Braddock Spear
Atlantic States Marine Fisheries Commission
1444 Eye Street, NW
Sixth Floor
Washington, DC 20005

October 31, 2009

Re: Comments and observations for the joint Horseshoe Crab and Shorebird Committee as related to the Adaptive Resources Model

Dear Mr. Spear:

Thank you for agreeing to forward our technical comments onto the chairs of the Joint Horseshoe Crab and Shorebird Technical committees and members as well as our comments regarding process to the ASMFC. Delaware Riverkeeper Network welcomed the opportunity to observe both joint meetings about the adaptive resource model held on March 31 and October 2, 2009 as it will greatly affect management decisions for horseshoe crabs and the fate of the shorebirds that rely on them for the Delaware Bay region.

Overall Comments:

First, we acknowledge the tremendous amount of time and resources that are being spent to develop an adaptive resource model whose main goal is as stated on May 30: *to manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity and provide adequate stop-over habitat for migrating shorebirds*.

Related to process, we were concerned that there did not seem to be anybody capturing the conversations or decisions that were being put forth during the meeting. We noted in our experience that issues which seemed to be settled at previous meetings were revisited at this meeting as though

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there had been no previous agreements. So we have some real concerns about the integrity of the process as it allows folks to continually ignore and revisit issues until the collection in the room is such that the conclusion reached is more desirable to a particular group of individuals.

As part of the meeting process, we were also unclear how disagreements on key inputs were actually then resolved and agreed upon in order for the modeler to move forward, incorporating valid and scientific concerns. This too speaks to the integrity of the process -- it is a dynamic that allows the modeler or others to take the discussion and later interpret, apply or ignore it as they individually see fit. And with no record of the related discussion there is no way to challenge that independent decision-making.

We understand that specific inputs to the model will have large consequences for what overall numbers the model calculates for horseshoe crab harvest output. We also understand that there appears to be, at least during both meetings, major concerns over the inputs and the robustness of the scientific data for which these inputs are based. Many questions that were raised in the first meeting seemed to still be at-large and with great disagreement in the second meeting, indicating continued disagreement on the science. With this uncertainty and with understanding that research in the field has limitations, we question whether producing this model with inputs that have so much uncertainty is a scientifically-sound and effective way to manage the species. At the very least, if the model is in fact used for determining harvest, data inputs put forth that do have uncertainty, must error on the side of caution and be protective inputs into the model that will better protect species in peril. Otherwise, the model based on inputs that are not based on sound science (and where scientists on the technical committee are not in agreement) and not based on real-world natural relationships between the crab and shorebirds will lead to a model that does not reflect natural conditions but rather only leads to an unsustainable harvest that might very well continue to impact shorebirds of the Delaware Bay. This model will take years to validate and should not be used to manage bird or crab populations until there is real proof of its validity.

Related to monitoring, it is important to keep monitoring methods consistent and working in parallel with the model and the validation process and beyond. Scientists need to continue their current monitoring protocols that brought us to the current dataset so that old data can continue to be useful with new data as it becomes available every year. By setting up a model that would harvest crabs regardless of the condition of the birds based on triggers that are not experimentally determined in the bay is a major weakness of the model.

In light of the time and expertise spent on this modeling effort to maximize crab harvest and in an environment where scientists are not clear on the fate of an entire species, it is also important to reiterate the economic value of the ecotourism industry as compared to the economic effect of horseshoe crab harvest for bait. Should we be creating a model to track the loss of eco-dollars to the states of NJ and DE when shorebird populations are no longer visiting the Bay, for example to also invest time in that industries livelihood?

Specific technical points and observations:

Shorebird Capture Data Concerns

There was concern from scientists regarding the shorebird capture data used as a model input regarding weight gain of birds and a realization that many of these weights used by Mr. McGowan (lead modeler) originated from earlier years of the study when the birds were likely at a higher weight

and not in such dire conditions as more recent years. Dr. Humphrey suggested reviewing this Delaware Bay data and being sure that weights were representative of current conditions and Mr. McGowan stated this would be difficult to do as research in recent years involved less capturing and more re-sighting information. With this scientific uncertainty in mind, a more protective approach to this weight input number should be used to be sure the model represents real-world conditions.

Concerns over Sex Ratio for Horseshoe Crabs

There was much discussion and disagreement by the scientists over the proposed 1.88 sex ratio for horseshoe crabs. We understand this ratio to be largely developed based on the off-shore Virginia Tech trawl surveys versus actual ratios noted in natural conditions and studies and census data available of the spawning crabs or egg densities on the beach. Scientists are in disagreement on the emphasis satellite males have on spawning and what is seen on the ground both historically and recently (and there is limited data about this point). Horseshoe crabs fertilize eggs externally and satellite males are part of that natural balance. In the Delaware Bay, the operational sex ratio of adult spawning crabs on the beach was stated to be at about 3.8 males for 1 female (D. Smith). How do we know from scientific research that this ratio is not more typical of a healthy crab population or the historic balance that existed pre-bait impacts? Where is the historical data available that supports a natural balance that is a 1.88 ratio? It seems that the decision to use the 1.88 ratio is largely based on personal communications with Dr. Brockman – to give a single personal communication that could not be heard, vetted, challenged, or discussed by other experts is not a valid or defensible approach to such important decision-making. The 1.88 ratio is not based on strong scientific data. Considering the dramatic effect use of this ratio will have on the ultimate conclusions reached it is critical that it be scientifically vetted and defensible. In fact, the 1.88 ratio will most assuredly drive harvest of what some scientists are calling "excess males" when in fact – this is unacceptable considering that we don't see strong research ruling out the significance of these satellite males. From discussions during the meetings, there also appears to be no scientific data pre-bait harvest to indicate the natural balance of males to females. Therefore, a risk-averse approach and ratio, i.e. a ratio reflecting pre bait and what is actually seen on beaches, would be more appropriate and justifiable rather than the 1.88 ratio – such an approach would drive selection of a ratio that is at a minimum 4:1 and more likely higher.

Scientists also noted the need for fine-tuning to reduce uncertainties in the Virginia-Tech trawl survey, egg density surveys and beach spawning surveys. The group was unable to answer a question by one scientist about the variance in the VA tech survey – while everyone agreed this was important information nobody was able to answer it; the issue got set aside without resolution or promise to revisit. And finally, scientists questioned using trawl survey data over actual spawning data of adult crabs and egg densities on the beach which have a better connection to shorebirds than the trawl surveys done offshore. We would agree that egg densities and spawning crabs on beaches relate better to shorebird weight and these numbers are likely more scientifically justified.

Concerns with Preliminary Model Outputs and Monitoring over Time

The issue of monitoring the application of the model outputs and revisiting inputs and numbers over time was discussed by scientists throughout the meetings. There should be a mechanism in place to revisit the model at least annually to determine how well it is working and make changes where appropriate. Monitoring needs to remain consistent so that old datasets can continue to be used with new data as it becomes available and a rigorous monitoring plan by the scientists needs to be continued. Years of validating the model in parallel with on-the-ground monitoring studies, will help correct any errors with the model before it should be used to directly manage horseshoe crabs or

shorebirds. The model should not be used too early before more rigorous testing is understood and inputs are more clear to the scientific community or else harvesting will likely occur at a time that will not be protective to the shorebirds.

It was also suggested by scientists that more model runs need to be conducted to actually see endpoints of the model to ensure that the model is calculating realistic and protective measures. Based on the questions to the inputs throughout the meeting, this seems like a very important step that is well justified.

Regarding preliminary model outputs, valid concerns by scientists were raised as the model did not include any outcome where there would be no harvest of crabs, despite the scientific fact that the red knots are at such low population numbers. Some scientists were concerned about the outputs and expressed that the model weights per input may be off (particularly in the case of the male and female crab ratio and the trigger for female crabs that was first set at 5 million and then raised to 7 million) as it appears that the outputs are not at all sensitive to red knot population numbers -- this concern seemed verified by the apparent reality that while red knot population numbers are already at very low numbers, the model has no possible outcome of "no harvest". We understand that the model is to include and weigh red knot populations as part of the process as stated in the goal of the model: *to manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity and provide adequate stop-over habitat for migrating shorebirds*. As such, the model needs to be adjusted to consider shorebird population numbers and weigh this factor heavily. For this process, the tech committee must also consider the research that is finding declines in other shorebird species that rely heavily on horseshoe crab eggs. (It is noted that if indeed years from now, crab numbers are extremely high and birds continue to plummet – based on other factors, then changes would be made to the model but at this early time to not weigh the red knot heavily in the equation is not appropriate.) By setting up a model that would harvest crabs regardless of the condition of the birds based on triggers that are not experimentally determined in the bay is a major weakness of the model.

Fecundity for Red Knots

Fecundity of females (the # of female offspring produced from eggs to fledgling) at 0.40 for the proposed model input was based on a scientific paper by Meltoff. The shorebird scientists raised the issue that this 0.40 rate may be atypical as the environment for this study in northeast Greenland was ideal habitat for the red knots (as noted by Meltoff) and that the sample size was small. Dr. Humphrey stated that he may have more appropriate peer-reviewed values to use in lieu of the 0.40 rate and if this rate is more real-world, likely a better fit to use for the model.

Mr. McGowan also pointed out what might be a very significant point to be considered by the ASMFC and the technical committees. When Mr. McGowan lowered the fecundity rate input below 0.40, a drastic population crash occurs in the red knots. Scientists felt this was an important observation by the model that demonstrates the implications crab harvest and lower egg densities have on this red knot fecundity rate, highlighting highlights the tenuous and precarious situation of the birds and their survival rates.

We would also like to point out conclusions of a recent study, "Investing in Our Future: the Economic Case for Rebuilding Mid-Atlantic Fish Populations" authored by John Gates at the University of Rhode Island which provides analytical evidence that there is economic value in actively rebuilding fish populations and foregone economic benefits from delaying rebuilding. Furthermore, if management

measures are not enacted, enforced, sustained and maintained, the success and benefit of rebuilding will dissipate, providing further evidence that adopting science-based rebuilding plans and regulations that achieve the required reductions in fishing mortality are critical to rebuilding valuable fish populations as soon as possible.

Thank you for your time and consideration of our observations. We look forward to learning more about how the processes of the model are refined to better depict real scientific inputs and resolutions to raised concerns in November.

Sincerely,

Maya K. van Rossum
the Delaware Riverkeeper

Faith A. Zerbe
Staff Biologist