GENERAL ASSEMBLY
STATE OF DELAWARE
411 LEGISLATIVE AVENUE
DOVER, DELAWARE 19901

Caitlin Starks, Senior FMP Coordinator
1050 N. Highland Street
Suite 200A-N
Arlington, VA 22201
Email: Comments@asmfc.org

October 16, 2024

RE: Horseshoe Crab Management Board, 2025 Delaware Bay Bait Harvest Specifications

Ms. Starks:

We, the undersigned legislators in the Delaware General Assembly, are submitting these comments for consideration by the Horseshoe Crab Management Board as they consider final action on the 2025 Delaware Bay Bait Harvest Specifications at their meeting on October 21st.

We continue to oppose the harvesting of female horseshoe crabs. Along with the rationale as described in the attached previous letter submitted to you on September 27, 2022, which we restate with this correspondence, we state as additional bases the following:

1. The harvesting of female horseshoe crabs runs contrary to the consensus recommendation of the stakeholder group designed by ASMFC which included environmental NGO's, fishing, biomedical, bird and horseshoe crab scientists and management perspectives in an effort to foster consensus. Their consensus recommendation was that "ASMFC should continue to run the ARM by default with a recommendation to pause female harvest in the meantime (i.e., while the other recommendations listed are implemented and stakeholder input is further considered)." See page 39 of 249 in briefing materials released by ASMFC for the October 21, 2024 meeting of the Board.

2. Graphs showing the abundance indices of female horseshoe crabs and male horseshoe crabs (Figure 4 on page 55 and Figure 5 on page 56 of 249, respectively) show a continuous decline of both since 2018. Graphs and charts of newly matured females (Figure 3 on page 67 and Table 6 on page 80 of 249) also show an alarming decline since 2018.

We understand that there has been no harvesting of female horseshoe crabs in Delaware since 2006. The question today is whether the population has so rebounded that now a restart of the female harvest is appropriate. We do not believe that this is the case and stand in opposition.

Sincerely,

Senator Stephanie Hansen, 10th District
Chair, Senate Environment, Energy, and Transportation Committee

Representative Debra Heffernan, 6th District
Chair, House Natural Resources and Energy Committee

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Senator Russ Huxtable, 6th District
Vice Chair, Senate Environment, Energy, and Transportation Committee

Representative Sophie Phillips, 18th District
Vice Chair, House Natural Resources and Energy Committee

Senator Laura Sturgeon, 4th District

Representative Kimberly Williams, 19th District

Senator Kyra Hoffner, 14th District

Representative Cyndie Romer, 25th District

Representative Madinah Wilson-Anton, 26th District

Representative Eric Morrison, 27th District

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Suite 200A-N
Arlington, VA 22201
Email: Comments@asmfc.org

RE: Comment on Horseshoe Crab Draft Addendum VIII September 27, 2022

Ms. Starks:

Thank you for allowing us this opportunity to comment on the Horseshoe Crab Draft Addendum VIII currently before the Atlantic States Marine Fisheries Commission (ASMFC).

As a coastal state and the lowest-lying state in the country, Delawareans rely upon a healthy coastal ecosystem and responsible coastal resource management decisions. Not only is this important for our physical and environmental health, but our economic health as well. Our Inland Bays contribute $4.5 billion yearly into our economy and over 35,000 jobs through tourism, recreation, the real estate market, and our emerging commercial aquaculture industry.[1] Outdoor recreation alone contributes $202 million yearly into the local economy and supports more than 2,300 jobs.[2]

All of this is to highlight that a broad ecosystem approach to resource management is imperative. The Adaptive Resource Management (ARM) Framework approach to managing the horseshoe crab bait fishery takes into account population models for horseshoe crabs and the endangered red knot shorebird as there is a special relationship between these species. The objective of the ARM Framework is stated as:

> *Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity, provide adequate stopover habitat for migrating shorebirds, and ensure that the abundance of horseshoe crabs is not limiting the red knot stopover population or slowing recovery.*[3]

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[1] Hauser, C. A. and Bason, C. W. (2022). *The economic value of the Delaware inland bays.* Delaware Sea Grant College Program, Delaware Center for the Inland Bays, p.21.
[2] Id., p. 19.
[3] Atlantic States Marine Fisheries Commission (ASMFC). (September 2022). Draft addendum VIII: Implementing recommended changes from the 2021 ARM revision and peer review report [PowerPoint slides]. Retrieved from: https://register.gotowebinar.com/recording/7478982971381519119

Our concern is that the ARM Framework is too narrow in its focus and does not approach the issue of what constitutes a healthy population of horseshoe crabs from the right direction. Its concern is largely with maximizing harvest for the commercial fishing industry that uses horseshoe crabs as bait (the conch (whelk) and eel fisheries) while doing no further damage to the crab and red knot populations, not with developing a healthy eco-system made up of many interdependent species. There are many other species, some threatened or endangered like our new state sea turtle, the Loggerhead, and other Diamondback terrapins that depend upon horseshoe crab eggs for their survival. Impacts to the recreational fishing industry, such as a decrease in sport fish like striped bass and flounder, which also depend upon horseshoe crab eggs, should be taken into consideration.[4] We need to take a more holistic view of what any increase in horseshoe crab harvesting, particularly for females, means to the entire ecosystem. The ARM Framework objective of "maintaining ecosystem integrity" is only meaningful when the entire ecosystem has been taken into account and there is agreement that the current state of the ecosystem is ecologically optimal.

Also, even though the number of horseshoe crabs is stable or slightly increasing, this number is far from where we were in the 1990's when the commercial fishing industry was unregulated, resulting in harvests of over 2 million crabs a year and a decline of about 88% of the species.[5] We need a better understanding of what our target number of horseshoe crabs in our waters should be and we need to base that target on what is holistically, ecologically optimal while *also* balancing the needs of a sustainable fishing industry.

In addition, we believe that there is important information not adequately accounted for in the ARM Framework related to the mortality of horseshoe crabs associated with vaccine development. Pharmaceutical companies in the United States still primarily utilize horseshoe crab blood in the production of many human medical products such as vaccines, insulin, and intravenous devices.[6] With the recent increase in the need for vaccines to address the COVID-19 pandemic, the harvesting of horseshoe crabs by pharmaceutical companies and the associated mortality with that practice has also increased. In 2018, the estimated number of horseshoe crabs harvested by biomedical companies for bleeding was 510,407 with a 15% mortality of 77,459 crabs. This increased dramatically in 2020 to 697,025 crabs harvested and a mortality of 106,339.[7] Given the continued need for vaccine development into the future, the unverifiable nature of the mortality percentage (some estimate this percentage to be closer to 30%),[8] and the lack of research on the health and fecundity of the female horseshoe crabs after bleeding, we believe that increasing the harvest of horseshoe crabs, particularly females, is unwise.

Lastly, the ARM does not take into account important issues of climate change such as sea level rise and warming water temperature and effects those factors have on the crabs' spawning and survivability, nor any increase in mortality due to increasing storms and their severity. The need to take issues of climate

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[4] Arnold, C. (2020, July 2). Horseshoe crab blood is key to making a COVID-19 vaccine—but the ecosystem may suffer. *National Geographic.* Retrieved from: https://www.nationalgeographic.com/animals/article/covid-vaccine-needs-horseshoe-crab-blood.

[5] Niles, L. J., et al. (2009, January 1). Effects of horseshoe crab harvest in Delaware Bay on red knots: Are harvest restrictions working? *BioScience, 59*(2). 10.1525/bio.2009.59.2.8

[6] Maron, D. F. (2022, August 4). Horseshoe carb blood saves lives. Can we protect these animals from ourselves? *National Geographic.* Retrieved from: https://www.nationalgeographic.com/animals/article/horseshoe-crab-blood--can-save-lives-can-we-protect-these-animals-from-ourselves

[7] Id.

[8] Id.

change into account has been supported by research published in the scientific journal Molecular Ecology over a decade ago and presented in Science Daily.[9] Specifically, it was recognized that the population is under threat from over-harvesting for use as bait, by the pharmaceutical industry, and by the destruction of habitats around the beaches that are the breeding grounds for horseshoe crabs, but "the most decisive factor may be future changes in sea level and water temperature."[10]

In conclusion, we believe that ASMFC should revise the ARM Framework to place greater emphasis on the recovery of the horseshoe crab species using an ecosystem-based approach, more closely account for the increasing use of the crabs and the associated mortality in the pharmaceutical industry, and give greater consideration to the effects of climate change on the health and reproduction of the species. Until that analysis occurs, we do not agree that an increase in the harvest of horseshoe crabs is appropriate or that female horseshoe crab harvesting is supported.

Sincerely,

Senator Stephanie Hansen, 10th District

Senator Laura Sturgeon, 4th District

Representative Kimberly Williams, 19th District

cc:
Mr. David Saveikis, DE ASMFC Commissioner (David.Saveikis@Delaware.gov)
Mr. John Clark, Proxy for David Saveikis (John.Clark@Delaware.gov)
Mr. Roy Miller, DE ASMFC Commissioner (fishmaster70@comcast.net)
The Hon. William Carson, DE ASMFC Commissioner (William.Carson@Delaware.gov)
Mr. Craig D. Pugh, Proxy for William Carson (Crabman31@aol.com)

[9] University of Gothenburg. (2010, October 6). Climate change affects horseshoe crab numbers. *Science Daily*. Retrieved from: https://www.sciencedaily.com/releases/2010/10/101004101330.htm
[10] Id.

October 17, 2024

Dear ASMFC Board Members,

I want to take a moment to express my gratitude for the incredible efforts over the past 25 years in managing the horseshoe crab population. Our collective work has led to a remarkable increase in horseshoe crabs, protections for spawning populations, significant reductions in harvest for bait, the establishment of monitoring and reporting requirements and the implementation of best management practices for biomedical use. These efforts ensure that we maintain a healthy and sustainable horseshoe crab population for future generations.

We've not only focused on horseshoe crabs; we've integrated the needs of the Red Knot into our management strategies, collaborating with environmental groups to develop the Adaptive Resource Modeling plan (ARM) - an unprecedented achievement. As part of the ARM framework, a survey was designed to monitor the Red Knot population. The survey conducted by the United States Geological Service shows a stable Red Knot population since 2012. With 25 years of data and insights at our disposal, we are in a strong position to continue this success.

However, it's time for us to shift our focus. While we have made significant strides in Delaware Bay, we must extend our conservation efforts to other horseshoe crab populations along the coast. By directing our resources and applying the successful practices we've implemented in the Delaware Bay region, we can make a meaningful impact elsewhere.

The narrative surrounding the fate of the Red Knot often overshadows our accomplishments, however it's essential that we move beyond past debates and instead focus on proactive solutions. Let's expand our knowledge while continuing to use the ARM plan to manage the Delaware Bay population for the sake of the horseshoe crabs themselves, and the entire ecosystem which includes the Red Knot.

Also, protecting human health should be a top priority. The production of Limulus Amebocyte Lysate (LAL) from horseshoe crabs used to test for bacterial endotoxin contamination in pharmaceutical drugs and medical devices must continue. While advancements in testing are important, we must be cautious—the synthetic alternatives to LAL are unregulated and may not detect natural endotoxins reliably. The potential risks to public health are too significant to overlook, and any switch to a synthetic alternative test should be slow and risk adverse, especially in light of the fact that the biomedical use of horseshoe crabs has a negligible effect on their population.

As stewards of this vital ecosystem, we must counter the sensational narratives that hinder biomedical companies and our conservation efforts. It's time to educate the public and foster a collaborative approach to continue to successfully manage the horseshoe crab population.

Let's focus on the future, build on our successes, and implement proven strategies where they are most needed. Enough is enough—let's move forward together.

Sincerely,

Benjie Lynn Swan

Limuli Laboratories