Atlantic States Marine Fisheries Commission

Horseshoe Crab Management Board

November 5, 2015
8:00 – 9:00 a.m.
St. Augustine, Florida

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(J. Gilmore)* — 8:00 a.m.

2. Board Consent — 8:00 a.m.
   - Approval of Agenda
   - Approval of Proceedings from February 2015

3. Public Comment — 8:05 a.m.

4. Horseshoe Crab Technical Committee Report (*S. Doctor*) — 8:15 a.m.
   - Shorebird and Horseshoe Crab Survey Reports Summary
   - Adaptive Resource Management (ARM) Framework Harvest Output for 2016
   - Double-loop Review of the ARM Model in 2016
   - Maryland Harvest Proposal
   - Biomedical data and jurisdiction concerns

5. Set 2016 Delaware Bay Horseshoe Crab Specifications (*K. Rootes-Murdy*) **Final Action** — 8:35 a.m.

6. Update on the Virginia Tech Horseshoe Crab Trawl Survey (*K. Rootes-Murdy*) — 8:45 a.m.

7. Discuss Gulf of Mexico Biomedical Fishery (*K. Rootes-Murdy*) — 8:50 a.m.

8. Consider Approval of 2015 FMP Review and State Compliance (*K. Rootes-Murdy*) **Action** — 8:55 a.m.

9. Other Business/Adjourn — 9:00 a.m.

The meeting will be held at the World Golf Village Renaissance; 500 S. Legacy Trail; St. Augustine, FL; 904-940-8000

MEETING OVERVIEW

Horseshoe Crab Management Board Meeting
Thursday November 5, 2015
8:00 a.m. – 9:00 a.m.
St. Augustine, Florida

Chair: Jim Gilmore (NY) Assumed Chairmanship: 10/14	Horseshoe Crab Technical Committee Chair: Steve Doctor (MD)	Law Enforcement Committee Representative: Messeck (DE)
Vice Chair: Robert Boyles (SC)	Horseshoe Crab Advisory Panel Chair: Dr. Jim Cooper (SC)	Previous Board Meeting: October 30, 2014
Shorebird Advisory Panel Chair: Dr. Sarah Karpanty (VA)	Delaware Bay Ecosystem Technical Committee Chair: Greg Breese (FWS)	
Voting Members: MA, RI, CT, NY, NJ, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (16 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 30, 2014

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Horseshoe Crab Technical Committees Report (8:15 – 8:35 a.m.)

Background

- The Delaware Bay Ecosystem and Horseshoe Crab Technical Committees (TCs) jointly met on October 9, 2015
- The TCs Reviewed the Adaptive Resource Management (ARM) harvest output, horseshoe crab surveys and discussed a few other issues including an alternative harvest proposal from Maryland, the double loop review of the ARM and biomedical data (**Briefing Materials**)

Presentations

- TCs Report by S. Doctor

5. Set 2016 Delaware Bay Horseshoe Crab Specifications (8:35 -8:45 a.m.) Final Action

Background

- The ARM subcommittee met by conference call in August and September 2015 (**Briefing Materials**)
- In the absence of the Virginia Tech Trawl Survey data in recent years, the ARM subcommittee considered a composite index to inform Horseshoe Crab abundance in the Delaware Bay region.

Presentations

- Overview of the ARM harvest output and TCs recommendations by K. Rootes-Murdy

Board Actions for Consideration

- Consider ARM harvest recommendations and set specifications for the Delaware Bay states in 2016.

6. Update on the Virginia Tech Horseshoe Crab Trawl Survey (8:45 -8:50 a.m.)

Background

- The Virginia Tech Horseshoe Crab Trawl Survey has not been conducted in recent years due to lack of funding
- While funds were available for the 2015 fishing season, the survey was unable to be carried out due to timing

7. Discuss Gulf of Mexico Biomedical Fishery (8:50 -8:55 a.m.)

Background

- In October 2015 the Commission received a letter from an IUCN subcommittee expressing concern over the development of biomedical fishery in the Gulf of Mexico for export to Biomedical Markets in Asia. (**Briefing Materials**)
- The authors of the letter request that ASMFC and the Gulf States Marine Fisheries Commission (GMFSC) consider developing a horseshoe crab management plan for the region.

8. Consider Approval of 2015 FMP Review and State Compliance (8:55 -9:00 a.m.) Action

Background

- State Compliance Reports are due March 1.
- The Plan Review Team reviewed each state report and compiled the annual FMP Review. (**Supplemental Materials**)
- The Potomac River Fisheries Commission, South Carolina, Georgia, and Florida have requested and meet the requirements for *de minimis* status.

Presentations

- Overview of the FMP Review Report by K. Rootes-Murdy

Board Actions for Consideration

- Accept 2015 FMP Review and State Compliance Report.
- Approve *de minimis* requests

9. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

HORSESHOE CRAB MANAGEMENT BOARD

Hilton Mystic
Mystic, Connecticut
October 30, 2014

These minutes are draft and subject to approval by the Horseshoe Crab Management Board
The Board will review the minutes during its next meeting

TABLE OF CONTENTS

INDEX OF MOTIONS

ATTENDANCE

Board Members

Bill Adler, MA (GA)
Jocelyn Cary, MA, proxy for Rep. Peake (LA)
Robert Ballou, RI (AA)
David Borden, RI (GA)
Rick Bellavance, RI, proxy for Sen. Sosnowski (LA)
David Simpson, CT (AA)
Lance Stewart, CT (GA)
Rep. Craig Miner, CT (LA)
James Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
Tony Rios, NY, proxy for Sen. Boyle (LA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Stewart Michels, DE, proxy for D.Saveikis (AA)
Bernie Pankowski, DE, proxy for Sen.Venables (LA)
Roy Miller, DE (GA)
Tom O'Connell, MD (AA)
Bill Goldsborough, MD (GA)
Russell Dize, MD, proxy for Sen. Colburn (LA)
John Bull, VA (AA)
Rob O'Reilly, VA, Administrative proxy
Robert Boyles, Jr., SC (AA)
Malcolm Rhodes, SC (GA)
Spud Woodward, GA (AA)
Pat Geer, GA, proxy for Rep. Burns (LA)
James Estes, FL, proxy for J. McCawley (AA)
Mike Millard, USFWS
Derek Orner, NMFS
Martin Gary, PRFC

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Penny Howell, Technical Committee Chair

Staff

Robert Beal
Toni Kerns
Marin Hawk
Kirby Rootes-Murdy

Guests

Doug Grout, NH (AA)
Dennis Abbott, NH
Sherry White, USFWS
Brandon Muffley, NJ DFW
John Clark, DE DFW
Jack Travelstead, CCA
Raymond Kane, CHOIR

The Horseshoe Crab Management Board of the Atlantic States Marine Fisheries Commission convened in the Grand Ballroom of The Mystic Hilton, Mystic, Connecticut, October 30, 2014, and was called to order at 8:30 o'clock a.m. by Chairman James J. Gilmore, Jr.

CALL TO ORDER

CHAIRMAN JAMES J. GILMORE, JR.: Good morning, everybody. Welcome to the Horseshoe Crab Management Board. My name is Jim Gilmore; I'm the administrative commissioner for New York. I will be chairing the meeting and I'm actually taking over the chair from Dave Simpson of Connecticut. We thank Dave for his two years of service to the board.

APPROVAL OF AGENDA

CHAIRMAN GILMORE: We're starting a little late so for all the people not at the Striped Bass Meeting yesterday, please indulge the folks that were there. The first order is approval of the agenda. Any changes to the agenda? Seeing none; we will take that as accepted.

APPROVAL OF PROCEEDINGS

CHAIRMAN GILMORE: We have the Proceedings from the February 2014 meeting. Are there any changes to the proceedings? Seeing none; we will list those as accepted.

PUBLIC COMMENT

CHAIRMAN GILMORE: Before every meeting, we take public comment on any issues not on the agenda. Are there any comments from the audience on things not on the agenda? Seeing none; we'll move right along. Our next order of business is the technical committee met with the Delaware Bay Ecosystem Technical Committee to discuss the Shorebird and Horseshoe Crab Survey Report Summary and ARM Framework Harvest Output for 2014. Penny Howell is going to go through a report on that and we will have some action after this.

HORSESHOE CRAB TECHNICAL COMMITTEE REPORT

SHOREBIRD AND HORSESHOE CRAB SURVEY REPORTS SUMMARY

MS. PENNY HOWELL: Okay, the technical committee reviewed the Horseshoe Crab Abundance Indices from six sources of information. I'm just going to summarize a few here and highlight two principal sources of indices. The first would be the Delaware Bay Horseshoe Crab Spawning Survey. The indices show that there is a fairly steady abundance.

The males were increasing slightly but with no statistical significance. The females were slightly decreasing but again with no statistical significance. The next source I just want to review is the Delaware Trawl Surveys. There is actually more than one. The first one is the 30-foot trawl catch summarized over all months; and you can see that the overall population is fairly steady.

It is below levels in prior years, but the last few years have been – there is no trend. The highlight is the 16-foot trawl catch of adults. Again, it is a steady trend; slight increase in the last year; again, lower than prior years but no trend in recent data. For juveniles, the picture looks a little better. There is an increase in recent years.

We had a little drop in the last few, but 2013 bounced up a bit. Both the Horseshoe Crab and Shorebird Technical Committees agreed that the surveys reflect little change in the status of horseshoe crabs in the Delaware Bay Region and the population has been stable since 2009.
Moving on to the red knot status, the Horseshoe Crab and Shorebird Technical Committees reviewed the red knot abundance in the Delaware Region and in Tierra del Fuego in Argentina. The abundance in the main wintering areas in Tierra del Fuego has not increased during the study period of 2004 to 2013.

Moving closer to home, the abundance of red knots in the Delaware Bay has remained low but relatively stable over the last decade. The proportion of red knots reaching the trigger weight

of 180 grams, which is most important for horseshoe crab management, has improved in four of the last five years in the previous survey.

ARM FRAMEWORK HARVEST OUTPUT FOR 2015

MS. PENNY HOWELL: Okay, moving on to the ARM Framework Procedure for 2015; the ARM Framework requires two data estimates on an annual basis; horseshoe crab abundance and red knot abundance. Since the framework process started, the Virginia Tech Trawl Survey has provided the estimates for horseshoe crab abundance.

However, funding in 2013 was not received; so the Virginia Tech Trawl Survey was not conducted in 2013. In the absence of the abundance estimates from this survey, the ARM Working Group decided to use the Horseshoe Crab Catch Indices from the Northeast Area Monitoring Assessment Program, or NEAMAP, to estimate abundance.

The Virginia Tech Trawl Survey was designed specifically to obtain an estimate of the horseshoe crab abundance; and while the NEAMAP Survey is not directed toward horseshoe crabs, that is the first slight problem here. In addition the surveys were conducted during different times of day and used different gear.

There are several structural reasons why the two datasets may not be compatible even though the NEAMAP data was honed down to match as much as possible the original Virginia Tech Survey Dataset. The results found that the correlation between the two surveys was not consistent, significant and positive for females while insignificant and negative for males.

Since the fishery harvests only males at this time, this was a critical flaw. The ARM Working Group presented four options for the technical committee for their consideration. While both technical committees agree that the annual datasets are the core of the ARM Framework, there was too much uncertainty in the accuracy of the NEAMAP data to recommend Option 2 or Option 3, which use the NEAMAP abundance estimates to calculate the equivalent Virginia Trawl Survey Abundance Estimate.

The technical committee agreed that Option 1 or status quo was the best available option to use for this year's ARM Framework and specification-setting process in the absence of the Virginia Tech Trawl Survey data. However, the technical committees agreed that this option should be used as a stopgap for 2014 and not extend it into the future and strongly recommends that more reliable estimates of abundance should be investigated for the 2016 analyses.

Some suggestions include finding funding for the Virginia Tech Trawl Survey; investigate abundance indices to estimate abundance or adapt the sampling design of the NEAMAP Survey to better accommodate the ARM Framework data needs. That last option is highly unlikely. In light of the structural dependence of the ARM Framework on the Virginia Tech Trawl Survey data as it was originally developed, the ARM Working Group has also agreed to investigate adapting the ARM Framework methodology to the NEAMAP data by reconfiguring the model. They're going to be looking into that in their next meetings.

As a result, the ARM Framework recommendation is based on the status quo. The selected Harvest Package 3 allows 500,000 Delaware Bay male horseshoe crabs and zero female horseshoe crabs in the following quota. The last topic to look into is the artificial bait trails. So far Connecticut has successfully completed two trials.

The board directed the technical committee to conduct field trials in the conch and eel fisheries to quantitatively compare the effectiveness of an artificial bait product developed by La Monica Fine Foods of Millville, New Jersey, to compare it to the presently used horseshoe crab bait in the fishery.

Although Massachusetts, Rhode Island, Connecticut and New Jersey all volunteered to participate in the trials, only Connecticut has

successfully completed the trials to date. Two trials sets were made in early summer with one fisherman. The fisherman carried out his useful fishing methods using the artificial bait alternating trap by trap with whatever bait product that he usually used.

Although these initial trials appear to demonstrate that this alternate bail product is an adequate substitute for whole horseshoe crabs, full analysis of the catch data should not be done until more than two trials are completed. That gets to the point that the major stumbling block with completion of this study was the lack of cooperation by La Monica Foods in delivering the product.

After several discussions with ASMFC staff, technical committee members and the product company people highlighting the importance of catering to the needs of fishermen in order to successfully promote the use of this alternative bait to the conch and eel fishing industry, company officials were completely inflexible as to where, when and how the product would be made available. For these reasons the trials were suspended, Massachusetts and Rhode Island withdrew; and until these issues can be resolved, I'm not sure that these trials are going to be able to go forward. That's the end of my report.

CHAIRMAN GILMORE: Any questions for Penny? Bob Ballou.

MR. ROBERT BALLOU: Penny, I want to explore what you just reported on regarding the inflexibility of the company that provides the artificial baits. Why would it not be an incentive for a company to try to work with the fishermen given the potential profits that they might make by having their product utilized? I want to try to drill deeper into what is going on there; and if you add a little bit more to your report on that, thank you.

MS. HOWELL: In my opinion the company is not ready for primetime. I don't think they realize the position that they're putting us in and the position that fishermen are in, which is unbelievable. I don't understand why they don't. We've had many discussions. Marin had many discussions with them.

The product was supposed to be delivered – we were told and given instructions, which were passed on to the fishermen, that would be in blocks. They weren't in blocks. The first product that was delivered had been sitting at the dock. They insisted that we go to New Bedford to pick it up even though they go right past Connecticut and could have just gone off an exit on the highway. We would have met them on the highway if need be and they refused. They only would deliver it on Mondays and – or two days of the week – I don't remember which one it was – and we had to tell them the Friday before.

Well, the fisherman wasn't sure when he would be setting gear; so that meant that the product that we got at best was a few days old. This is a mixture of clams and a few other things. If can imagine what old bait smells like, you're there. This had the consistency of thick oatmeal; so getting it into a bait bag was a little problematic. The fisherman ended up using more than what was supposed to be this very small amount. He was concerned about what the price was going to end up being. It was all kind going downhill very quickly.

MR. WILLIAM A. ADLER: Mr. Chairman, a couple of things. First of all; did you say that the horseshoe crab levels are stable? That was my first question; overall?

MS. HOWELL: In Delaware Bay. Those reports were just for Delaware Bay.

MR. ADLER: Okay, and my second thing goes to the artificial bait thing. Was there any result from the one trial that was done as to whether it worked?

MS. HOWELL: Yes; as I say, I hesitate to be too quantitative because the sample is so small; but, yes, the bait is viable. The fisherman was satisfied with its performance. He was not satisfied with what he to go through and get it; but once he got it and used it, it worked.

DR. DAVID PIERCE: Two questions. The first one is with regard to NEAMAP. I'm a member of the NEAMAP Board; and I continue to hope that we will be in a position to use the results from NEAMAP for indices of abundance for a wide variety of species. We do see some positive information coming out relative to that use.

I note that the technical committee has indicated that the NEAMAP information cannot be used at this time; and there is a recommendation that we work with the NEAMAP Survey to modify equipment and procedures to better sample horseshoe crabs. My question is has there been any communication with the NEAMAP Team, the researchers involved with NEAMAP to determine if this is a recommendation that actually can be used; that they can be guided by? They can really modify the equipment and procedures to do that?

MS. HOWELL: Yes; I under there has been discussion. They offered to make slight modifications; but on the other side of the table, the modeling group also wanted to look into modifying the model procedures as well. Since the model was really formulated around the Virginia Tech Trawl Data, a lot of this is data imprecision issues.

There are two ways to get at this. One is modifying the – actually, not so much modifying it. I think it is getting more sampling in the areas that need to be done and a gear change. But not to put it all on NEAMAP, the other side of it is the modelers are going to look into the model format and see whether some statistical analyses can be used that are more compatible with the NEAMAP procedures.

DR. PIERCE: Then, finally, in your discussion on the review of the Shorebird Surveys, I note from the report itself that abundance of red knots in the Delaware Bay has remained low but relatively stable over the last decade. Then the concluding statement is "lacking a rise in abundance, red knots may be listed as threatened in the near future." The important point made by the technical committee is that a boost in crab productivity is needed to change this trend. Obviously, crabs are important, as we all know.

Was any work done by the technical committee recently or even in the past that will give us some guidance as to what sort of change in crab productivity is needed to change this trend in red knot abundance that would move us away from the possibility of there actually being a listing of red knot as threatened?

MS. HOWELL: The shorebird technical people have felt that unless we get the spawning abundance back up to what it was in the early nineties; that the birds are still in jeopardy of not making adequate weight. The Horseshoe Crab Technical Committee is not so sure that is really the limiting factor. That is an open question.

MR. ROY MILLER: Thank you, Penny, for the report. There are three things in your report, unfortunately, that I find disturbing; and I'd like to list them. One is our inability to fund the Virginia Tech Trawl Survey; that has already been discussed. The other thing that disturbs me is the apparent lack of cooperation of the artificial bait supplier.

Those of us in the Mid-Atlantic Region and especially those of us on the Delaware Bay placed a great of the Department of Natural Resources money to support the development of artificial bait into the hands of the scientists that were conducting our research; so naturally we would like to see that investment pay off some day and was disappointed that thus far it hasn't translated into suitable field trials. The third thing I find disturbing is the apparent lack of recovery of female horseshoe crabs. None of this is your fault, Penny; please don't take this personally.

MS. HOWELL: I don't.

MR. MILLER: But I'm wondering if you would care to offer any speculation in your opinion why there has been – in spite of years now of conservation on the parts of the resource agencies why there has been no apparent recovery of female horseshoe crabs and even the male horseshoe

crabs are not showing perhaps the depth of recovery that we would have liked. Care to speculate on that in any way? Thank you.

MS. HOWELL: As long as you recognize that it is speculation; my speculation is that this is a slow-growing animal that really is going to take at least ten years to get one generation of mature females into reproducing. The fact that we're seeing juveniles coming up I think is indication that the conservation efforts are successful; maybe not successful enough; but the biology of the animal is not going to speed that up too fast.

The other part of it is I think that the stock recovers like almost spreading out; so it is not a pinpoint recovery. You will see numbers go up slightly and then it will spread out geographically. As it builds, it builds a slow base, if you will, and then the numbers will go up from there. The animals do migrate in small amounts; and I think you're going to have to see a recovery of the entire Chesapeake, Delaware and New Jersey sub-stock before you'll see really good numbers coming into the bay. That is my speculation.

MR. MILLER: Thank you for that; and if I could just follow up, Mr. Chairman, very quickly. The other disturbing thing, of course, is the failure of red knots to recover at least in the Delaware Bay area and it also sound like the Tierra del Fuego population hasn't recovered either. There are a lot of potential reasons for that, let's put it that way, and we've heard them all over the years.

Do you personally feel that the failure of the female horseshoe crab population and the failure of the recovery of the female horseshoe crab population or at least, let's put it this way, perhaps the slow nature of the recovery; do you really think that is continuing to depress the red knot numbers or do you think the external factor is driving the red knot numbers?

MS. HOWELL: You're really going to push me to the line here. Again, as long as you recognize that it is personal speculation; I think that the linkage between the weight gain and the horseshoe crab egg abundance is real and a limiting factor. The fact that the weight gain is adequate and increasing is reflective of the conservation efforts and the slow increase in the stock.

That is the slow increase. It is not fast enough and it is not overriding the other limiting factors that the birds have that I'm not in any position to comment on. Maybe if we flooded the entire Delaware Bay with tons and tons of horseshoe crab eggs, it would override the other limiting factors or maybe it wouldn't. That is an experiment that I don't think anybody is going to be able run. There is a linkage; they both are stable and increasing in incremental ways. I feel like I'm the president talking about the economy. We're getting there but very slowly.

MR. STEWART MICHELS: Penny, that was a great report and an excellent summary, by the way. I was just wondering has the technical committee had a chance to look into using some of the other existing surveys and modifying them in place of the Virginia Tech Trawl Survey, like the Delaware Bay Spawning Survey or the New Jersey Clam Survey; or is it just too early yet that you guys haven't gotten to that?

MS. HOWELL: They are going to be looking into that. I did skim over the fact that the New Jersey surveys, the Ocean Trawl Survey, the Delaware Bay Surf Clam Survey was looked at. The Maryland Horseshoe Crab Spawning Survey, the Delaware Bay Horseshoe Crab Egg Survey and the Delaware Bay and Atlantic Fly-Away Red Knot; I mean, there is a whole lot more information we're looking at. I just didn't want to give this long laundry list.

The thing is that the framework was built around the Virginia Tech Trawl Survey; and for better or worse, it went forward that way. Now there is some possibility – and I'm putting a lot of weight on the working group to come up with a better statistical analysis. After they build this really nice model, now we're asking them to completely change it.

DR. MICHAEL MILLARD: I want to follow up on Stew's comment to note that – and, of course,

the loss of the Virginia Tech Trawl Survey is of concern and it would be nice to have it funded again; but if it comes back in a mode of a year-to-year funding, that's not really a model for a successful effort. We can't live under that uncertainty I think year to year.

To follow up on Stew, then I think we should look to these other surveys. The technical committee should consider developing some kind of index from these ongoing, more secure surveys and somehow work that into the model. If we can make NEAMAP work, so much the better; but I was at that one meeting and it didn't sound very promising to me at least at that point. I would encourage the technical committee to look at these other ongoing surveys and somehow move those or move the modeling effort towards them so they can meet in the middle.

MS. HOWELL: Just to follow up briefly on that; Mike makes a very good point. The thing that is most important to getting this management model to work is a long-term trend because of the lengthy nature of the biology and the interaction with that and the birds. We feel like we're stepping on rocks in a river that which survey is going to be the long-term survey that we can depend on is the question.

MR. GILMORE: Just a question maybe to Bob; yesterday at the executive committee meeting, it was talked about they're pursuing additional funding. Is that a one-shot deal or was that something that was longer term?

EXECUTIVE DIRECTOR ROBERT E. BEAL: Well, we'll take whatever we can get I guess is the short answer. Yes; we've been up on the Hill having discussions about this over the last month or so. There are a few congressional offices on the House side and Senate side from New Jersey and Delaware that are interested in finding some money for this project.

We're going to keep working with them. We're on a continuing resolution and we're kind of all in a holding pattern, but we're going to keep working on it and hopefully we'll be able to come up with some money. Again, it is definitely not a guaranteed long-term source; but it is one of those things if you can get it woven into the federal budget enough times, then people get used to it and it kind of becomes a long-term funding. We're trying to get that going. We've had some pretty successful meetings and there is a lot of interest and a few letters flying around or being drafted right now, anyway. We're going to keep pushing, but it is not guaranteed long term.

MR. ADLER: Other factors in the red knot; I didn't know what they amount to, but I have heard over the years that there are other factors that can be limiting the growth of the red knot stock; and it might not just be the horseshoe crab. Do they eat other things other than horseshoe crab eggs was one of my questions? Do they know whether they have another food source besides horseshoe crab eggs?

MS. HOWELL: Yes, there is other food out, but the key is with this long-term migratory bird by the time it gets up to Delaware, it is almost physiologically exhausted. Many of these birds actually digest part of their organs in order to keep flying. They could eat other foods, but other foods are much more difficult to digest, such as small clams or even worms and stuff.

They really need the equivalent of white bread to eat. Eggs are the ideal for them, very high energy, very easy to digest. There are other food options but this one really nutritionally is far superior given their deteriorated state when they finally make it from Argentina all the way up. You can understand that a small bird that migrates from Argentina to the Arctic Circle is exposed to all kinds of other mortality factors.

MR. ADLER: Can we develop an artificial food for the red knots? Maybe we could call Lamonica or whatever it is. I didn't know, Mr. Chairman, if you needed a motion to accept this report?

CHAIRMAN GILMORE: Not yet, Bill; I think we're going to go through a presentation on that and we'll get into that. Lance Stewart.

DR. LANCE STEWART: Penny, one of the things I was wondering if it has been followed up in the trawl survey is nocturnal studies. I had suggested about two or three years ago that if the Virginia Trawl Survey was going to have any real relevance – I think what I've seen in many years of studying lobster at night with scuba gear is that horseshoe crabs come out of the sediment at night. You could have orders of abundance greater in your trawl surveys if they had tried that. Since the amount of leverage that trawl survey has on the condition of red knot and everything else, I would think that would have been a variable that would have been tried to be corrected.

MS. HOWELL: I'm sorry, Lance; I don't understand the question you're asking.

DR. STEWART: If the Virginia Trawl Survey had been directed at conducting nocturnal trawl surveys; I would suggest – and I don't know because it hadn't been done – that their abundance indices per trawl would be extremely higher than during a day survey. I don't know if you have corrected for that or anything.

MS. HOWELL: Yes; the working group did do a correction for the day/night. That is the whole process they went through to try to make the NEAMAP data match by doing corrections for just what you're discussing.

DR. STEWART: I've never seen that and I just wondered.

MS. HOWELL: We had a report that just summarized the end result. They didn't make a report of all the internal steps that they made.

DR. STEWART: So in summary it didn't make any difference at all?

MS. HOWELL: It did; and they adjusted it. Even with the adjustment, the indices didn't – they were looking for trends and not actual numbers. They were trying to get a trend match. You're right; the NEAMAP numbers were lower than the Virginia Tech, which would be understandable, but they were looking to get a trend match. It matched for the females but it did not match for the males and reasons for that are varied.

MR. BALLOU: So, Penny, it seems clear the board shares your frustration regarding the problems with the artificial bait trials. Do you have a recommendation as to what might be done or what could be done to get that back on track?

DR. STEWART: The product has to be made available. At least for a trial basis, they've got to be able to deliver it to us somewhere close, like within the state, especially when they're going right by. Their insistence that it only be delivered to New Bedford was a real impediment. The other thing is they've got to work out the consistency of the product.

They said that it couldn't be frozen. Our fisherman froze it and said it worked fine. It is unfortunate that it has to be frozen because that was going to be one of the things that would bring the price down if they could buy it in large quantities and not have to freeze it. Running a freezer is expensive; but if that is the case, they ought to have told us that is how it needed to be handled.

They need to be more honest about how we're supposed to handle this stuff rather than telling us that it is in a nice neat block and then giving us stuff that you have to scoop out with an ice scoop; and making it available in more locations and more readily when we can use it and get it to the fisherman.

MR. BALLOU: I wasn't aware, frankly, that there had been some funding perhaps provided to help get this going. Now that I'm aware of that connection, is this something that the board might want to consider writing a letter? I mean is there something we can do other than just looking to you to try to do your best; and I understand you are. I just think I speak for the board in saying that we would be more than willing to try and do whatever we can to back you in your efforts to try to get this company to do what apparently they really to do and should be doing, particularly

given the funding that has been provided. Thank you.

MS. HOWELL: I'd appreciate that help, yes.

MS. TONI KERNS: Just to give a little further detail, Marin and I did have several conversations, Marin more than myself, with the gentleman that owns the company to try to sort of help foster this partnership that we were going through with them. We did pay for the bait itself. We were not paying for delivery or else it was an added cost into the slabs of bait that we were paying for.

They were delivering other products up to New Bedford, and so that is why it was every Monday and Wednesday or every Monday and Thursday because that is when they made their regular deliveries. We can try to have some more conversations. I'm not sure a letter is going to have that much influence over the company itself. I don't know if the conversations will help. Marin has probably had at least five conversations with this gentleman about deliveries and product quality, et cetera.

MS HAWK: I also think one of the largest issues is communication; so I'm not sure how successful a letter would be.

MR. DAVID V. BORDEN: Mr. Chairman, I arrived a little late this morning; so if I ask a question that has already been handled, just move me along.

CHAIRMAN GILMORE: Well, you get the last question because we're getting ready to move on after this.

MR. BORDEN: I'm just curious about this issue about freezing the product. At least in New England – I can't speak on behalf of the Chesapeake states; but in New England every single conch dealer that I know of has freezer facilities. They freeze their horseshoe crabs. They have frozen crabs and they have frozen mussels that they're all selling to the conch fishermen. If the product were frozen, it would be just an absolutely natural addition. They would just put it in the freezer; and when the fishermen come in, they dole it out. If it is frozen, they could keep it in coolers for days. It is like there is a disconnect here somewhere. Thank you..

MS. HOWELL: Yes; that is probably the way it is going to happen. We were just hoping that this product would – because there is a cost; that the cost would be offset by not having to freeze it. It looks like you're right; that it is going to have to be frozen just like every other bait product. That wasn't what the company told us ahead of time; so that had to be added. In fact, they were given instructions not to freeze it because it wouldn't work; and that is not true. It does work; it does work fine frozen. There is a little disconnect here.
MR. BORDEN: Is the formula private property or is this a formula that the commission has come up with?

MS. HAWK: There was a study at the University of Delaware; and there is actually a paper and the recipe for it is in the paper. Some of the ingredients are difficult to obtain.

SET SPECIFICATIONS FOR 2015 DELAWARE BAY FISHERY

CHAIRMAN GILMORE: Okay, I think we're going to move on now to setting the 2015 Delaware specifications. Marin is going to do a PowerPoint first and then we'll get into it.

MS. HAWK: This will be very brief. As Penny mentioned, the ARM Framework is what we use to set specifications. Usually we use the Virginia Tech Trawl Survey data as the horseshoe crab abundance index. We did not have that data this year so that was a hurdle. We also use the shorebird abundance that Penny went over.

Since we don't have that benthic trawl survey data, the ARM Working Group and the technical committee recommend status quo for the 2015 fishery. That is ARM Harvest Package Number Three, 500,000 male horseshoe crabs in the Delaware Bay Region. This is the horseshoe crab quota by each state in that region. Thank you, Mr. Chairman.

CHAIRMAN GILMORE: Any questions for Marin? Okay, I'm going to need a motion to move this forward? Bill Adler.

MR. ADLER: A motion for what? I mean, do you need a motion to accept all these reports?

CHAIRMAN GILMORE: To set the specifications; essentially the recommendations of the technical committee.

MR. ADLER: **Okay, I so move that we accept the report and the specifications**.

CHAIRMAN GILMORE: Stew Michels seconded the motion. Bill, could we specify that it is Harvest Package Three under that so it is clear?

MR. ADLER: Yes; add that in.

CHAIRMAN GILMORE: Is there any discussion on the motion? **Motion to accept the report and the specification of Harvest Package Three for the Delaware Region for 2015. Motion by Bill Adler and seconded by Stew Michels. Is there any objection to the motion? Seeing none; we will accept that as unanimously approved.**

FMP REVIEW AND STATE COMPLIANCE

CHAIRMAN GILMORE: Okay, moving on, the next agenda item is FMP Review and State Compliance. Marin.

MS. HAWK: This will also be very brief. This is the total harvest for horseshoe crabs by biomedical and the bait industry. I'm going to break it down a little bit for you. For the bait fishery there was a total harvest of 796,939 crabs, which is an increase of 18 percent from 2012. However, the harvest is still well below the coast-wide quota, which is 1.4 million crabs.

In terms of the biomedical harvest, the number of crabs that were brought to biomedical facilities was 549,937 crabs. This a 3 percent decrease from the previous five-year average. There was a total of 60,622 crabs that were used in the biomedical industry and bled that was transferred from the biomedical industry to the bait industry. That is actually a 33 percent decrease from the past five-year average. The coast-wide mortality estimate was 78,007 crabs.

In terms of state compliance, all states submitted reports. The PRT found that all state management measures were consistent with the FMP. The District of Columbia did not submit a report. As in years past, the PRT recommends that the District of Columbia as well as the Potomac River Fisheries Commission take steps to be removed from this board.

In addition, the PRT strongly recommends the continuation of the benthic trawl survey. I think the board agrees with that, so we'll continue working on that. Finally, there were five jurisdictions that requested de minimis. New Hampshire, Potomac River Fisheries Commission, South Carolina, Georgia and Florida all qualified and requested it. New Hampshire has been removed from the board. New Jersey qualified but did not request it. The PRT recommends granting all requests for de minimis. Thank you, Mr. Chairman.

CHAIRMAN GILMORE: Any questions for Marin? Bill Adler.

MR. ADLER: If the Potomac River Fisheries and D.C. are de minimis; do they still have to put in that report that they didn't put in?

MS. HAWK: The Potomac River Fisheries Commission submitted their report. They do have to submit one; but D.C. has not submitted one for at least two years.

MR. ADLER: And if they are de minimis, do they have to put that report in?

MS. HAWK: Yes, they do.

CHAIRMAN GILMORE: Other questions for Marin? Robert Boyles.

MR. ROBERT H. BOYLES, JR.: Mr. Chairman, is it an action by this board or is it an action by the commission to remove D.C. and PRFC?

MS. HAWK: I believe D.C. has to come to the commission and ask to be removed.

MR. BOYLES: I guess it is untoward to say anything about Washington ignoring the needs and the wants of the states. I guess that is out of line and out of order, right?

MR. BALLOU: Marin, it is nice to see a report that doesn't have any holes in it due to confidentiality issues. Is that because with regard to the biomedical figures that you put up there is at least three or more companies; is that why we're able to see the full report?

MS. HAWK: That is correct; there are five biomedical companies along the coast; so we can smoosh them all together.

CHAIRMAN GILMORE: Anymore questions for Marin? Okay, I'm going to need a motion to accept the compliance reports. Go ahead, Robert.

MR. BOYLES: Just a technical question; D.C. is required to submit a compliance report but has not?

MS. HAWK: That is correct; and this now the third year in a row where they have not and have not responded to any inquiries as to submitting a report.

MR. BOYLES: Mr. Chairman, I think that warrants some action by this board; would you agree?

CHAIRMAN GILMORE: Yes, I would, Robert, if essentially we're into the third year on this. I'm not sure of the procedure on this. Normally they would request to be removed from the board; but I guess we could put a motion up to remove them if the board sees fit.

MR. THOMAS O'CONNELL: In regards to this issue, Marin, you said that they haven't been responsive to inquiries. Has that been a letter or has there been a phone call? They were here this week; and I was wondering if the issue was brought up to them personally. I would think that they would be responsive but maybe I'm wrong.

MS. HAWK: It was not brought up this week. I have called and e-mailed but with no response.

MR. O'CONNELL: I would recommend maybe another follow-up call; and if they don't respond, then the board consider taking some action.

MS. HAWK: I also believe about a year ago when all the states declared interest in these boards; they were non-responsive in terms of horseshoe crabs as well.

CHAIRMAN GILMORE: Toni, would a letter be more appropriate on this because obviously they have talked to and a phone call is probably going to have the same result. Maybe something in writing might be more beneficial.

MS. KERNS: We can send a letter and an e-mail with that exact same letter and see what we can do.

CHAIRMAN GILMORE: Does that sound good for everybody on the board? Go ahead, Craig.

REPRESENTATIVE CRAIG A. MINER: If I could suggest that maybe someone as high up in our food chain as possible could make a phone call rather than sending a letter; I think that might be a better step. It is amazing what happens when somebody gets the wrong letter.

CHAIRMAN GILMORE: Who do you suggest in the food chain?

REPRESENTATIVE MINER: Maybe a director or maybe the head of our council. It may just not be getting somebody's attention; but if somebody gets a letter from this group, it may not be the kind of attention that we want I guess is my point.

MS. KERNS: Why don't Bob or I give Bryan a call first to see if we can work it out; and if not,

then we may ask for assistance from Tom since I know Tom does talk to Brian on a fairly regular basis. We know we might get a response from there. How about we try that?

CHAIRMAN GILMORE: That sounds like a great plan. Are you okay with that, Tom? Okay, that sounds like a good approach. Okay, I'm back to we need a motion to accept the compliance reports and the de minimis. Bill Adler.

MR. ADLER: **I make a motion to accept the compliance reports and the FMP Review.**

CHAIRMAN GILMORE: And the requests for the de minimis for the states up on the board?

MR. ADLER: **I'll that, the de minimis states of New Hampshire and Potomac River Fisheries Commission.**

CHAIRMAN GILMORE: Seconded by Dave Simpson. Is there discussion on the motion? David Pierce.

DR. DAVID PIERCE: Just a clarification, Mr. Chairman, regarding de minimis. Maybe there is a sequence I'm not quite appreciating here; but under the management plan review there is an action item. It indicates that Massachusetts and New York have also requested de minimis. Should this be modified to include New York and Massachusetts or is that the subject of another motion?

CHAIRMAN GILMORE: That actually was the subject of a typo. When I saw that, I thought that was a test to see if I was actually reading the material. I don't think I'm going for de minimis. I don't know if Massachusetts is interested in de minimis. I think those were just typos in the original agenda.

DR. PIERCE: Well, I must admit I'm sitting in for my colleague, Dan McKiernan, and I didn't think we were requesting de minimis. When I see Massachusetts here in the list, it is a bit confusing, to say the least. I'm going to assume that we're not requesting de minimis and that this is also mistake that we've been lumped in with our friends from New York. Unless someone in the room from Massachusetts knows differently, I'm not going to make a motion to include Massachusetts.

CHAIRMAN GILMORE: Rest assured, David, I've looked at it and Massachusetts and New York do not meet the requirements for de minimis. Any other discussion on the motion? Move to accept the compliance reports, the FMP Review and de minimis status for the states of New Hampshire, PRFC, South Carolina, Georgia and Florida. Motion by Mr. Adler; seconded by Mr. Simpson.

Is there any objection to the motion? **Seeing none; the motion is approved by unanimous consent.**

ELECTION OF VICE-CHAIR

CHAIRMAN GILMORE: Now we can move on to I believe our last order of business, which is we have to elect a vice-chair. Since I just took over and we don't have a vice-chair, we need to get one. There are some fabulous perks with this job, incredible travel. You can see great place on the east coast of the U.S. and a great species. Are there any nominations for vice-chair? Mr. Woodward.

MR. SPUD WOODWARD: **Mr. Chair, I would like to nominate Dr. Malcolm Rhodes from South Carolina as vice-chair.**

CHAIRMAN GILMORE: Wonderful; is there a second to that motion; Russ Allen. Robert.

MR. BOYLES: Mr. Chairman, I move we close the floor to nominations and that Dr. Rhodes be appointed as vice-chair by acclamation.

CHAIRMAN GILMORE: I think everyone agrees with that. Thank you, Mr. Boyles. **Congratulations, Dr. Rhodes, welcome to the team**.

ADJOURNMENT

Is there any other business to come before the Horseshoe Crab Board? Seeing none; a motion to adjourn. So moved. Thank you, everyone.

(Whereupon, the meeting was adjourned at 9:25 o'clock a.m., October 30, 2014.)

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

ASMFC Horseshoe Crab and Delaware Bay Ecosystem Technical Committees Meeting Summary

Arlington, VA
October 9, 2015

Technical Committee Members: Steve Doctor (HSC TC Chair, MD DNR), Penny Howell (CT DEEP), Greg Breese (DBETC TC Chair, US FWS), Mike Millard (phone, US FWS), Joanna Burger (Rutgers), Derek Perry (MA DMF), Jeff Brust (phone, NJ DFW), Tiffany Black (FL FWC), Amy Fowler (SC DNR), Rachael Maulorico (VMRC), Steve Poland (NC DMF), Jim Page (GA DNR), Derek Orner (phone, NOAA), Rachel Systak (NY DEC), Dr. Amanda Dey (NJ DFW), Eric Hallerman (Virginia Tech), Dave Smith (USGS), Wendy Walsh (US FWS), Ed Hale (phone, DE FW), John Sweka (phone, US FWS), Chris Wright (phone, NOAA)

ASMFC Staff: Kirby Rootes-Murdy

Public: Richard Lambird

The Horseshoe Crab Technical Committee and Delaware Bay Ecosystem Technical Committee (TCs) held a joint meeting on September 9, 2015 in Arlington, Virginia to review the Adaptive Resource Management (ARM) Framework harvest recommendations. The TCs also reviewed horseshoe crab and shorebird abundance data, was updated on biomedical activities in the Gulf of Mexico, and received a report on the artificial bait trials. Below is a summary of their discussion.

1. ARM Framework Optimal Harvest Recommendation for 2015

Virginia Tech Trawl Survey Update: Eric Hallerman provided an update of the Virginia Tech Horseshoe Crab Trawl Survey for 2015. While funding is available for the 2015 season from ASMFC through the Saltonstall-Kennedy grant funds, there have been some administrative hurdles in getting the survey started and the window for conducting the survey this season is shrinking. The grant agreement is for the survey to be conducted in both the core area from Atlantic City, NJ through Wachapreague, VA; including inside the Delaware Bay) and peripheral stations (similar to 2012 year; when full funding was available) for the 2015 survey. The group expressed concern over whether the survey would effectively sample horseshoe crabs much later in the season given movement patterns. ASMFC Staff notes that they will work with Virginia Tech to sort out the grant finalization issue so the survey can proceed this year.

Composite Index: John Sweka walked the group through the composite index developed for the ARM model in 2015. The ARM model requires single estimates of adult male and female horseshoe crab abundance in the Delaware Bay region- therefore, the surveys needed were combined into a single composite index. A linear mixed random effects model was used to generate the composite index for each year from 1998-2014. In this type of model, each

individual survey within the year represented a random effect. The final set of surveys used in the composite index were the Delaware 30 ft trawl survey, the New Jersey Delaware Bay trawl survey, and New Jersey Ocean trawl survey. These surveys were selected because they had; 1) sex-specific abundance indices; 2) had overlapping years of data with each other and the Virginia Tech (VT) trawl survey; 3) and are understood to be likely continued into the future. Surveys considered but ultimately not used in the composite index were the Maryland Coastal Bays Trawl Survey, NJ Surf Clams Dredge Survey, and Delaware 16ft trawl survey). The New Jersey Surf Clam dredge survey was eliminated because it has ended. The Maryland Coastal Bay trawl survey was eliminated because catches of horseshoe crabs were low making sex-specific indices of abundance questionable. The Delaware 16 ft trawl survey was eliminated because it samples juveniles. Finally, the Delaware Bay Spawning Survey was eliminated because it is a completely different type of survey compared to the trawl surveys included. John pointed out that he scaled up the population estimates to the composite index, that the composite index doesn't overly weight any of the surveys, and that there is good overlap between 2002-2011 when comparing the composite index against the VT trawl survey. In deriving a population estimate from the composite index, the estimate is approximately 16.3 million males and 8.4 million females for 2014.

The group discussed a few elements of the surveys considered, specifically whether they were occurring during the non-breeding period, how indices of abundance for the surveys were created as the surveys occur multiple times over the year and lastly how the abundance estimates tracked with the VT trawl survey. It was noted that the 2014 estimate of female crabs (8.4 million) using the composite index was nearly double the 2012 estimate (4.5 million) from the VT trawl survey. John explained this large difference was attributed to variability in the surveys used for the composite index and that estimates may vary higher and lower in a given year. The group did not note any issues with the methodology and felt this was a good approach in lieu of the VT trawl survey in recent years.

Red Knot mark-resight population estimates: Kirby Rootes-Murdy briefly walked the group through the mark-resight data and stop-over population estimate for Red Knots that Jim Lyons (ARM subcommittee member) developed for the 2015 ARM model. The population size of the marked birds was estimated using the Jolly-Seber model. The proportion of the population that is marked was estimated with a binomial model and the count of marked birds. Overall, estimated resighting probability of red knots in 2015 appeared to be lower than in 2014. The estimated proportion of the stopover population with marks was lower in 2015 than during 2011-2014 (9% in 2015, relative to 10-11% from 2011-2014). The stopover population for 2015 was estimated at 60,727 birds (95% CI, 55,568-68,732) a 38% increase from the 2014 estimate (44,010) and a 25% increase from the 2013 estimate (48,955). As noted in Jim's report, part of this increase may be due to the record number of flagged birds detected in the Delaware Bay area in 2015. The number of flagged birds detected each year is a function of the size of the banded population, the proportion of the *rufa* population that stops in the Delaware Bay area in a given year, and the resighting probability. The record number of the

flagged birds detected suggests that a greater proportion of the *rufa* population may have stopped in Delaware Bay area in 2015 than in recent years.

Some of the TC members noted concern over the 2015 estimate, noting that small little changes in other variables in the aerial and ground count surveys would likely not result in a large increase in the population. Specifically, a systematic resights protocol should be followed to ensure the data collected are representative (i.e. covers all locations used by birds and the full period of the migration stopover in May). These concerns were raised during the initial review by the ARM subcommittee, but an alternative estimate was not put forward so it remained unchanged. Noting this and the subsequent lack of change in harvest level outputs from the 2015 ARM, the group was in agreement with this estimate moving forward.

Review of model output & Recommendation to Board/Discussion: In considering the two previous items as inputs to the model, the group reviewed the outputs of the 2015 ARM model. The model outputs for harvest levels in 2016 remained unchanged from 2015. Last year (2014), the TCs recommended staying status quo with the previous year's harvest levels. The 2015 ARM outputs for 2016 harvest mark three years (2014-2016) of consistent harvest levels (see below).

Decision matrix was optimized incorporating recommendations on red knot stopover population estimates and associated calibration of red knot threshold[4].

Recommended harvest package	Male harvest (×1,000)	Female harvest (×1,000)
3	500	0

Table 1: Harvest recommendations based on harvest package three of the ARM model. Allocation of allowable harvest under ARM package 3 (500K males, 0 females) was conducted in accordance with management board approved methodology in *Addendum VII to the Interstate Fishery Management Plan for Horseshoe Crabs*. Note: Maryland and Virginia total quota refer to that east of the COLREGS line.

	Delaware Bay Origin HSC		**Total State Quota**	
State	**Male**	**Female**	**Male**	**Female**
Delaware	162,136	0	162,136	0
New Jersey	162,136	0	162,136	0
Maryland	141,112	0	255,980	0
Virginia	34,615	0	81,331	0

The TCs were in agreement with maintaining these harvest levels with the addition of the composite index in place of the VT survey, but noted that the following items needed to be addressed moving forward:

i. The ARM Model as specified in Addendum VII (2012) is to be reviewed and updated as needed through the double- loop process every 3-4 years; 2015-2016 falls on the end of

this cycle. **The TCs recommend that the double-loop review process is the highest priority in 2016**.

ii. In conducting the double-loop review process, the ARM's Objective, Predictive, Monitoring (three parts of the model) would need to be re-considered. The TCs recommend that the ARM subcommittee develop draft terms of reference for the double-loop of the ARM and subsequent timetable for the scope of work on specific items to be reconsidered through the double-loop.

iii. As part of the double-loop review process, the TC notes two items that specifically need to be reconsidered- the mark-resight estimate and ratio, and the population threshold for allowing the harvest of female crabs. If the Double loop process is not done in 2016, analysis of these two items need to be done in 2016.

iv. The need for a coastwide benchmark stock assessment remains as the last one fully completed was in 2009. The group felt that an assessment update without the inclusion of the data from the biomedical catch is not useful. The TC recommends that benchmark assessment be conducted as soon as biomedical data confidentiality issue can be resolved.

The TCs further discussed the role of the biomedical data and data confidentiality. The group noted that post-release mortality from biomedical bleeding needs to re-evaluated and considered for the next assessment. **With the addition of new biomedical facilities in the Delaware Bay region in recent years, ASMFC staff will check whether the 'rule of three' would still apply.**

One final note: last the TCs found the use of NEAMAP data problematic for use with the ARM and instead used the option of status quo harvest at the previous year's level. This year the TCs accepted the findings from the composite horseshoe crab index, and were able to allocate harvest using the ARM model.

2. Maryland proposal for 2016 harvest alternative

Steve Doctor went through the Maryland harvest proposal for 2016. Maryland's bait quota was 170,653 horseshoe crabs from 2007-2012 (2:1 ratio of male to female from 2009-2012). Starting in 2013, Maryland's quota was increased to 255,980 crabs, but only males could be harvested. The increased quota was intended to make up for the financial loss of no female harvest in the state. Female crabs fetch a higher market price than males due to their production of eggs and their appeal in the conch fishery. However, without some females in the catch the increased allowable male harvest has not offset the loss of harvesting females, and the fishery is currently underutilizing its current bait quota due market timing and demand for females crabs caught by other states. Maryland's proposal is to reduce their overall bait quota for 2016 from 255,980 to 170,653 with the aim to catch approximately 34,130 female horseshoe crabs. As part of the proposal, the TCs were asked: 1) what the current estimate of the adult female

population size for the Delaware Bay Horseshoe crab stock? And 2) what the biological impact of harvesting approximately 34,000 females from the MD coast where approximately 35% of crabs harvested in the MD coastal region are from the Delaware Bay stock?

The TCs discussed the proposal and were in agreement on the following points;

-The group felt that the proposal of harvesting approximately 34,000 female crabs was a relatively small number of the crabs from the DE Bay population (assumption being 1/3 of crabs harvested from MD coast would be from DE Bay population). The VT trawl survey (2002-2011) annually estimated female abundance between 2,900,000-9,530,000 females. The composite index of female abundance for 2012-2014 ranged between 5,950,225-8,407,654 females.

-Maryland's stipulation that the harvest would be from the open ocean and not allowed from spawning beaches may be more conservative than taking crabs from the Chesapeake Bay. Steve Doctor noted concern over allowing harvest of females in the MD portion of the Chesapeake Bay due to uncertainty in the population size.

-A small female harvest from Maryland may be beneficial in decreasing pressure on areas outside of Delaware Bay that are currently experiencing higher fishing pressure for female crabs because of the closure of female harvest in the Delaware Bay region.

-The sex ratio has become more skewed in recent years under the no female harvest (from 2:1 to 4:1) and the taking of females may negatively affect the current demographic.

Concerns:

-The TC noted that the proposal is not technically consistent with the ARM process, which creates more variables thus leading to less certainty in the performance of the ARM model.

-The TC also raised concerns that this creates a slippery slope/precedent setting for other states such as Delaware to begin harvest of females.

-The TC also noted there hasn't been an increase in the abundance estimate from the spawning survey in recent years with the no harvest of females allowed. While that may indicate stability in the population, it is unclear what impact it may have on the population.

-Lastly, there was a minority opinion regarding the methodology and accuracy of the female population estimate from the composite index.

The TC noted that the decision for change to the harvest limits in the Delaware Bay was ultimately a Management Board decision, but that these consideration should be understood and communicated.

One further point was that with the review of the ARM (see above) there will be an opportunity to re-evaluate the harvest allocation to the states, which could take new information regarding genetics, market demand and impact on the fishermen into account.

3. Review of Horseshoe Crab Surveys

The following reports were reviewed by the TCs:

1) Delaware Bay Trawl Surveys (Delaware 16 - foot and 30 - foot) Report
2) New Jersey Surveys (Ocean Trawl, Delaware Bay Trawl) Report
3) Delaware Bay Horseshoe Crab Spawning Survey Report
4) Maryland Horseshoe Crab Spawning Survey Report
5) Delaware Bay Horseshoe Crab Egg Survey Evaluation and Report
6) Delaware Bay and Atlantic flyway Red Knot Survey Report

Delaware Surveys: Ed Hale went through the spawning survey. In the Delaware Bay, there was no change in Baywide spawning. The DE 16 ft Trawl Survey has been an index for a number of species, and 2014 was our biggest bump in abundance since 1996.

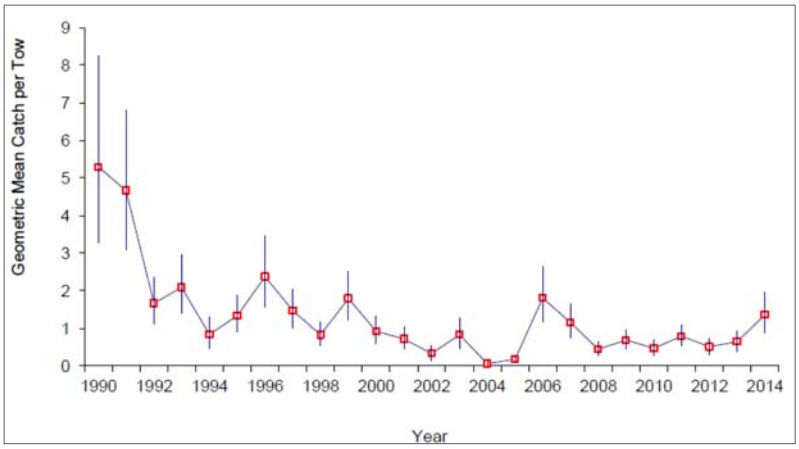

Figure 1. Index of horseshoe crab relative abundance from Delaware's 30ft trawl survey (all months sampled)

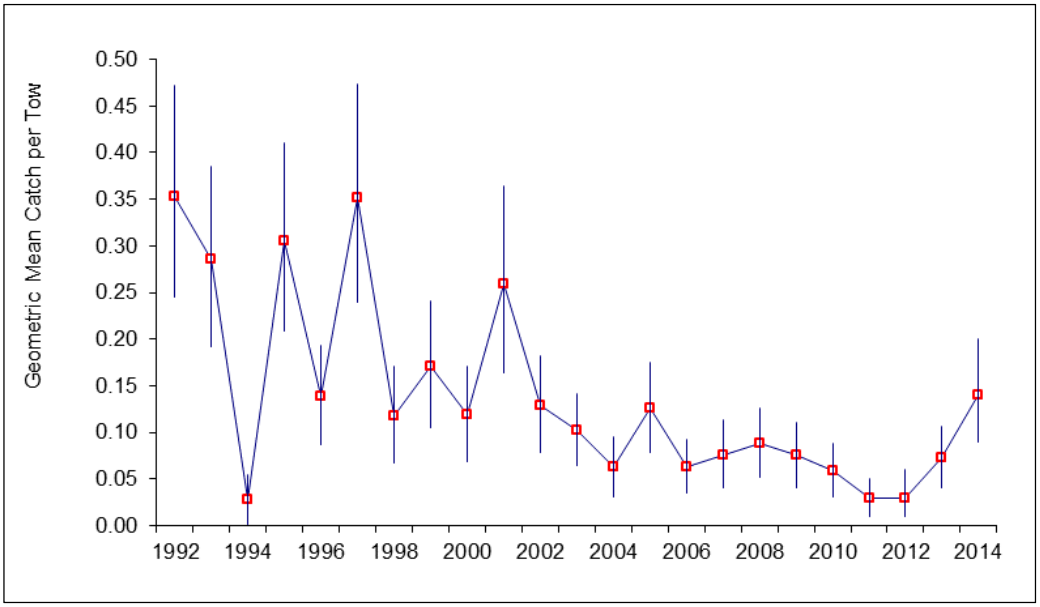

Figure 2. Index of adult horseshoe crab relative abundance from Delaware's 16ft trawl survey- Delaware Bay results

Maryland Surveys: Steve Doctor walked the group through the MD Coastal Bays Trawl Survey and presented data from a commercial offshore trawler. MDNR continues to collect the required horseshoe crab data from the Maryland Coastal Bays Trawl Survey. Data are collected monthly with a 16 ft otter trawl from April to October. The index shows an increasing trend in recent years (2008-2014).

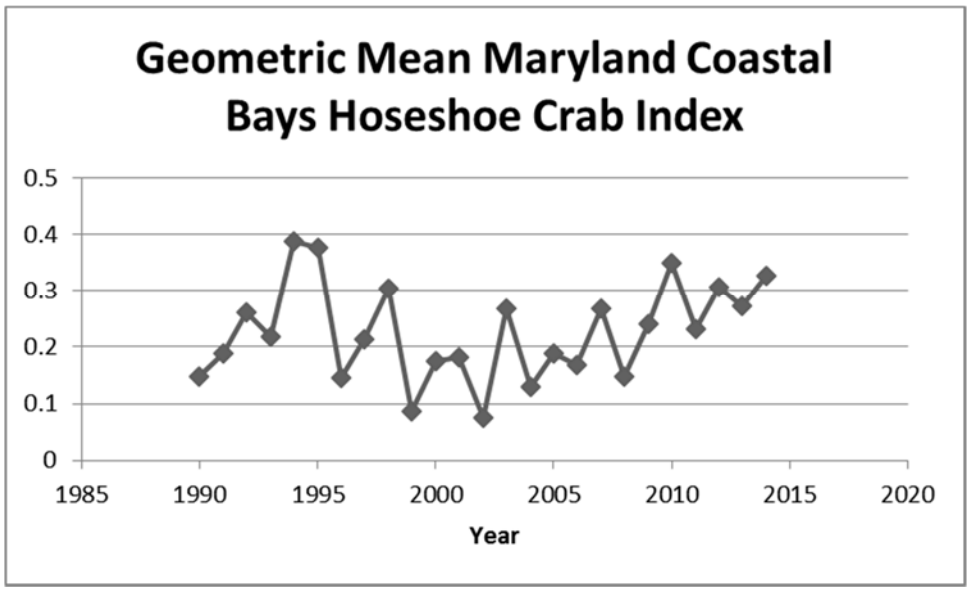

Figure 3. Horseshoe Crab trawl index of relative abundance (geometric mean) 1990-2014.

New Jersey Surveys: Jeff Brust went over the New Jersey survey results. NJ started counting crabs (sexing them) in 1999 and have done so through the present. The Delaware Bay Trawl Survey samples from April through August and has shown no significant trend, some trending upwards but not significant. 2003 seems to be the low point in the bay survey. NJ lost funding for the surf clam index, although they got funding to do in 2015.

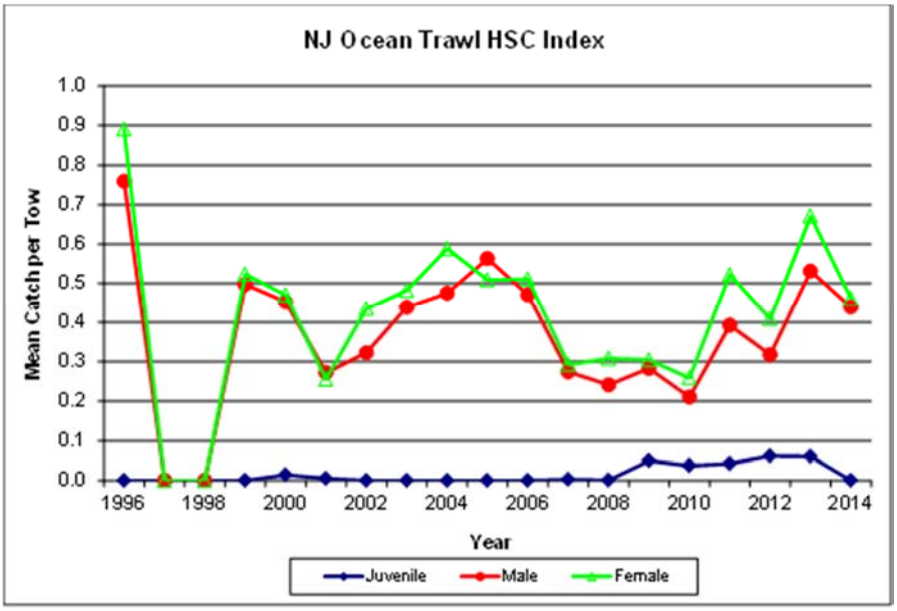

Figure 4. Geometric mean number of horseshoe crabs caught per tow in the New Jersey Ocean Trawl Survey.

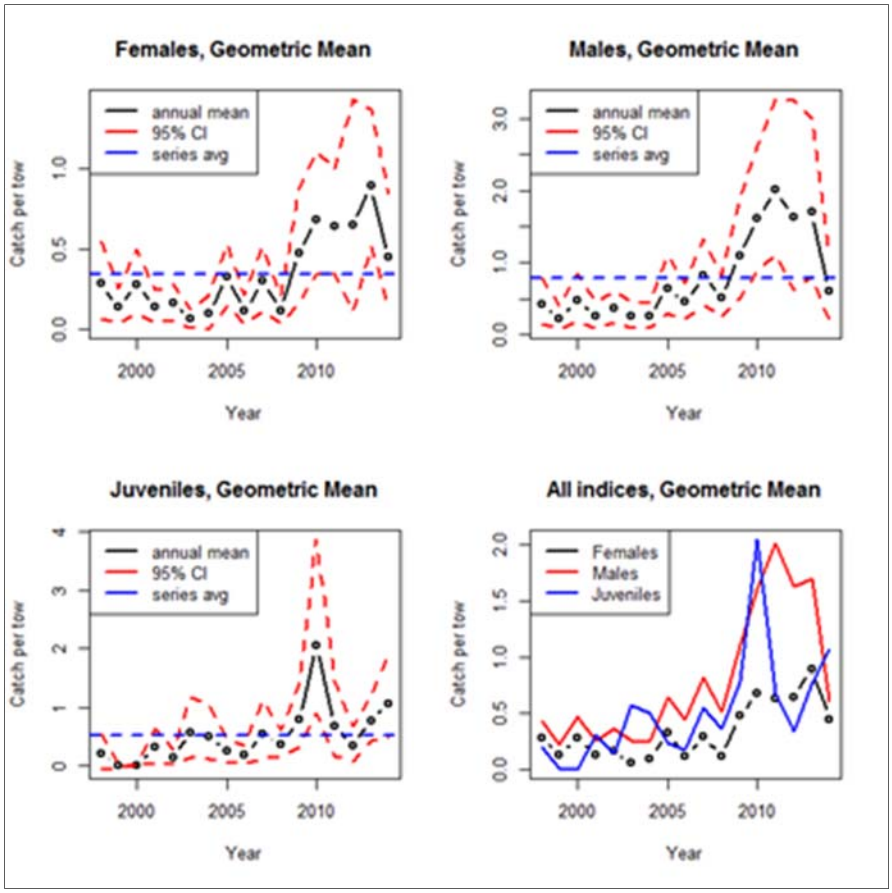

Figure 5. Geometric mean number of horseshoe crabs caught per tow in the New Jersey Delaware Bay Trawl Survey.

Generalized summary results for all states- surveys have been stable or increasing from the 2008-2014, but interannual variability

4. Shorebird Surveys and Egg Surveys

Amanda Dey went through the shorebird surveys (with data from NJ, DE, and MD). Shorebird stopover and winter population estimates have remained low but stable over the last few years(2010-2014). The proportion of red knots reach adequate weight (180 grams) improved in 2015. Surface densities of horseshoe crab eggs (top 5 cm) also improved, but not significantly. Other indices of shorebird foraging conditions have remained stable (female spawning crab index).

Wendy Walsh explained to the group the USFWS's efforts to address the listing of red knots as threatened.

5. Gulf-crab bleeding research update & IUCN letter

Dave Smith walked the group through the IUCN letter. The IUCN subgroup has raised concern over the recent development of a biomedical fishery in the Gulf of Mexico that is primarily for export to Asian markets. Currently there is permit holder who resides on the Gulf Coast of Florida but their permit encompasses the entire state; they can harvest from either the Atlantic

or Gulf coasts of Florida. Without a current Gulf States Marine Fisheries Commission (GSMFC) FMP on horseshoe crabs and limited regulations on harvesting of horseshoe crabs in the Gulf of Mexico, the subgroup urges that the ASMFC offer any technical assistance needed for guiding the development of a regulatory framework for the biomedical fishery. Recently a harvester in FL was issued a permit to harvest horseshoe crabs on FL's Gulf coast, but both USGS and FLFWC staff are concerned that there are not effective mechanisms in place to monitor this harvest and potential impacts to regional population.

The TCs were in agreement with the information presented and had the following recommendations:

1. The TCs are supportive of opening up a line of communication with the GSMFC on guidance for the development of a Fishery Management Plan in the Gulf of Mexico as well as providing additional information on the Best Management Practices (BMPs) for biomedical facilities in the handling, treatment, and release of Horseshoe Crabs.

2. While the biomedical facility BMPs are largely adhered to (developed by the ASMFC Horseshoe Crab Ad-hoc Working Group in 2011), the current coastwide harvest mortality (15% mortality on 570,000 crabs) threshold have been exceeded annually in recent years. Both items are currently not compulsory in the FMP and the TCs feel that both the underlining assumptions of acceptable mortality from bleeding (bleeding mortality may range from 5-30% based on recent research) and the biomedical harvest levels should be considered in the next Addendum to the FMP.

3. The TCs would like further clarification on the jurisdictional bounds within the ASMFC Horseshoe Crab FMP regarding requirements that could be imposed on biomedical facilities.

6. Gulf-crab bleeding, Marine Life Landings, and additional mortality in FL

Tiffany Black followed Dave's presentation regarding her experience in the permitting process regarding the Biomedical Permit issued to the mobile facility. Additionally Tiffany presented current mortality issues that have developed from intake pipes at Cape Canaveral Power & Light facility. Horseshoe crabs have been reported being removed from the intake grates and disposed of at a nearby landfill- it has been estimated that approximately 109,000 crabs been taken from the Power Plant stations in the Indian River Lagoon system annually from the 1970s through the early 2000s (Ehlinger & Tankersly, 2007). Cape Canaveral Power & Light facility has proposed to address this mortality through placing barriers in their intake value areas that would prevent Horseshoe Crabs from becoming trapped. While this has been reported for one facility, there is concern that a similar level of mortality may be occurring at other power plants on FL's east coast (there are at least 5 other power points where this may occurring).

The second item Tiffany presented on was the marine life harvest vs bait harvest. Currently Florida's bait harvest quota is 9,455 crabs annually. While Horseshoe Crabs aren't considered marine life species in Florida (designation given to commercial species used for aquaria and research) there are significant higher numbers of crabs that are taken outside of the bait fishery. On the west coast, the marine life harvest of horseshoe crabs is closer to 20,000 individuals annually.

The TC shared concern over the likely higher mortality of horseshoe crabs along the Florida coast. The TC would like the Board to be aware of the higher mortality and consider it in the *de minimis* status requests annually.

7. Artificial Bait Trials Results

Kirby Rootes-Murdy briefly went over the artificial bait trial timetable and results. At the February 2014 Board Meeting, the Horseshoe Crab Management Board tasked the TC with conducting artificial bait trials. A working group was formed with representatives from the states of Massachusetts, Rhode Island, Connecticut, and Delaware. In April 2014, the working group met by conference call to develop a proposal process for the states to conduct the bait trials with LaMonica Foods. The work was to be completed during the 2014 fishing year. The Management Board was to be updated at the February 2015 Board Meeting, but was not ultimately reviewed due to timing.

In terms of the results, Rhode Island and Connecticut were able to conduct the trials- data are still being written into more formalized reports. Massachusetts and Delaware were unable to conduct the trials due to issues with securing the artificial bait from LaMonica Foods.

Maryland Proposal to Reduce the Commercial Horseshoe Crab Quota for 2016

The horseshoe crab harvest limit in Maryland was 170,653 horseshoe crabs from 2003 until 2012 (Table 1). On June 8, 2013 the regulations were changed by public notice to reflect a new harvest limit of 255,980 male only horseshoe crabs, and this quota remained in 2014 and 2015. The increased harvest of males was intended to make up for the financial loss of female harvest in the state.

Table 1. Summary of Maryland's 2007 - 2014 Horseshoe Crab Bait Fishery Quotas.

Year	2007	2008	2009	2010	2011	2012	2013	2014
Quota	170,653	169,189	170,653 2♂:1♀	170,653 2♂:1♀	170,653 2♂:1♀	170,653 2♂:1♀	255,980 ♂ only	255,980 ♂ only

Table 2. Summary of Maryland's 2007 - 2014 Horseshoe Bait Fishery Landings, n=1,391,397.

Harvest Category	2007	2008	2009	2010	2011	2012	2013	2014
# Males	70,768	97,237	114,134	119,207	131,375	114,306	240,688	148,269
# Females	101,349	66,258	50,698	42.338	35,568	54,760	0	0
# Unsexed	0	0	602	602	110	21	0	0
Total #	**172,117**	**163,495**	**165,344**	**161,545**	**167,053**	**169,087**	**240,688**	**148,269**
Total lbs.	653,732	535,444	496,040	463,139	455,309	503,441	529,513	314,330
% Females	59	40	31	26	21	32	0	0

The tradeoff was never fully attained and the horseshoe crabs harvest continues to decline in Maryland. As of Mid-August, 2015 the total harvest so far is approximately 4,000 horseshoe crabs. There is a very limited market for male horseshoe crabs in Maryland when the commercial season opens, as other states have taken up the harvest of female crabs that Maryland used to supply. Many horseshoe crabs supplied by other states were harvested early- before June 6th, before Maryland opened their directed horseshoe crab fishery. This has created a financial burden for the 10 permitted horseshoe crab harvesters in Maryland.

Maryland has a large indigenous spawning population of horseshoe crabs and is mindful of protecting that population. There are Islands with beaches in the Coastal Bays that are protected during the spawning season. Maryland does not allow directed commercial harvest of horseshoe crabs until after June 6th, the date established by ASMFC as protecting spawning horseshoe crabs. Maryland also does not allow beach harvest and restricts biomedical bleeding to males only until after June 6th to allow female horseshoe crabs to be as fit as possible when spawning.

The purpose of eliminating the female harvest in Maryland was to protect horseshoe crabs of Delaware Bay origin; however, not all of them are of Delaware Bay origin. Genetic analysis of horseshoe crabs along the Maryland coast by Virginia Tech indicated that 34.2% (Eric Hallerman-personal communication)

of the horseshoe crabs found off the coast of Maryland are genetically predicted to be of Delaware Bay origin.

Maryland is proposing to reduce the horseshoe crab quota back to 170,653 animals and allow a modest female harvest. The intent is to offer some economic relief to the fishermen that have been affected by the quota changes that were instituted in 2013. Maryland is also proposing a four males to one female harvest which translates to 34,130 female horseshoe crabs. Maryland intends to track the catch as carefully as in the past and retain the other conservation measures as outlined above.

As part of a technical committee review of this proposal, there are a few questions that may help inform a decision:

- What is the current estimate on adult female population size for the Del Bay stock of HSCs?

- What is the biological significance of removing 34 thousand female horseshoe crabs from Maryland coast on the Delaware Bay horseshoe crab population- keeping in mind that only approximately 35% are actually Delaware Bay origin?

IUCN SSC
HORSESHOE CRAB
Specialist Group

Paul K.S. Shin, South East Asia Co-Chair
Mark L. Botton, North America Co-Chair

October 5, 2015

Mr. Robert Beal, Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland Street
Suite 200 A-N
Arlington, VA 22201
rbeal@asfmc.org

cc: Kirby Rootes-Murdy, Chair, Horseshoe Crab Fishery Management Plan (*krootes-murdy@asmfc.org*)
Dr. James Cooper, Chair, ASMFC Horseshoe Crab Advisory Panel (*JIMANDFRAN2426@OUTLOOK.COM*)
Dr. Mike Millard, US Fish & Wildlife Service (*mike_millard@fws.gov*)
Dr. David R. Smith, US Geological Survey (*drsmith@usgs.gov*)
Dr. H. Jane Brockmann, University of Florida (*hjb@ufl.edu*)
Dr. Ruth H. Carmichael, Dauphin Island Sea Lab (*rcarmichael@disl.org*)

Dear Director Beal,

As Co-Chairs of the Horseshoe Crab Specialist Group of IUCN, the International Union for the Conservation of Nature, we are writing to alert you to our serious concerns about the emergence of a biomedical fishery for American horseshoe crabs (*Limulus polyphemus*) in the United States Gulf of Mexico.

We have been strong supporters of the ASMFC Horseshoe Crab Management Plan for the horseshoe crab [1], which has balanced the multiple uses of the animals for biomedical and bait fisheries, while seeking to maintain a suitable resource of eggs for migratory shorebirds in the Delaware Bay region. However, horseshoe crab populations on the Gulf of Mexico coast of Florida, as well as those in Alabama, Mississippi, Louisiana and Texas, are not under the jurisdiction of ASMFC.

It has come to our attention that a Horseshoe Crab Biomedical Collecting Permit was issued in August 2015 by the Florida Fish and Wildlife Conservation Commission, Tallahassee Office. While Florida Regulation 68B-46.002 stipulates a daily bag limit of 100 horseshoe crabs, it also indicates that "persons possessing a valid Horseshoe Crab Biomedical Collecting Permit are exempted from bag and possession limits specified in paragraph (a) of this subsection if the horseshoe crabs collected are maintained and released alive" [2]. The ASMFC assumes a 15% mortality caused by biomedical bleeding and associated handling [3], based on best practices.

We have a number of specific concerns about the emergence of a biomedical fishery for horseshoe crabs in the Gulf of Mexico that we would like to bring to your attention.

1. Although Florida statutes limit the number of horseshoe crabs that can be collected by those with a Saltwater Products license to 100 horseshoe crabs per day, the State does not have an overall limit on the number of horseshoe crabs that can be collected in the State.

2. The permit holder states that he is using a "mobile trailer facility for temporary holding." The details of this facility are not spelled out and it is not clear that this is an appropriate facility for storing horseshoe crabs prior to and after bleeding to meet the needed standard for best practices. The permit suggests, *but does not require*, that the permit holder follow best practices for biomedical bleeding as detailed in the 2011 Best Management Practices developed by the ASMFC. We are concerned that the mortality due to bleeding could greatly exceed the presumed level of 15%.

3. In Florida, the biomedical permit allows the holder to take horseshoe crabs from their spawning grounds. Fisheries managers do not allow harvest to take place on most spawning grounds because of the inevitable effect on the population

4. There is no management structure for the West Coast of Florida (or other parts of the US Gulf of Mexico coast) because the Gulf States Marine Fisheries Commission does not have a horseshoe crab management plan. Horseshoe crabs are declining in Asia, and the diminishing supply of Chinese horseshoe crabs (*Tachypleus tridentatus*) for the biomedical market will increase demand for American horseshoe crabs [4]. With the ever-increasing demand for horseshoe crabs by the biomedical industry, and the lack of management of horseshoe crabs along the Gulf Coast, it seems likely that additional watermen will seek to acquire permits to exploit these populations. Fishery managers throughout the Gulf of Mexico should consider their response proactively, *before* the problem becomes serious by developing a horseshoe crab management plan and conservation-focused regulations.

5. We acknowledge that data on the size of Gulf of Mexico populations is limited in comparison to the Mid-Atlantic and New England States [5], and only the population from Seahorse Key, FL has been studied for a long enough period of time to discern temporal trends [6]. However, we emphasize that the lack of long-term data for the Gulf of Mexico should not preclude management; indeed, following the precautionary principle, caution should be exercised in allowing the exploitation of population(s) of uncertain size. A similar situation existed on the U.S. Atlantic coast during the early days of developing a horseshoe crab management plan for that region.

6. Gulf of Mexico populations are genetically distinct with no interchange with Atlantic Coast populations; moreover, there appear to be some genetic differences between southern and northern Florida Gulf Coast animals [7]. Some regions of the Gulf Coast remain unstudied. We do know that the smaller, more isolated horseshoe crab populations in New England have proven to be more vulnerable to overfishing than the

larger, more interconnected Mid-Atlantic populations [8]. This experience suggests that caution be exercised with regard to the Gulf of Mexico fishery.

We therefore urge that ASMFC and GSMFC work together to consider development of a horseshoe crab management plan for the region and enact the necessary rules and regulations to ensure the long-term viability of horseshoe crab populations in the Gulf of Mexico. Our Horseshoe Crab Specialist Group has individuals with expertise on the Gulf of Mexico and the ASMFC management process for horseshoe crabs. We are happy to provide whatever input or other support you might require.

Sincerely,

Mark L. Botton, Ph.D., Co-Chairman
Horseshoe Crab Species Specialist Group
Department of Natural Sciences
Fordham University
113 West 60th Street
New York, NY 10023 USA
botton@fordham.edu

Paul K. S. Shin, Ph.D., Co-Chairman
Horseshoe Crab Species Specialist Group
Department of Biology and Chemistry
City University of Hong Kong
Kowloon, Hong Kong
bhpshin@cityu.edu.hk

Notes

[1] ASMFC (Atlantic States Marine Fisheries Commission) (2015). Fishery management plans and FMP reviews. http://www.asmfc.org/species/horseshoe-crab

[2] Chapter 68B-46 HORSESHOE CRABS. Horseshoe Crabs Harvest Restrictions: License Requirements, Gear Specifications, Daily Bag and Possession Limits.

[3] Subcommittee, ASFMC. (2013). Horseshoe Crab Stock Assessment Update. Atlantic States Marine Fisheries Commission, 68pp.

[4] Gauvry, G. (2015) Current horseshoe crab harvesting practices cannot support global demand for TAL/LAL: The pharmaceutical and medical device industries' role in the sustainability of horseshoe crabs. In: Carmichael, R. H. et al. [eds.], *Changing Global Perspectives on Horseshoe Crab Biology, Conservation and Management*. Springer International, Switzerland, pp.475-482.

[5] Rudloe, A. (1980) The breeding behavior and patterns of movement of horseshoe crabs, *Limulus polyphemus*, in the vicinity of breeding beaches in Apalachee Bay, Florida. Estuaries 3: 177–183; Fulford, R. S. and Haehn, R. A. (2011) An evaluation of Mississippi barrier islands as spawning and nesting habitat for the American horseshoe crab, *Limulus polyphemus*, with implications for island restoration. Gulf and Caribbean Research 24: 51-62; Carmichael, R. H. Dauphin Island Sea Lab, AL, personal communication, September 2015.

[6] Brockmann, H. J. and Johnson, S. L. (2011) A long-term study of spawning activity in a Florida Gulf Coast population of horseshoe crabs (*Limulus polyphemus*). Estuaries and Coasts 34: 1049-1067.

[7] King, T. L. et al. (2015) Conservation genetics of the American horseshoe crab (*Limulus polyphemus*): Allelic diversity, zones of genetic discontinuity, and regional differentiation. In: Carmichael, R. H. et al. [eds.], *Changing Global Perspectives on Horseshoe Crab Biology, Conservation and Management*. Springer International, Switzerland, pp. 65-95.

[8] Smith, D. R. et al. (2009) Comparative status and assessment of *Limulus polyphemus* with emphasis on the New England and Delaware Bay populations. In: Tanacredi J. T. et al. [eds.], *Biology and Conservation of Horseshoe Crabs*. Springer, New York, pp. 361–386