



# Atlantic States Marine Fisheries Commission

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## Shrimp Summer Survey Work Group

May 2019 Conference Call Summary

**Work Group Members in Attendance:** Peter Chase (NEFSC), Maggie Hunter, (ME DMR), Robert Atwood (MA DMF), Dana Hammond (New Harbor, ME), Alicia Miller (NEFSC)

**ASMFC Staff:** Katie Drew and Pat Campfield

### Task from the Shrimp Fishery Management Section

**Move to establish a Working Group to review the summer shrimp survey. The Working Group will provide advice on the operational aspects of the management of the summer shrimp survey. This includes:**

1) Assisting with the development of options that would improve the consistency, reliability, and efficiency of the existing survey.

### CONSISTENCY

*Should we continue sampling fixed stations? Yes. The TC currently uses fixed and random stations in the stock assessment. The new UMaine Statistical Catch-At-Length model uses a standardization method by lat/longs and is therefore capable of handling the blend of random and fixed stations.*

*Can we use strata we haven't relied on heavily in the past? Yes. The assessment model is flexible in its ability to use data from each stratum based on and weighted by the number of stations sampled per strata.*

*Do trends in Summer Survey shrimp catch numbers and composition align with trends from other surveys? Yes. Trends are very consistent with ME-NH inshore trawl survey and NEFSC bottom trawl survey. TC also evaluates cohort tracking between years as metric for Summer Survey accuracy. Most years track cohorts, with a couple of exceptions; ME-NH Spring survey is less correlated. Robert noted the 2019 Spring ME-NH Survey saw an uptick in shrimp catches, though still relatively low; not sure if small males; 2018 Fall Survey was still low.*

*Stratum 5 – why don't we sample there more? Pete said parts are too deep to fish. Southernmost strata typically have low or no catches, plus it's a long steam to get there.*

*Personnel – Pat asked if the survey crew is consistent between years? Pete indicated from NEFSC he always participates for at least 1 survey leg and other seaworthy scientists from*

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NEFSC who are experienced shrimp samplers participate on the other legs. He puts out a call for scientific crew from the states + ASMFC in addition to 2-3 NEFSC scientists who are familiar with shrimp i.d. and FISCUS electronic data entry system. In recent years we've had more transition, including grad/undergrad (??) students. The Center is juggling multiple summer surveys for other target species (scallop, quahog). Maggie noted there have been fewer and different state participants since the shrimp fishery closure.

**Work Group Recommendation 1: maintain a more consistent scientific crew from survey partners, notably Mass DMF who has sent a variety of people in recent years.**

2019 Survey scientific crew: Pete said we're half staffed so far, Robert plans to participate for a leg and another NHFG scientist will go another leg; Maggie indicated a new hire will participate for DMR in 2019.

Weather Issues: the Gloria Michelle can't handle seas beyond 4-6'. It's a shrimp vessel they brought up from the Gulf of Mexico, not well suited for Northeast sea conditions. The Work Group agreed with Gloria Michelle safety practices during the survey, not suggesting to risk safety in order to get tows in rougher seas. Pete mentioned tow success and data quality also is reduced in heavier seas, based on poor net mensuration and lower catch data.

#### RELIABILITY

How do we address mud tows? Mud tows have been common in stratum 1 (Southwestern Gulf). Did the new doors address mud tows? Captain Hammond helped with new door specifications and recommended a new sweep. NEFSC put new sweep on, still seeing mud tows though some improvement with new doors. Pete mentioned in an average year the survey has 5-10 mud tows.

Tow speed: Survey operations protocol defines an average tow speed of 2 knots, noting faster speed may reduce mud tows. If average is slower than 2 knots, the tow results are thrown out.

Tows are excluded if the sweep jumps off the bottom, or door and wing spread are outside of tow protocol. Good tow is defined as 2 knots avg, 15 minute duration, and correct net geometry per net mensuration.

Who is responsible for equipment ops on the Gloria Michelle? There seem to be frequent equipment breakdowns. NEFSC owns the vessel and is responsible for upkeep of equipment and general operations together with the NOAA Corps.

Major systems were upgraded within the past 5 years, including dry dock to inspect hull. Winch issues have been the most common trouble. NEFSC has since bought and tested new winches. Pete is working with the NOAA captain again this Spring on systems check and ensuring vessel has redundant systems. He notes the 2019 Mass DMF Spring trawl survey on the Gloria Michelle did not have vessel issues.

## EFFICIENCY

*We need to improve the number of stations sampled per survey, after a number of missed stations in 2018. NOAA crew and NEFSC scientists routinely scouting to find good bottom. Is putting a shrimp fishermen onboard feasible? Yes, Pete contacted Captain Hammond about participating on one week leg. Maggie also recommends contacting Bob Tetrault, captain of F/V Robert Michael, the survey vessel for the ME-NH Trawl Survey.*

*Can we use a historical database of tows to identify past successful tow areas? Yes. Pete already does this using maps that show historical tow locations; the map is used as a last resort to find towable stations, if the pre-selected stations or alternate stations are deemed untowable by the captain. Downeast Maine is particularly challenging (Strata 6 and 8).*

***Recommendation 2: Recruit a shrimp captain to go on survey legs with challenging strata.***

*In challenging areas, can we bypass random selection and pick known successful sites? NEFSC does so with alternate sites in order to not waste time searching for towable bottom. We need to balance station selection exceptions with data needs for other species. Maintain sufficient random sampling to preserve statistically representative sampling.*

***Recommendation 3: Keep a spare net onboard. Currently the Gloria Michelle has been limited by deck space in recent years and unable to carry a spare.***

2) Evaluating the ability to incorporate the commercial industry into the survey, including assessing the consequences of transitioning the shrimp survey to a commercial platform.

*Are we seeking shrimp captains input in an advisory role only, or to also explore using industry vessel for survey? Both. We would like fishermen input on stations selection – preferably onboard during survey legs. If unable to go on survey, captains' input during pre-survey stations selection is desired.*

*Can we pay shrimp captains to participate on survey? Yes, NEFSC would make room on vessel and in past cooperative research projects has compensated fishermen. Captains need to submit a resume through independent contractor NEFSC uses. Target captains' participation during legs 1 and 2 during the second half of July. Check with Tetrault (Maggie to contact), Dana (follow up with Pete), Goethel, and Shrimp Advisory Panel members.*

***Recommendation 4: During Survey planning, share station strata with captains for input on towable bottom. Consider implications of and avoid violating non-random station selection.***

*Does the Work Group recommend continuing on the R/V Gloria Michelle as the survey vessel or explore northern shrimp fishery vessel for survey conduct? Unclear, we need to develop scenarios with details on alternative vessel capabilities and associated costs relative to status quo. Operations and budget categories include personnel, equipment, supplies, electronic data entry system (or revert to paper data collection), data post-processing and associated servers.*

*If the survey used a different boat, who takes over survey operations? Can one of the states run the survey? Robert indicated NHFG running the survey is not likely, would require a new hire at a minimum. Maggie indicated DMR might be able to run the survey.*

*Pete outlined a total cost of \$126K to run the survey. ~\$90K pays for running the Gloria Michelle, supplies costs, and personnel overtime. Substantial additional survey support is provided in-kind by NEFSC. Notably, Pete's planning and coordination time, IT staff time. Total costs are likely higher on another vessel if NEFSC in-kind support is not part of the program.*

*R/V Gloria Michelle: 65-footer, endurance of 6-days, birthing for 10 (6 scientists, 4 crew), cost is \$4,400/day including fuel*

*F/V Robert Michael: 54-footer, daily endurance for inshore trawl survey, Dana says possibly longer endurance for shrimp sampling, birthing for 7-8 people, cost is \$3,710/day including fuel, captain, and 2 crew + \$1,800 for days loading/offloading gear*

*A NEFSC Cooperative Research Fleet vessel is likely \$10-12K/day + vessel calibration, requires contracting for 5-year durations (no fishing during survey period). We asked Pete to check on options for a larger vessel. He is not certain vessel of similar size to the Gloria Michelle is available. NEFSC pursuit of another vessel to dock at Woods Hole; Pete has asked in the past if NEFSC could buy a cheap 90-foot trawler. Nothing came of it.*

*Are there other Research Vessels in New England capable of survey conduct? Pro: larger, better suited to the Gulf of Maine. Con: R/Vs typically fish 24-hours around the clock, while shrimp survey only samples during the day. R/V Hugh Sharp and R/V Connecticut (80-90'; ~\$12K) from the UNOLs fleet are capable but even more expensive.*

*Cons: Running the survey on an F/V would likely have a higher cost. A smaller F/V (50-footer) also presents challenges for weather, endurance, and crew birthing. A larger, faster vessel (90-footer) could handle rougher seas and accomplish stations more quickly, though likely at higher costs.*

*If the survey switched to an industry vessel, between vessel calibration tows and adjustments would be needed. In some sense, vessel switch would mean the start of a new survey and time series. Pete thinks it's better to keep a 40-yr time series going. The Work Group also noted a potential inefficiency and poor use of funds to do new door and winch calibration tows in 2018 and 2019 on the Gloria Michelle, only to then switch to a new vessel where additional calibrations would be needed.*

***Recommendation 5: Develop scenarios for conducting the Survey aboard commercial vessels, including detailed comparisons of vessel capabilities and associated costs.***

3) Understanding the data needs of other species from the survey and ensuring these data are not lost.

*The Work Group discussed the use of Summer Survey catch data for species other than shrimp. Alicia and Pete have asked around the NEFSC Population Dynamics Branch in the past and described a list of 10+ species for which the data are used in stock assessments or other technical work to inform fisheries management. Other species include sea herring (adult index), hakes, witch flounder, monkfish, and dogfish.*

*Alicia noted the summer survey catches species not represented well in the Spring or Fall bottom trawl surveys. The Summer Survey also does CTD casts – the only offshore CTD sampling in summer – which is valuable across species for incorporating environmental variables in a variety of NEFSC analyses.*

*How are data for other species used specifically? Are they abundance indices in stock assessments, biosampling for assessment life history parameters? Are CTDs used formally in tracking oceanographic trends? The group asked Alicia to write a short 2-page summary of other species caught in the Summer Survey and how the data are used. She will inquire with the rest of the NEFSC Population Dynamics Branch again, as well as the Ecosystems Branch and NEFSC Oceanographers, regarding data uses. The group requested data use summary by the end of June.*

***Recommendation 6: Consult with the NEFSC Population Dynamics and Ecosystem Branches to determine whether Survey catch data for other species are vital or supplementary for stock assessment, ecosystem analyses, and other fishery management purposes.***

Pat mentioned the comments and recommendations on the Summer Survey from the 2018 Stock Assessment Review Panel. Pete expressed interest in pursuing station re-stratification as a potential adjustment to the survey. It is up to the Shrimp Technical Committee to decide status quo, or re-stratify. Pete/NEFSC will implement the TC's stratification definitions.

### Guidance from the 2018 Stock Assessment Review Panel

- Use Sea Surface Temperature (SST) anomalies to account for changes in stations, survey timing, etc.
- Should we still continue to stratify the survey? Yes. But where the strata are the most appropriate ones is a different question. You could add bottom type as a stratification variable since it was so useful to the assessment model. Panel suggests as a research recommendation to review/assess stratification.
- Fishery independent priority: continue summer shrimp survey despite low abundance; explore ways to sample age 1 and younger shrimp. Summer survey is important to monitor the population.
- How damaging would a gap in survey data be to run the survey model? It would be damaging in the ability to track a potential recovery. We wouldn't know how or why it recovered. Would be suspicious of higher population values without the complete time series of data.
- Summer survey could also be the first place that you see changes in distribution due to temperature changes.
- GMRI has been looking at an acoustic survey for shrimp, but you get much more information from the summer survey (biosampling for lengths, sexes). Acoustic survey could be considered as a less preferred option if the summer survey is discontinued.

### Technical Committee Research Recommendations from the 2018 Stock Assessment

- Continuing sampling through Shrimp Summer Survey despite the current low abundance of shrimp and the closure of the shrimp fishery in 2013 (high priority, long term)
- Evaluate potential benefits of re-stratification of the ASMFC Shrimp Survey. Two strata have already been dropped, and the remaining strata may be less optimal. Given the possibility that shrimp may move to deeper waters as surface waters warm, higher depth resolution of strata may be useful (moderate priority, short term).

<b>Species</b>	<b>Shrimp Survey Data Used in Assessment?</b>	<b>How?</b>	<b>Impact of Survey Changes</b>
American lobster	not yet	Data has been explored but not currently used with the assessment. May be useful in the future as their distributions shift.	
Jonah crab	not yet	Data has been explored but not currently used with the assessment. May be useful in the future as their distributions shift.	
Longfin and Illex squids	yes	Used to determine relative abundance and biomass in the GOM because it occurs during the summer when both species are present in the GOM.	Changes to the survey vessel or design would impact both squid time series if the indices used in the computations are no longer sampled or if the current stratified random design is changed.
Atlantic herring	yes	Used as an index of abundance.	The consequence would depend on the type of change. A minor change (stratification) might only affect survey precision, which can be easily accounted for in the assessment. A vessel or gear change might make the survey useless for assessment for several years unless some extensive calibration study is completed. Herring otoliths just started being collected during this survey last year. Thus, any changes to vessel or gear would also undermine these aging efforts.
red crab	not officially	Abundance and size are tracked over the years but not as an official index.	
witch flounder	yes	ASMFC shrimp survey provides useful information on relative trends in abundance, biomass, distribution, and recruitment and this survey has been used as age-specific tuning indices in past analytical stock assessments. Length frequency data has been used; age structures are not collected, but age-specific indices, mean weight at age, mean length at age were derived by applying annual NEFSC spring and fall (combined) age length keys. The survey is currently used to provide corroborative information.	Changes to the vessel (without calibration) or changes to survey design changes could end this time series. Depending on the type of changes to stratification, it may or may not impact the time series. For witch flounder, strata 1, 3, 6, and 8 are used.
pollock	not yet	There is a recommendation that the shrimp survey be considered for possible inclusion in the pollock assessment during the next pollock benchmark	
monkfish	yes	Used as an index of abundance.	It would impact the time series continuity. It is the only survey we have that hasn't had major changes in operations, so its continuity is especially valuable.
white hake	yes	Used as an index of abundance.	Would disrupt the time series.



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## **Shrimp Summer Survey Work Group Update** Northern Shrimp Technical Committee meeting

October 2, 2019

### Improving survey operations and station success rate

1. In June 2019, 11 paired door calibration tows were completed; to date, a total of 39 paired door calibration tows have been completed
2. For the 2019 Survey, Capt. Dana Hammond (New Harbor, Maine) was contacted prior to the survey regarding station selections relative to towable vs. un-towable ground; no comments were received (***Survey WG Recommendation #4***)
3. NEFSC maintains a database that can be used to produce charts of historical tow locations; if the randomly selected stations or alternate stations are deemed untowable, the charts can be referenced as a last resort to find areas with towable bottom; the charts provided do not specify exact starting and ending Lat/Lons for historical tows
4. Capt. Hammond was scheduled to participate on Leg 2 of the 2019 Survey and later notified NEFSC that he was unable to go; Capt. Rob Tetrault was also consulted prior to the survey but was unable to participate (***Survey WG Recommendation #2***)
5. For the 2019 Survey, 83 of 84 planned stations (98.8%) were successfully completed with usable tow and catch data

### Assess the consequences of transitioning the shrimp survey to a commercial vessel

6. Daily cost estimates for F/Vs were collected, ranging from \$3,700 – \$10,000 per day, compared to the R/V Gloria Michelle's \$4,400 per day; costs for larger, seaworthy university vessels were also collected, ranging from \$7,310 – \$12,000 per day (***Survey WG Recommendation #5***)
7. Substantial in-kind support is provided by NEFSC to run the survey, in the form of survey planning, coordination, and scientific crew time, data management, and other services; switching the survey to a state agency operation on a commercial boat may require hiring new or rededicating state agency personnel
8. If the survey switched to an industry vessel, between-vessel calibration tows and adjustments would be needed. Without calibrations, a vessel switch would essentially mean the start of a new survey and time series.
9. More detailed cost estimates and operational roles are still needed to fully respond to the Section task regarding a vessel change

Understanding the data needs of other species from the survey

10. NEFSC generated a summary of Survey data uses in stock assessments; data are currently used in stock assessments for 7 species. There is potential for survey data use in assessments for 4 additional species. **(Survey WG Recommendation #6)**
11. The Summer Survey catches species not represented well in the Spring or Fall NEFSC bottom trawl surveys, filling a key information gap for several stocks, plus CTD data