Atlantic States Marine Fisheries Commission

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Horseshoe Crab Advisory Panel Conference Call
Meeting Summary

September 21, 2016

Advisory Panel Members: Dr. Jim Cooper (Chair), Allen Burgenson, Benjie Swan, Brett Hoffmeister, Jay Harrington, Rick Robins

ASMFC Staff: Mike Schmidtke (FMP Coordinator), Toni Kerns

1) **Update from October 2016 Board Meeting**

Mike Schmidtke updated the AP on results of the last Horseshoe Crab Board (Board) meeting (October, 2016). At this Board meeting, harvest specifications were set for the 2017 fishing year, with specifications for the Delaware Bay coming from the ARM model, development of Draft Addendum VIII was postponed until after the 2018 stock assessment, the ARM Subcommittee was tasked with conducting alternative runs of the ARM model that incorporated biomedical mortality, and the TC was tasked with conducted a survey of horseshoe crab bait use in the eel and whelk fisheries.

2) **Review 2017 ARM Model Run** (*M. Schmidtke*)

Mike Schmidtke presented information about the 2017 run of the ARM model for the Delaware Bay region. The model has two types of thresholds that impact potential harvest package selection. If female horseshoe crabs are less than 80% carrying capacity (approximately 11.2 million female crabs) and red knots are less than 81,900 birds in the superpopulation estimate, no female harvest options will be selected by the model. If the spawning beach sex ration falls below 2 males to 1 female, no male harvest options will be selected by the model.

Brett Hoffmeister commented that the potential scenario of a large female population that would lower the sex ratio below the 2 male to 1 female threshold. Rick Robins commented that the sex ratio used is that on the beach during spawning and is an operational ratio, attributable to spawning behavior and generally significantly higher (more males) than that of the population as a whole. Current spawning beach populations of horseshoe crab are heavily male-skewed and have exceeded the 2 male to 1 female threshold in every year the ARM model has been run. The sex ratio threshold was originally intended to ensure an adequate number of males are available to allow horseshoe crab population persistence under conditions of male-only harvest. However, if the case occurred that the female crab population threshold is exceeded and the sex ratio threshold is not, harvest package options for this population may need to be reconsidered.

Benjie Swan asked about the potential of re-evaluating these threshold levels, stating that due to current and historical levels and trends in horseshoe crab and red knot populations, attaining either of these threshold levels may be unrealistic. The AP generally agreed that an 80% carrying capacity female crab threshold is much higher than comparable threshold levels used for other species, while recognizing that a higher threshold is needed due to the multispecies management approach being used by the ARM. Mike Schmidtke commented that threshold levels used in this model go beyond the capacity of ASMFC alone and would require cooperation from other agencies that are more informed of red knot management and population needs. Rick Robins commented that the Commission should be commended for the conservative nature of the ARM model and the recent stability, particularly in the bait fishery, that has resulted from this approach.

Red knot abundance in 2017 (49,405 birds) increased from 2016, but with shorter stopover duration by approximately 3 days. Horseshoe crab abundance in 2016 was estimated by the Virginia Tech Horseshoe Crab Trawl Survey as 25.4 million males and 7.7 million females. Neither female horseshoe crabs nor red knots exceeded their population thresholds, thus female harvest package options were not available in the 2017 run of the ARM model. The ARM model selected harvest package 3 (500,000 males; 0 females) as the recommended 2018 harvest quota for the Delaware Bay region.

3) **Alternative ARM Model Runs Incorporating Biomedical Mortality**

At the last Board meeting, the ARM Subcommittee was tasked with performing alternative runs of the ARM model that incorporated biomedical mortality data. Runs were completed using 3-year averages of biomedical mortality in the Delaware Bay. Biomedical mortality is currently calculated as the number of horseshoe crabs reported as observed dead during the collection, transport, and handling processes plus 15% multiplied by the number of crabs bled.

The AP expressed concern with the 15% estimated mortality rate, generally indicating that they believe this rate to be lower. Brett Hoffmeister commented that adding observed mortality to the estimated 15% exacerbates the issue by increasing the effective mortality above 15%. Several members of the AP agreed, stating that they had the initial impression that the 15% rate encompassed all steps of the biomedical process. In an email following the call, Mike Schmidtke explained that the 15% rate is not all-encompassing because it is applied only to bled crabs rather than all crabs collected. Mortality at steps prior to bleeding is reported annually and then added to 15% assumed to occur as a result of the bleeding and release stages of the biomedical process.

Jay Harrington commented that the biomedical industry typically bleeds adult crabs and that natural mortality is not explicitly accounted for by the 15% estimated mortality rate. While natural mortality is not explicitly accounted for in this estimate, this estimate is not intended to evaluate sustainable collection levels of crabs for biomedical purposes, because biomedical collections are not limited by a quota. This rate is intended to only to annually estimate the amount of mortality occurring due to biomedical collections. Sustainability of these collections

and all methods of removals, will be evaluated via natural mortality and other population descriptors through the upcoming stock assessment process.

Two methods were chosen by the ARM Subcommittee for incorporating biomedical mortality into the ARM model. The "Preferred" Option of the ARM Subcommittee subtracts biomedical mortality estimates in the Delaware Bay region from the current harvest packages. Rick Robins commented that this approach should be adjusted such that the biomedical catch is incorporated as additive to the bait quota since both fisheries have operated in parallel prior to implementation of the ARM and it is not biologically or ecologically necessary to put these fisheries in conflict with respect to quotas from the harvest packages. The "Minority" Option adds biomedical mortality as a removal source (similar to bait harvest) in the population dynamics model, with no change to the harvest packages. Neither option for incorporating biomedical mortality resulted in drastic changes to harvest package selection or frequency in the resulting decision matrix. ****The AP recommends that since incorporation of biomedical data made little difference to the results of these runs, that biomedical data should not be incorporated into annual ARM model runs to recommend harvest specifications****. Several AP members agreed that use of the "Preferred" Option could compromise the confidentiality of facilities outside of the Delaware Bay region. Therefore, ****the AP recommends that if the Board pursues incorporation of biomedical data into annual ARM model runs, it should be done through the "Minority" Option of adding biomedical mortality as a removal source in the internal population dynamics model****.

4) **2018 Stock Assessment Procedures**

Mike Schmidtke presented the draft Terms of Reference and assessment timeline. Dr. Jim Cooper asked if there would be a time for AP participation in the assessment. Mike Schmidtke explained that the assessment is conducted by the Stock Assessment Subcommittee (SAS), with assistance from the Technical Committee (TC) as needed. The AP may view the final assessment, but does not have a role in its development. The AP would have a role in reviewing any management decisions that are made as a result of the assessment.

Mike Schmidtke explained the assessment workshops and how confidential data would potentially be handled at each step of the assessment. Prior to the Data Workshop, a press release will be published requesting horseshoe crab data. Of interest to several members of the AP is the biomedical component of data requested. Studies describing mortality at various steps of the biomedical process, particularly during bleeding and post-bleeding, would be useful in evaluating biomedical mortality levels. Dr. Jim Cooper commented that a preference for peer-reviewed literature, specifically non- or reduced consideration of studies conducted by biomedical companies and state agencies that are not in the peer-reviewed literature, could eliminate the most useful information available on post-bleeding mortality. Dr. Cooper further commented that some studies found within the peer-reviewed literature drastically depart from biomedical practices to the point that these studies would misinform biomedical mortality estimates. The Data Workshop is tentatively scheduled for January, 2018, so all data submissions should be received by then.

The AP expressed concern with literature that supports biomedical mortality rates greater than 15%. The AP feels that methods used in these studies were not consistent with those of biomedical facilities. Furthermore, several of these studies were conducted prior to the establishment of the biomedical best management practices (BMP). As biomedical practices have evolved and improved over recent years according to standards set by the BMPs, the practices of those studies are less consistent with current methods employed by biomedical facilities. Benjie Swan commented that she would submit a review evaluating these studies for future consideration by the Board and other Committees.

Mike Schmidtke explained that the Data Workshop is where submitted data will be considered for use in the assessment. All SAS members are required to gain confidential data access from all states submitting confidential data prior to viewing confidential data at the Data Workshop. Confidential access will be requested by SAS members for each state involved in the horseshoe crab fishery (Florida-Massachusetts) using the Atlantic Coastal Cooperative Statistics Program's Confidential Access Request application (as well as additional state-specific applications, where required). Within the application process and under direction of the Commission's Fishery Data Use Policy, SAS members will not be allowed to publicly distribute or discuss confidential assessment information. Additionally, SAS members will not be permitted to use confidential assessment information for purposes outside of the assessment. When confidential data is discussed at the Data Workshop, doors will be closed (both figuratively and literally) to those TC members who are not authorized to view confidential data. If questions arise about confidential data, they will be conducted in a closed-door session with the SAS and the TC representative of the providing state.

At the Assessment Workshop, the SAS applies models to the data from the Data Workshop. This meeting will only include SAS members. Confidential data may not be shown in the published Assessment Report. The SAS and ASMFC Staff are still considering potential options for handling confidentiality at this step of the assessment. One potential strategy under consideration is to have two Assessment Reports, one including confidential data for Peer Review and the other without confidential data that can be made public.

At the Review Workshop, a Peer Review Panel evaluates the Assessment Report. All Peer Review Panel members will be required to gain confidential access from all states submitting confidential data prior to viewing an Assessment Report that includes confidential data. Confidential data may not be shown in the published Review Report. ASMFC Staff are still considering potential options for handling confidentiality at this step of the assessment. One potential strategy under consideration is to have two Review Reports, one including confidential data to provide feedback for the SAS and the other without confidential data that can be made public.

This assessment is the first time that biomedical data is being included in the assessment process. As such, several members of the AP feel that evaluation of studies used to estimate biomedical mortality should be conducted by someone who has familiarity with methods used in the biomedical industry. Dr. Jim Cooper commented that at least one reviewer should be a

scientist from the biomedical community that can critically review the methodology of scientific studies used to estimate mortality associated with biomedical bleeding of horseshoe crabs. Toni Kerns explained that Peer Review Panels may be selected through the Center of Independent Experts or from federal or university scientists that have an expertise on multiple aspects of the assessment. Therefore, someone who has knowledge of the biomedical bleeding process may be considered if he or she has expertise in other areas of the assessment such as population dynamics or assessment models, but would be less likely to be considered as strictly a biomedical specialist.

5) **Other Business/Adjourn**

Jay Harrington commented on indirect interactions of horseshoe crabs and red knots that are not currently accounted for by the ARM model. Horseshoe crabs are known to feed on shellfish. Red knots have been documented to feed on similar types of shellfish in addition to horseshoe crab eggs. Jay proposed that in a way, the ARM model may be conflicted as horseshoe crabs or red knots increase and compete for similar food sources. Additionally, Jay commented that literature indicates that horseshoe crab abundance levels are not correlated with red knot survivorship or reproduction. Jay will be submitting a memo outlining literature on the relationship between horseshoe crabs and red knots.