



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
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Christopher M. Moore, Ph.D.
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901-3910

Dear Chris,

Thank you for providing the final report from the Mid-Atlantic Council SSC review regarding the NEFSC Working group report on proposed changes to the Atlantic surfclam and ocean quahog survey. We will publish the SSC review and the Working group report together as a 2018 CRD. Additionally we will publish the enclosed NEFSC response to the recommendations provided in the SSC review.

NEFSC appreciates the time and effort the SSC put into this review, and would like to thank, in particular, the review subcommittee of Ed Houde, Mike Wilberg, Olaf Jensen and Rob LaTour. The review and recommendations were very helpful in completing the redesign of the clam survey.

Sincerely,

Jonathan A. Hare, Ph.D.
Science and Research Director



NEFSC Response to Reviewer Recommendations

Recommendations

Based on its review, the Subcommittee provides several recommendations. Some recommendations can be addressed as edits to the WG Report. Others should be taken under advisement by the NEFSC and considered to improve survey design in the longer-term. And, some recommendations are Research Recommendations that could be added to those already identified by the WG.

1. Recommendation. ToR 2. The analysis in the WG Report does not directly consider how alternative survey designs might affect utility of the survey for the fishing industry. The Subcommittee recommends that the NEFSC address this need and provide a brief discussion of benefits and utility of the new design to industry in the WG Report.

Response:

Industry currently uses the NEFSC clam survey directly to provide information on previously unfished high density clam beds. Industry also benefits indirectly from the survey when it is used to inform various data streams used in the stock assessment for each species. These include survey trends, absolute abundance estimates, age and length composition as well as biological data such as growth rates and length to meat weight relationships.

The new survey will concentrate on areas of high abundance due to implementation of the one percent rule. It will provide finer spatial resolution due to the expected increase in sample density per unit area. Increased sample density in areas of high abundance should provide the industry better information on the location of dense clam beds and potentially fine scale information on areas of fast growth and high meat weight to length ratios. Areas of faster growth or high meat weight to length ratios are areas that industry deem appropriate for voluntary rotational fishing. In general a higher sample density survey will provide finer spatial resolution information to the industry and should represent an improvement over the current survey.

2. Recommendation. ToR 3. The Subcommittee recommends that a more explicit statement and justification of the proposed schedule for reconsideration of survey design be included in the WG Report. The WG Report proposed that reconsideration of survey design might be undertaken on a decadal basis. In a conference call with the principal authors of the WG Report they indicated this timeframe is a reasonable expectation of what they believe NEFSC can accomplish.

Response:

NEFSC agrees with the reviewers that a regular period for reconsideration of the survey design is desirable. NEFSC recommends that a term of reference should be included in new research track stock assessments for clams that explicitly requires a reconsideration of survey design. NEFSC recognizes that the proposed survey, which should yield finer spatial resolution, may provide a basis for considering model based stratification schemes and simulation testing (see Recommendation 5 below). Although evaluation of survey design is a Center priority, NEFSC cannot commit to a decadal reconsideration of the survey outside of the stock assessment process due to the relative expense of such an undertaking, and the uncertain availability of funding. However, the research track stock assessment process is likely to allow for at least decadal consideration of the survey design, and may result in less than a 10 year cycle.

3. Recommendation. ToR 3. The WG Report should acknowledge that, under the new proposed survey design, schedules for stock assessments will change. Under the new design, stock assessments should be conducted every four years for surfclam and every six years for ocean

quahog. The Subcommittee recommends that the change in assessment schedule be addressed in the WG Report and also directly communicated to the Council.

Response:

NEFSC agrees this is a likely outcome of the switch to the proposed survey. At the time of printing, NEFSC was engaged in an assessment scheduling process involving both Councils, among other clients, and the proposed changes to the survey were reflected there. NEFSC is however, not responsible for the final outcome of the assessment scheduling process, which is ultimately the purview of the NRCC. When a new assessment schedule is developed, Councils and other clients will be involved in the alternative scheduling process through their representation to the NRCC. NEFSC will continue to advocate for a four year schedule for surfclam and a six year schedule for ocean quahog.

4. Recommendation. ToRs 3 and 4. The Subcommittee recommends that the WG Report recognize the need for NEFSC to include a new Term of Reference in future stock assessments for surfclam and ocean quahog should the proposed survey design be adopted. The new ToR should explicitly address the question of whether the survey areas are appropriate. If the distributions of clams shift substantially, the survey strata may need to be modified. This recommendation is especially important for ocean quahog which, under the new survey design, will have updated assessments only every six years.

Response:

NEFSC agrees this is an important requirement for future stock assessments and supports the inclusion of this TOR.

5. Longer-Term Recommendation. ToRs 3 and 4. The Subcommittee recommends that NEFSC consider and evaluate a broader range of alternative survey designs in future considerations of survey efficacy. The Subcommittee notes that the WG conceived new stratification schemes from a design-based philosophy. Geostatistical and other model-based tools now available can be useful for survey design and represent an independent comparative approach that also extends consideration to less traditional survey designs (e.g., hybrid of stratified random and fixed station).

Response:

NEFSC agrees that model based survey designs are a potentially useful tool, and in fact, pursued them early in the survey redesign process. The WG intended to design strata based on environmental covariates and test the design against simulated clam populations as well as existing survey data. Unfortunately, this approach was abandoned after the WG determined that neither the survey, nor most of the environmental data sets available, provided sufficient spatial resolution to be useful. The WG remains hopeful that as both environmental data and proposed survey improve in spatial resolution over time, model based survey designs will become practical.

6. Longer-Term Recommendation. ToRs 2 and 4. The Subcommittee recommends that NEFSC collect additional habitat and environmental data at survey sites. The WG Report's principal authors noted in a conference call that, while such information could be important, there is insufficient time in survey cruises and no funding at present to obtain better data on habitat and biological communities. This is unfortunate because such information would serve to document how long-term shifts or trends in abundance of surfclam and ocean quahog relate to ongoing environmental and habitat changes. Some shifts and trends will be attributable to changing climate but other factors also may be important.

Response:

NEFSC agrees that collecting environmental data is important. However NEFSC does not believe that the clam survey is an efficient way to collect it. The clam survey operates from a commercial platform that is designed to remove non-clam material from the dredge. Sampling for habitat at survey stations would require an alternate collection device, such as a grab sample, or a substantial alteration in the collection protocol. The clam survey is currently run at high capacity and interrupting the survey protocol for the collection of habitat data would come at the cost of reducing the number of random stations in the survey. Optical surveys such as HabCam are likely to be more cost effective for the collection of fine scale environmental data. Optical data is collected continuously on the NEFSC scallop survey and could be post stratified to examine part of the proposed surfclam strata. There is considerable overlap between sea scallops and ocean quahog habitat.

7. Longer-Term or Research Recommendation. ToRs 3 and 4. The Subcommittee recommends that NEFSC and the WG conduct analyses to document changes or shifts in distribution and abundances of the clams. This would ensure that survey designs continue to support future stock assessments. Such evaluations may require a different simulation testing framework than the bootstrapping approach conducted by the WG. A recommended approach would be to simulate spatial fields and sample these fields using the proposed alternative survey design. These fields could be generated using co-kriging (regression against environmental covariates such as depth in combination with kriging) to represent the spatial distribution of the stock and its spatial autocorrelation properties (strength and scale of patchiness).

Response:

NEFSC agrees this is likely a useful approach in time. The current spatial resolution of both environmental data and clam survey stations is not currently sufficient for this purpose. The proposed survey should increase the probability that these techniques will be useful due to the expected increase in sample density.

8. Longer-Term or Research Recommendation. ToR 4. The Subcommittee notes that habitat variables could inform decisions to define survey strata; however, except for depth and latitude/longitude, these were not included in the WG's analysis (excepting its recognition of untowable ground). The Subcommittee believes that bottom type may be a useful variable for defining similarity among strata building blocks. It notes that bottom mapping data exist, e.g., see MAFMC EAFM Guidance Document, and recommends that this be acknowledged in the WG Report and considered as a longer-term or research recommendation.

Response:

NEFSC agrees that bottom mapping data are likely to be useful once they are available at high resolution over a substantially increased proportion of the stock area, particularly Georges Bank, where current data are sparse and the habitat is relatively variable. NEFSC further agrees that habitat mapping should be included in future stock assessments for clams as a research recommendation.

9. Research Recommendation. ToRs 3 and 4. The Subcommittee notes that multivariate techniques for survey optimization (i.e., finding a design that minimizes some combination of the variances for both species) are available. These methods could be tested to define an appropriate base case (i.e., single survey covering both species) against which to compare a survey design in which each species is surveyed separately.

Response:

NEFSC determined early in the survey redesign process that allocation to both species simultaneously performed poorly relative to separating the species. While simultaneous minimization of variance is possible, it is unlikely to be better than separating the stocks while they remain spatially distinct. If however, as we expect, the overlap between the stocks increases, simultaneous minimization of variance may be the better option. NEFSC recommends that this recommendation be part of the TOR for the stock assessment of each species (mentioned above in Recommendation 4).

10. Recommendation. Although not a listed ToR, the Subcommittee notes that costs and economics of alternative survey designs were not evaluated in the WG Report. The principal authors of the report, in a conference call, indicated they did not believe the new design will reduce survey costs. The Subcommittee recommends that an analysis be conducted to provide a projection of proposed survey costs relative to the current survey design.

Response:

NEFSC supports this recommendation and suggests it should be included as a research recommendation in the next clam species stock assessment. Engagement with social scientists would be beneficial in this regard.