMS SHMW analysis)

Parameter	Parameter Estimate
Intercept	-50.333
ln shell height	2.862
Latitude	1.007
ln depth	-0.169
NLS_South_Deep	-0.127
NLS_South_Shallow	0.095
NLS_West	-0.049
VIMS_45	-0.027

Figure 1 - Predicted SHMW relationships by SAMS Area for the NL using model nl3.
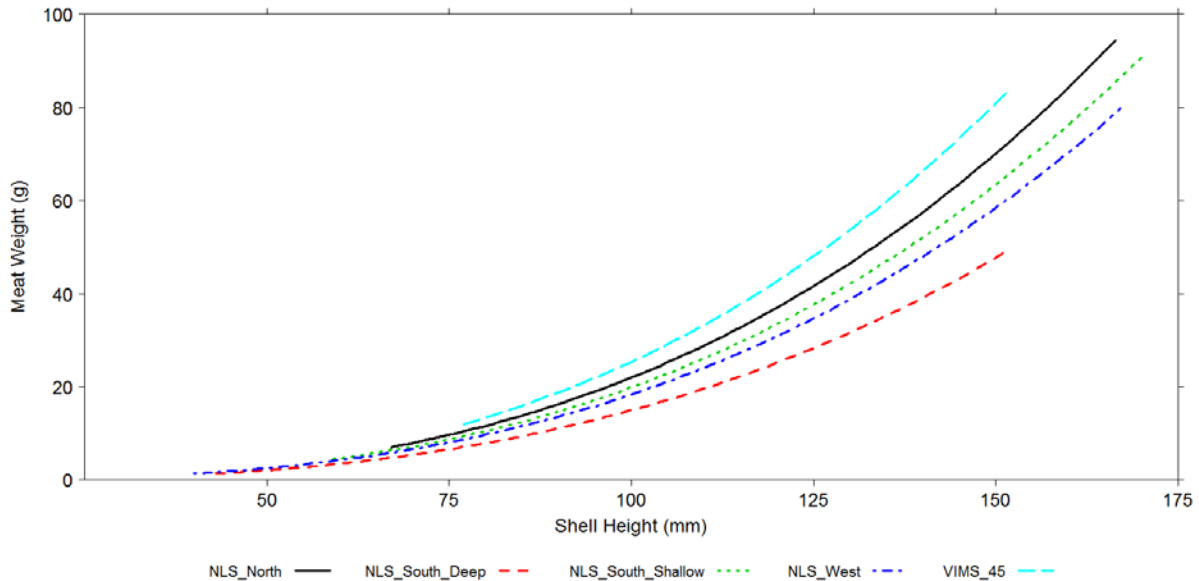
Biomass Estimates for August 27/28, 2019 PDT Meeting:
- All survey groups (VIMS, SMAST, CFF, and ME DMR) transmitted their initial biomass estimates to the NEFSC and Council by the August 20th deadline.
- Survey groups (VIMS, SMAST, CFF) agreed to prepare two sets of biomass estimates for all Nantucket Lightship areas using the SARC 65 and VIMS 2016-2019 SH/MW parameters as a sensitivity analysis:

Table 3 - Estimation areas in the Nantucket Lightship using SARC 65 and VIMS 2016 - 2019 data.

	SARC 65	VIMS 2016-2019 (see Table 2)
NLS-N		
NLS-S Shallow		
NLS-S Deep	Note: use specific equation	
NLS-W		

- In the short report, survey groups should report estimates using the SARC 65 SH/MW equations for all areas, except the NLS, where the VIMS 2016-2019 data should be used. See Table 4.
- By the end of the two-day meeting, the PDT should be in agreement on data treatment to initialize the SAMS model, or at least be close to a decision.

Table 4 - SH./MW equations to be used in the survey short report.

GB	SHMW equation
CL1-Access	SARC 65
CL1-Sliver	SARC 65
CL1-South	SARC 65
CL2-North	SARC 65
CL2-Access	SARC 65
CL2-Ext	SARC 65
NLS-North	*VIMS 2016-2019*
NLS-South-Shallow	*VIMS 2016-2019*
NLS-South-Deep	*VIMS 2016-2019*
NLS-West	*VIMS 2016-2019*
NF	SARC 65
GSC	SARC 65
SF	SARC 65
MidAtlantic	
BI	SARC 65
LI	SARC 65
NYB	SARC 65
MAB-Nearshore	SARC 65
HCS	SARC 65
ET Open	SARC 65
ET Flex	SARC 65
DMV	SARC 65

Dredge Efficiency in High Density Areas:
The group noted the continued divergence in dredge and optical estimates in high-density areas of the Nantucket Lightship (i.e. NLS-West, NLS-S-Deep) and Mid-Atlantic Access Area (i.e. ET-Flex, ET-Open). No new analyses are expected at the upcoming PDT meeting, and PDT members on the survey call agreed that using a factor of 3 (SARC 65) would be a reasonable starting point.

Potential areas to consider modifying dredge estimates:
- NLS-W
- NLS-S-deep
- ET-Flex
- ET-Open

Selectivity Curves:
The survey group briefly discussed selectivity curves, noting that the PDT recommended using a different selectivity curve in the NLS-W and NLS-S-deep in the 2018 SAMS projections. When completing the 2019 exploitable biomass estimates, it is reasonable for survey groups to use Yochum and DuPaul (2008) selectivity curves; however, Dr. Hart explained that SAMS model projections of exploitable biomass are based on selectivity curves estimated from the CASA model, which account for gear selectivity (i.e. 4" ring) and fishery selectivity (i.e. targeting larger scallops). Dr. Hart suggested that the PDT could explore using observer data to develop a

selectivity curve in the NLS-S. Council staff have followed up with Dr. Hart and the observer program about obtaining observer data to examine this.

In 2018, the PDT recommended applying the Georges Bank Open selectivity curve in the Nantucket Lightship-West and South-deep area to select a larger proportion of the 7-year-old animals in this area that are have already recruited to the fishery but are not growing normally.

Figure 2 - Comparison of CASA selectivity curves from SARC 65 with 4" ring curve (Yochum & DuPaul, 2008).