

**Atlantic States Marine Fisheries Commission**  
**Horseshoe Crab Advisory Panel Report**

**November 29, 2011**

**Participants**

Dr. James Cooper (NC), Chair  
Dr. Mick Dawson (MA)  
Rick Robins (VA)  
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The Horseshoe Crab Advisory Panel (AP) met via conference call on November 29, 2011, to review the Draft Addendum VII to the Horseshoe Crab Fishery Management Plan. The AP agreed that the best option for management of the horseshoe crab bait fishery was to move forward with implementing the Adaptive Resource Management (ARM) Framework, Option 3, as it provides a sound, scientifically-based recommendation for harvest of horseshoe crabs while still considering the needs of the red knots. The AP had previously reviewed suboptions 3a-d under Option 3 in May 2011 and noted that the situation in the industry had changed in 2011. The market became extremely bait-limited, causing shortages during and especially at the end of the year. Even without these changes in the bait industry in 2011, the AP expressed frustration that the addendum process does not necessarily include economic information on the options.

Thus, the AP worked to include some information on what potential economic impacts that may result from the addendum in this report. Bernie's Conchs, LLC, is the major purchaser of conchs from Virginia Beach to the eastern shore of Maryland. The company provided 2011 fourth quarter information on the use of horseshoe crabs for bait and the resulting ex-vessel value paid to fishermen for the conchs caught using the horseshoe crabs. From October 1 through December 31, 2011, Bernie's Conchs, LLC, purchased 394,805 pounds of conch shellstock at a price of \$750,129. For these harvests, 37,059 female horseshoe crab equivalents, or 74,118 male horseshoe crab equivalents (2:1 ratio) were used. Thus, each female horseshoe crab equivalent (or 2 male horseshoe crab equivalents) yielded, on average, 10.7 pounds of conch shellstock with an ex-vessel value of \$20.24, based on the shellstock purchase price of \$1.90 per pound.

With these potential economic impacts accompanied by the observed changes in the 2011 bait market, the AP emphasized that the implementation of a Delaware Bay Stock Allowance option, can have major impacts on the industry. Using the most recent 2011 data provided by Bernie's Conchs, LLC, eliminating female harvest in Virginia could have a potential economic impact of over \$200,000 on the ex-vessel value of conch shellstock that could be produced with that amount of bait. Using the same data, the potential impact of eliminating female harvest in Maryland could reduce the ex-vessel value for conch shellstock possible from that bait by \$860,000. The AP recognized these options represent a slight departure from the ARM recommendations but also noted that the impacts of New Jersey's moratorium would have a higher impact on deviating from perfect ARM implementation in terms of total number of crabs. Although there was no consensus to support a 2:1 offset in males, it would, under some circumstances, improve the implementation of the ARM Framework, notwithstanding New Jersey's moratorium on harvest. In terms of specific options for Suboptions 3a to 3c, the AP did

not have any changes in recommendations from its May meeting. The recommendations are pasted below for reference.

*Option 3a, Lambda*

**The consensus recommendation from the AP is that the lambda values fall between the values based on the tagging data (Option 1) and those based on the genetics data (Option 3). The AP recommends that the Board consider these two sets of values as ends for a slot for determining the lambda values for use in future management.**

*Option 3b, Weighting allocation*

**Thus, the majority recommends that the Board base the proportional allocation of the ARM harvest on Addendum VI quota allocations; the minority recommends that the Board based the proportional allocation of the ARM harvest on RPLs.**

*Option 3c, Harvest cap*

**The AP agrees with the DBETC and recommends a harvest cap based on Addendum VI quota allocations to cap the non-Delaware Bay harvest of Maryland and Virginia. Further, the AP recommends that the Board include review of the harvest cap and its level as a high priority in the normal course of double-loop review process of the ARM model.**

*Option 3d, Delaware Bay Stock Allowance*

The AP recognized the importance of having a scientifically-based harvest level for horseshoe crabs that also considers the needs of red knots. In order to provide the Board with additional economic information, the AP included data from Bernie's Conchs, LLC, on the ex-vessel value of the conch harvest, which uses horseshoe crabs as bait. These data indicated that prohibiting female harvest in Maryland and Virginia would have a potential economic impact of over \$1 million in relation to the ex-vessel value of the conch shellstock. These estimates do not include the value of the horseshoe crab harvest or the processed whelk products.

Maintaining the female harvest at status quo levels amounts to less than 80,000 crabs in total harvested by Maryland and Virginia, of which less than half are of Delaware Bay origin (assuming lambda values set at 0.51 for Maryland and 0.35 for Virginia). The most recent estimates available for the Delaware Bay population indicate a population level over 8 million crabs (2010 Virginia Tech survey). In addition, the stock assessment in 2009, which passed peer review, suggested a female population of over 9 million crabs (ASMFC 2009). In comparing these overall population estimates to the recommended levels of the Delaware Bay Stock Allowance, sustaining the current female catch is minimal. **Thus, the AP recommends that the Board allow a level of Delaware Bay Stock Allowance to maintain current female quotas in Maryland and Virginia.**

*Option 3e, Delaware Bay Stock Allowance with additional 2:1 male:female offset*

The AP recognizes the tremendous amount of political pressure to continue to reduce the female harvest of Delaware Bay crabs, which has over time shifted the harvest to be male-biased. New Jersey's moratorium further impacts the bait market and implementation of the ARM model. **The majority of the AP recommends that, should female harvest be limited or prohibited, the Board include a 2:1 male:female offset, allowing a larger harvest of males and a**

**potentially more-perfect implementation of the ARM harvest. The minority recommends against the 2:1 offset being automatically invoked.** The minority noted that the ARM model, as implemented under this addendum, provides the Board with the flexibility to review the ARM model's total impact and account for additional needs on a case-by-case basis.

*Option 3f, Plan B for management*

The AP agreed that the Board should consider the best available scientific information, should the specific data needed for the ARM Framework not be available. **Thus, the AP recommends that a contingency plan for management be included in the addendum, and the Board use its resources to consider which option would be most appropriate.**

Conclusion

In summary, the AP supports the implementation of the scientifically-based ARM Framework and harvest output. The ARM Framework is a tool for the Board to use in its management of horseshoe crabs and incorporates multiple review processes to assess its full impacts. The AP highlights the potential economic impacts without a Delaware Bay Stock Allowance option, which compared to the current estimated population levels, is a minimal adjustment. The economic impacts, using the 2011 fourth-quarter values of conch shellstock ex-vessel value and the amount of bait that would be lost by prohibiting female harvest in Maryland and Virginia, could amount to over \$1 million, not including the loss of the ex-vessel harvest value of the horseshoe crabs or of the processed whelk products. For future work on the ARM Framework, the AP recommends that the Board consider adding additional harvest packages, such as a 600,000-male only harvest, and incorporate reassessment of the allocation options into the double-loop review process. The AP emphasized the importance of continually reviewing and updating the ARM Framework and harvest options through the review process.

1) *Lambda,  $\lambda$*

**The AP recommends lambda values set between the values obtained from the tagging data and values obtained from the genetics data.**

2) *Allocation weights,  $w_i$*

**The AP did not have consensus on which option to weight the harvest. The majority favored using the Addendum VI levels; a minority opinion favored using the reference period landings. There was no support for using the average landings.**

3) *Harvest cap for Maryland and Virginia*

**The AP agrees with the DBETC and recommends a harvest cap based on Addendum VI quota allocations to cap the non-Delaware Bay harvest of Maryland and Virginia. Further, the AP recommends that the Board include review of the harvest cap and its level as a high priority in the normal course of double-loop review process of the ARM model.**

- 4) *Delaware Bay Stock Allowance (DBSA)*  
**The AP recommends that the Board allow a level of Delaware Bay Stock Allowance to maintain current female quotas in Maryland and Virginia.**
  
- 5) *Delaware Bay Stock Allowance with 2:1 male:female offset.*  
**The majority of the AP recommends that, should female harvest be limited or prohibited, the Board include a 2:1 male:female offset, allowing a larger harvest of males and a more perfect implementation of the ARM harvest. The minority recommends against the offset, noting that flexibility to modify the harvest already exists within the ARM Framework implementation.**
  
- 6) *Plan B for management*  
**The AP recommends that a contingency plan for management be included in the addendum and the Board use its resources to consider which option would be most appropriate.**