

**PROCEEDINGS OF THE  
ATLANTIC STATES MARINE FISHERIES COMMISSION  
HORSESHOE CRAB MANAGEMENT BOARD**

**The Westin Alexandria**  
Alexandria, Virginia  
**May 3, 2016**

**Approved August 2, 2016**

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1. **Approval of Agenda** by Consent (Page 1).
2. **Approval of Proceedings of February 2016** by Consent (Page 1).
3. **Move to add Horseshoe Crab to the stock assessment schedule in 2018 and to task the Stock Assessment Subcommittee and Technical Committee to complete a regional 'black box' benchmark stock assessment.** (Page 11). Motion by Bob Ballou; second by Bill Adler. Motion carried (Page 14).
4. **Motion to adjourn,** by Consent (Page 14).

**ATTENDANCE**

**Board Members**

Bill Adler, MA (GA)  
Sarah Ferrara, MA, proxy for Rep. Peake (LA)  
Dan McKiernan, MA, proxy for D. Pierce (AA)  
David Borden, RI (GA)  
Eric Reid, RI, proxy for Sen. Sosnowski (LA)  
Bob Ballou, RI, proxy for J. Coit (AA)  
Dave Simpson, CT (AA)  
James Gilmore, NY (AA)  
Emerson Hasbrouck, NY (GA)  
Mike Falk, NY, proxy for Sen. Boyle (LA)  
Russ Allen, NJ, proxy for D. Chanda (AA)  
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)  
Tom Fote, NJ (GA)  
David Saveikis, DE (AA)  
Craig Pugh, DE, proxy for Rep. Carson (LA)

Roy Miller, DE (GA)  
Mike Luisi, MD, proxy for D. Blazer (AA)  
Bill Goldsborough, MD (GA)  
Cathy Davenport, VA (GA)  
Kyle Schick, VA, proxy for Sen. Stuart (LA)  
Rob O'Reilly, VA, proxy for J. Bull (AA)  
Michelle Duval, NC, proxy for B. Davis (AA)  
Robert Boyles, Jr., SC (AA)  
Mel Bell, SC, proxy for M. Rhodes (GA)  
Pat Geer, GA, proxy for Rep. Nimmer (LA)  
Spud Woodward, GA (GA)  
James Estes, FL, proxy for J. McCawley (AA)  
Mike Millard, USFWS  
Chris Wright, NMFS  
Martin Gary, PRFC

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

**Ex-Officio Members**

Steve Doctor, Technical Committee Chair

Doug Messeck, Law Enforcement Representative

**Staff**

Robert Beal  
Toni Kerns  
Ashton Harp

Kirby Rootes-Murdy  
Kristen Anstead

**Guests**

Doug Grout, NH (AA)  
Rep. Sarah Peake, MA (LA)  
Sen. Brian Langley, ME (LA)  
Loren Lustig, PA (GA)  
Jim Lyons, USGS  
Charles Lynch, NOAA  
Derek Orner, NOAA  
Kelly Denit, NMFS  
Alli Murphy, NMFS  
Gregg Waugh, SAFMC  
Joe Cimino, VMRC  
Jeff Deem, VMRC  
Andy Shields, PA Fish & Boat

Stewart Michels, DE DFW  
John Clark, DE DFW  
Cheri Patterson, NH F&G  
Brandon Muffley, NJ DFW  
Mark Gibson, RI DEM  
Jason McNamee, RI DEM  
Benjie Swan, Limuli Labs  
Raymond Kane, CHOIR  
Arnold Leo, E. Hampton, NY  
Brett Hoffmeister, Associates of Cape Cod, Inc.  
Allen Burgenson, Lonza Walkersville, Inc.  
David Bush, NCFA  
Christine Lecker, Wako Chemicals, USA

The Horseshoe Crab Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 3, 2016, and was called to order at 10:28 o'clock p.m. by Chairman James J. Gilmore.

#### **CALL TO ORDER**

CHAIRMAN JAMES J. GILMORE: Welcome everybody; this is the Horseshoe Crab meeting. My name is Jim Gilmore; I'm the Administrative Commissioner for New York; and I'll be chairing the meeting today. We've got a few things to go over and one action, hopefully. Well, why don't we just get into it?

#### **APPROVAL OF AGENDA**

CHAIRMAN GILMORE: First off, we have an agenda before us. There are several items on the agenda. Are there any changes to the agenda? Seeing none; we'll assume they're adopted by consensus.

#### **APPROVAL OF PROCEEDINGS**

CHAIRMAN GILMORE: We also had the proceedings from the February, 2016 meeting that was in your briefing package. Does anybody have any changes to those proceedings? Seeing none; we'll adopt those by consensus.

#### **PUBLIC COMMENT**

CHAIRMAN GILMORE: Before each meeting we offer a time period for the public to come up to the public microphone and provide public comment. This would be on actions that are not on the agenda. If you want to have a comment during some of the discussions that are on the agenda; hold those off until later. But if someone wants to make a comment, now would be the time to do it.

I had two people sign up, Benjie; let's see if Benjie is in the room. Your comment was on the agenda topic, so we'll take that later on. Christina Lecker, if you would like to go up to the public microphone. I'm sorry. Okay great, all right we'll

hold those off until later. Okay let's jump right into it.

#### **UPDATE ON THE ADAPTIVE RESOURCE MANAGEMENT FRAMEWORK REVIEW**

CHAIRMAN GILMORE: We have an update on the adaptive resource management framework review; and Jim Lyons is going to give us a presentation on that.

MR. JIM LYONS: Good morning everyone; my name is Jim Lyons; I am with the USGS Patuxent Wildlife Research Center. I have been part of the Adaptive Resource Management Subcommittee since it was formed in about 2009, here today to report on the progress of the subcommittee on this review of the adaptive resource management framework, and tell you a little bit about what we've been working on.

This type of review is a standard part of adaptive resource management, and it provides the opportunity for us to examine all the elements of the adaptive management framework; and determine if they are functioning as intended, and if they are still adequate. It is a process that was laid out in the 2009 report on the framework, and something that we've started earlier this year.

In our first meetings of the subcommittee back in the beginning of 2016 we started to begin this process of the review, and produced a list of components of the framework that could be part of the review; and came up with a number of short term things that we thought could be completed in less than a year, and a number of longer term things that would probably take more investment of time and resources; and brought those to the Board at the February meeting. The Board directed us at that time to take up the short term items, which is what I'm here to report on.

These are things that we will be completing by the fall of this year. The short term items, there are three parts of the review, one is to review the monitoring programs that are part of this decision

making framework for horseshoe crabs and for red knots. The decision making framework requires population assessments of those two species each year, and so we're evaluating the current monitoring and how well that is functioning for both species.

The second part of the review involves looking at the harvest packages or the options in our decision making framework, and asks if they are adequate or if they could be improved somehow. The third part is the objective function, which is the target of the optimization routine that produces the recommendations each year.

There are several components to this objective function or reward function, and we're looking at those and asking if they could be improved. I'm going to say a few words about each of these components, and let you know our progress on each. The first part of the review as I said, is evaluating the monitoring programs for horseshoe crabs and red knots.

With respect to horseshoe crabs, the decision making framework requires population size estimates for four age and sex classes every year. These data have probably been the most problematic part of the framework, because the framework was designed with the Virginia Tech Trawl Survey operating as a way to produce these population size estimates; but as you know the trawl survey hasn't been fully funded since 2011.

It was partially funded in 2012, but not operating in 2013,'14, or '15. Currently funding is in place for 2016. In the meantime we've been using some alternatives or some ad hoc approaches that are part of the review. One of them is a composite index approach that we developed in 2015. This composite index uses multiple surveys and multiple years to produce one index of population status for horseshoe crabs.

Then we correlated that composite index with the same years of the Virginia Tech Trawl Survey, and we attempt to predict what the Virginia Tech Trawl Survey would produce for an estimate were

it running. Despite the evidence that there's pretty good correspondence between this composite index and the Virginia Tech Trawl Survey in the years that they were run together, this is an indirect measure and something that we could improve on.

We're considering or have reviewed in our subcommittee other approaches, including a mark-recapture approach estimating population size, which seems like it might be limited because of the amount of tagging effort that would be required to make that adequate. Then finally we are discussing the potential for a catch survey model to provide the data necessary for the horseshoe crab monitoring.

But the catch survey model seems to have quite a bit of potential, but would require several years of data from a trawl survey to put that model together. All of that leads us to the suggestion that the Virginia Tech Trawl Survey is the most direct and most appropriate way to monitor horseshoe crabs; and we're emphasizing in the review that it would be in the best interest of the framework if we could secure funding for that trawl survey. We have a draft report of this part of the review that looks at each of these components, the Virginia Tech Trawl Survey, the Composite Index, mark-recapture approaches and the catch-survey model; and evaluates the pros and cons of each. We'll be summarizing recommendations for the Board with that report.

The second part of our review, the monitoring part of this review is related to red knots and the mark-recapture and mark-re-sight approach that we use to estimate red knot population sizes. We recently created a new study design and a new sampling plan for the mark- re-sight data as part of this review to make sure that the data on the bird populations are consistent with the modeling approach and reviewed this sampling plan with the field crews; and brought more clarity to the way that those data are collected, so that they can produce reliable population size estimate.

Then finally with respect to monitoring, we've had some discussions about the potential for biomedical data if available to improve the framework. It is not clear what would be available and when, so we have to continue to discuss this in more detail; and could provide recommendations on how we might be able to use aggregated data if it were available.

The second part of this major review is to look at the alternative harvest packages, the options that are available to us, and then ask if the harvest is being limited by the options that we have; and could we maybe improve on the set of packages that we're currently evaluating. The current framework has five packages.

As part of this review we've produced an alternative set of packages, including some with more potential for female harvest. We're continuing to evaluate the potential changes to the options that go into the framework, and if they can be improved some members of the subcommittee emphasized that the currently female harvest is constrained more by utility thresholds that are part of the framework.

The framework has population size thresholds for the female crab population and the red knot population. We're currently below both of those thresholds, so despite changes to the alternative harvest packages, it is not clear that there would be an increase in female harvest because of the state of these populations with respect to those thresholds.

But we're going to continue to discuss those alternatives in detail, and provide some recommendations on changes there. Finally the third part of this monitoring review is about the objective function. As I said that is the target in the optimization routine. It is a reward function that is composed of utility from both female harvest and from male harvest.

Most of the work so far has been related to constraints that are placed on male harvest with a utility function. The suggestion was that there is

some redundancy in this constraint on male harvest, with some elements of the crab population dynamics model. Currently there is a constraint in the reward function related to the sex ratio of the population, such that utility of harvest is lowered when the sex ratio is below three to one.

But there is also a part of the population dynamics model that reduces population growth when sex ratio is declining as well. There might be some redundancy there, and the subcommittee has been exploring simulations and scenarios to determine the impacts of removing this constraint from the reward function. So far, preliminary results suggest that there would not be major changes in recommended harvest, or the changes in harvest levels, if we simplified the model and streamlined or simplified the reward function, and streamlined the framework by removing that sex ratio constraint.

We'll have more definitive recommendations about that for the August meeting. Then finally, we also have had some conversation about the change in status of red knots. As you know the species was listed under the Endangered Species Act as threatened in December of 2014. We have discussed the potential for implications of that on our decision making framework.

But for the most part we feel like it is probably not going to have strong implications for what we're doing, because the decision making framework is already supporting conservation of red knots, and probably is doing the best that we can with respect to that species. But we will be including that in our report to the Board.

In conclusion then, I was going to wrap up with some next steps for this process. We want to finish the reviews that I've mentioned and compile these recommendations, and present those to the Delaware Bay Technical Committee and the Horseshoe Crab Technical Committee in an in-person meeting at some point this summer; and present these recommendations to them. Then produce final recommendations for the

Board for the August meeting. With that I will be happy to answer any questions you might have about the review of the adaptive resource management.

CHAIRMAN GILMORE: Great update; questions for Jim?

MR. EMERSON C. HASBROUCK: You may have mentioned this and I might have missed it. What is the status of the funding for the trawl survey?

MR. LYONS: The trawl survey is funded for this year. But I believe that it is just for, my knowledge of the status of the funding for the trawl survey is that it is funded for 2016; but not beyond that. Other than that there may be other folks that would have more information about that.

CHAIRMAN GILMORE: Other questions from the left side of the room, until we fix the microphone link?

DR. MIKE MILLARD: Thanks Jim, great update. It is good to hear the progress on these three short term affects. Thinking back, I want to draw your attention to the two long term efforts that were also put on the table at the last meeting. I think those included revisiting the suite of models that make up the ARM.

Second, transferring that software routine over to a more efficient package, I think it would be a mistake to let those fall off the table. I've heard from some of the ARM members about that and I guess I would like to hear your opinion about those two long term efforts, and if and when we should bring those back up again.

MR. LYONS: Yes the two long term items, including assessing the population dynamics models for horseshoe crabs and for red knots, and for converting the framework to new software that would allow more flexibility and improve the process. The committee feels those are important items, but they would probably require additional staff and some help with that. We

continue to be interested in those, and emphasize the importance of those improvements. They would probably be more substantial changes and more substantial improvements to the process than the short term items, and we're hoping that we can do them at some point.

CHAIRMAN GILMORE: Any other questions for Jim? Maybe we can get a few new microphones in on that trawl survey funding or whatever. All right we're going to move on. Thanks, Jim, we look forward to the August updates and how much progress we're going to make.

### **BIOMEDICAL DATA CONFIDENTIALITY AND STOCK ASSESSMENT PLANNING**

CHAIRMAN GILMORE: The next discussion item is on biomedical data confidentiality and stock assessment planning. I believe Kristen is going to kick this off with a presentation, and then we'll have some comments.

MS. KRISTEN ANSTEAD: Good morning, I'm going to update you on where we are with the biomedical data confidentiality, and how we could move forward with doing a stock assessment for horseshoe crab. The last benchmark was done in 2009, and that was a coastwide trend analysis.

There were some additional models explored for the Delaware Bay at that time, and a surplus production model and a catch survey. But they omitted the biomedical data, so when it came time to do an update in 2013, only the coastwide trend analysis was updated; because they didn't include the biomedical in those other analyses, and it was thought that those really need to be included going forward.

We suspect that the biomedical now accounts for greater than 10 percent of the coastwide mortality, and so moving forward we really need to account for that in the models. Because of the data confidentiality issues around the biomedical, the TC did not recommend doing the scheduled

benchmark in 2016; and instead we prioritized this review of the ARM model.

The ARM model finds the optimal harvest levels, and it links it to red knots, and it was designed to be a supplement to the stock assessment, not a replacement for. We still need to find a way to move forward to assess the population as a whole. One of the reasons that we need to do this on a regional basis is that there is evidence that there is localized spawning density, size structure, movement, and we're not capturing that by doing an assessment on a coastwide level.

There are also different harvest pressures along the coast from the bait fishery, the biomedical, so there are different mortalities in each of these regions; and I'm included two graphs here. The top one is some trends in New England. Those are some indices from Rhode Island and Massachusetts. It is not a comprehensive list but it is just to show you that in recent years there has been a decline in the stock in New England.

The second graph are two indices from New York that is also experiencing a decline overall. Delaware Bay populations and the southeast seem to be either level or increasing. They are doing well. But these two populations are not, and that is what we're sort of missing by not doing a regional assessment of this stock.

I think the last time a benchmark was done in 2009, there were four biomedical facilities. We now have six, and so we have one in Massachusetts, one in New Jersey, one in Maryland, two in Virginia, and one in South Carolina. If we look at that as far as a regional assessment is concerned, we're still running into the rule of threes here, where you have to have three separate contributors to the fishery data; so that you can't identify any one contributor. In New England we have one facility, so we can't use the biomedical data there in a transparent way.

We have zero in New York, and one in the southeast. We do have four in the Delaware Bay region, so we have discussed the possibility of

being able to do an assessment using the biomedical data in that region. But it is still sort of a gray area, because if we have done a coastwide assessment and published those numbers of what the biomedical is landing, bleeding, and the mortality associated with that.

Arguably, then if we did the same for the Delaware Bay, New England could subtract the Delaware Bay numbers, their own numbers from that coastwide, and identify what example southeast is harvesting and bleeding; so we have violated confidentiality that way potentially. The likelihood of being able to do a Delaware Bay assessment and include that biomedical in a transparent way is probably still unlikely; even though we have more than three in that region.

We've explored some different ways to try to use this data. We contacted each state and just to confirm that they all follow the rules of threes, when it comes to confidentiality, and they do. We also talked about potentially changing the permitting, so when biomedical is issued a permit it has to say explicitly in there this data must be used publicly in the stock assessment.

But that is also probably not an option, because it would be trumped by confidentiality rules. The Stock Assessment Subcommittee met in March to brainstorm ideas with how to use this data in a stock assessment. Additionally, these issues were brought up at the ASC/MSC joint meeting last month, and both of these committees concluded that a regional assessment probably can't be done using the biomedical data.

The AP also discussed this in a phone call recently, and they did express some concern about that Delaware Bay region, and trying to use that data even though there are more than three companies there. These are options that have been previously discussed over the last few years. One was to release all the biomedical data to the public, and the biomedical companies were not comfortable with this option; and it does violate confidentiality.

Another option would be to release the biomedical to the SAS and TC, and when we publish reports we could regroup it coastwide. The biomedical was in favor of this, but the TC did have concerns regarding transparency of publishing a stock assessment without these numbers being explicitly in the document.

Another option that has been thrown around is proportioning out that mortality, so taking the coastwide mortality and divvying it up equally between the six biomedical facilities and using the data that way on a regional basis. But this is also a little tricky, because either it isn't accurate, then when its peer reviewed the peer review panel will say; well is this data representative of the truth, and we say no. Then why did we use it in the model that is not informative if it is not representing the truth.

If it is representing the truth then that might violate confidentiality, because then we would be saying parsing this out equally is representative of the truth, and now we've identified pretty much what the landings, the bleeding numbers, and the mortality for each of those facilities are. This option isn't probably helpful either. These are our current options. We can continue to delay the benchmark indefinitely, and that is sort of where we are right now. We could do a turn of the crank update, and similarly to what we did in 2013, just update those coastwide trend analyses; again this would not address those regional populations or start to identify the issues in New England and New York.

But there is still information here. We would update some of the trends and see overall how the population is doing, and it would not include the biomedical data. We could do a transparent coastwide assessment. If we did this we could explore some other modeling opportunities, potentially even regionally.

We could explore different modeling for the Delaware Bay, kind of like the benchmark in 2009 did with the surplus production or the catch survey, and incorporate the biomedical this time.

But that would not be transparent, or we could do a nontransparent regional black box benchmark. To do this the SAS, the TC, and the Peer Review Panel would all get access to confidential data.

We would do a full assessment by region, including the biomedical, and then publish a nontransparent report. These are sort of the options that we have right now. We are looking for guidance from the Board on how to proceed to get an assessment done for this population. I'll go back to the next slide, and I'm happy to take any questions you might have.

CHAIRMAN GILMORE: First, do we have questions for Kristen?

MR. DAVID V. BORDEN: Under Item Number 4, do I understand this correctly that the confidential data would be made available to the individuals doing the stock assessment, but all of those individuals would basically have had to sign one of these confidentiality forms? Okay so, I guess my own preference here, I think it is important to do the regional assessment in as fine a detail as we need to do.

I would be comfortable supporting that. I would also note that it might be a good idea; I mean a lot of the state directors I think have signed the same forms; so maybe we could have a subcommittee of the Board, appointed by the chair that got access to the same confidential data, so that it would be more transparent.

CHAIRMAN GILMORE: It's a good idea. Other questions?

MR. DANIEL MCKIERNAN: Yes, a question on Number 4. It talks about recommending regional allocation adjustments. Could you clarify that?

MS. ANSTEAD: If we were able to assess each of these populations regionally, it could adjust the recommended harvest levels. But that is where we get into kind of a tricky area. It wouldn't be transparent so we would be saying we would

recommend an adjustment in this way, but we can't tell you why; because those numbers can't be published. We can show trends on a graph without labeling the axis, but that would be the most amount of information we could provide to support that guidance. I don't know if you have anything to add, Kirby.

CHAIRMAN GILMORE: Other questions, Rob O'Reilly.

MR. ROB O'REILLY: I had trouble picking up everything, but about four years ago one of the problems was the cap had been exceeded, and where does that stand today?

MR. KIRBY ROOTES-MURDY: Rob is referring to a coastwide cap on biomedical mortality, and again that is what we aggregate all the biomedical data across the coast. It is set at approximately 57,000 crabs, so if that number is exceeded on an annual basis that is the threshold.

That number has been exceeded, I can double check, but I believe at least each of the last four years; at which point the Board, at least according to the FMP, is tasked to take management action; and the Board has declined taking management action during those points when that has been brought up.

MR. CHRIS WRIGHT: Just a couple clarifying questions. The permits that are issued from the states are the biomedical industry; are they considered a fisherman under those permits?

MR. ROOTES-MURDY: Thank you for that question. I sent around a memo to the administrative commissioners outlining the confidentiality rules for each of the states. Generally that information provided by the states really focused on what the data that was received from biomedical harvesters was viewed at.

Depending on the state, it varies on how the collection of horseshoe crabs for biomedical purposes are viewed as either scientific or a directed commercial harvest. In terms of the data

itself, this data is viewed as catch data and that is how it is submitted; this data is submitted to the states and the states then submit it to the commission for review. But it varies from state-to-state on whether it's a scientific or biomedical collection, or a harvest for the purpose of biomedical use.

MR. WRIGHT: It seems to me that the commission should direct the states to issue their permits so that they are considered a fisherman, and then that way you would pool them with the other fishermen. Then we wouldn't have this confidentiality issue.

MR. ROOTES-MURDY: This brings it back to the issue of the rule of three. In terms of looking at fisheries data, fishery resource data, you need to have at least three contributors; that is either three fishermen or three dealers; and the biomedical facilities are viewed in the context of this fishery as dealers.

Regardless of whether the permit is issued ascribing them as being a fisherman or not, the data itself is treated with this rule of three, so you still need to have an aggregate of at least three; in order to get out of that when you're looking at this data on a regional basis, regardless of whether they're considered fishermen or not.

MR. WRIGHT: I'm still a bit confused that they would be treated as a dealer, even though they're issued a fishing permit.

MR. ROOTES-MURDY: Well again, depending on the state, the state either issues out harvest permits for biomedical purposes or scientific permits. But that data is treated as confidential under the rule of three; regardless of whether they are viewed as specifically fishing for commercial landings, or if they are harvesting for biomedical use.

MR. WRIGHT: I understand that. But if they're pooled with the other fishermen, if they're catching fish and they're issued a permit to catch fish, then they're considered a fisherman, right?

Why would they be considered both a dealer and a fisherman?

CHAIRMAN GILMORE: Robert Boyles has got something on this.

MR. ROBERT H. BOYLES, JR.: Chris, maybe I can help you out. South Carolina has reported, we do have a biomedical facility. Any number I report is going to be a confidential number, any number I report. It is protected. We protect it to protect the confidentiality of the actor there, because all our crabs, by permit all of our crabs in South Carolina are returned to the water.

There is no bait harvest in South Carolina. It is exclusively a biomedical fishery. But if I give you X number then my South Carolina operator's competitors are going to know the size of their fishery. Does that make sense? There is no way around that confidentiality without the rule of three.

MR. WRIGHT: Yes that clarifies it, but I am just trying to figure out a way of getting around it in an easier way than we're approaching it right now. Is the data that is being collected that would fall under the Act? Therefore we would still have to follow the rule of three?

CHAIRMAN GILMORE: Chris, I appreciate the efforts to try to get around this. Staff has been going through this for quite a while right now, and every one of them they come up with really comes down to it is really subject to a challenge. We're thinking that any of those ideas, including what you're going for, sounds great on paper; but it just really leaves us open to a challenge, so I don't think they're going to work. Any other questions?

MR. STEWART MICHAELS: Kirby, I think I've asked this question before, but what is the competitive advantage or disadvantage to these companies for knowing how many crabs are harvested in an area? Have the biomedical firms given any indication of that? I have some understanding about public perception and the perception of

environmental groups, but competitively speaking, what difference does it make if you know that Company A harvested say 10,000 crabs in a given year?

MR. ROOTES-MURDY: I'll give it a shot, but then we have biomedical representatives in the audience and I think they would probably be more equipped to answer it. But my understanding as it has been communicated in our exchange with AP members is that when looking at this information, one company could figure out how effective another company is in producing or procuring the ingredients, the blood needed for lysate.

Looking at it on a competitive advantage they could make the argument they are doing it more effectively than their competitors, in the number of crabs they are using to secure that lysate. But I will turn it over to one of the biomedical representatives if they would prefer to elaborate or provide more information.

CHAIRMAN GILMORE: Benjie, do you want to? If you go down to the end, get your backpack on it is quite a walk.

MS. BENJIE L. SWAN: Benjie Swan with Limuli Laboratories. I think that the horseshoe crabs themselves are equivalent to the product. It is not that we add a whole bunch of other things to the product. If I say I collect a thousand crabs that means I have a thousand units of product to sell. I think it lets your competitor know an awful lot about your company.

Say if you're very small and people, maybe the general public or the people that buy from you don't realize you're so small, but they find out you're that small and they'll say, well I don't want to work with them, I want to work with the big guy or something like that. I think it could hurt a company that way.

Then say a company has problems with collecting horseshoe crabs, and their numbers drop to a certain level. There could be a rumor that goes

around that that company is going to fall and go out of business, and that would be a scramble for their people that they sell to, to find someone else, even though they may be just decided to have a down year that year or something.

Say if they ramp up whatever they're making and they collect more crabs, then people would maybe think, oh they either had problems or they're doing really well. Let's go with that company. Then we all know the environmental concerns; that if you're a big company and you're doing well that environmental companies might go after you, or if you're small they'll say, well we don't really need that company because they're so small.

Let's get them out of this region that's very sensitive or something like that. I think there is an awful lot that could happen to a company if the numbers are out. I will say that the industry started in the 1970s, and since that time I have grown up with confidentiality. It is like engrained in us that you do not discuss your numbers. My comments were I did have another suggestion on how to work within the numbers.

CHAIRMAN GILMORE: Why don't you, Benjie, hold off on that. But actually stay there, because my plan is actually to get a motion up and then go around. Then we can get your comments in a few minutes. Just stay right there for a while.

MR. HASBROUCK: I've got a couple of questions. I want to make sure that I fully understand the issue here. We know what the total harvest is for biomedical. But the assessment will be better if it's done on a regional basis, so that is where the issue is. We know what the total harvest is for biomedical.

But we can't divvy it up or allocate it to the specific regions. Then also, in the last assessment that was done, for the biomedical harvest, are all of those crabs considered harvested dead essentially, or is there a mortality factor that is applied? If there is a mortality factor what is that based on?

MS. ANSTEAD: Yes in the assessment we always have a table that is how many were collected, how many were bled coastwide, and then we assign 15 percent mortality. That is just what that has been decided based on the literature of how many crabs survive. It isn't that they're all considered dead. They bleed them, they return them to the water, and we think 85 percent of them go on to live. It is not a huge amount, but in that 15 percent it could be lower, it could be higher. The literature ranges from 8 to 30; so that would be another part that could be explored if we were to look at incorporating this data into the assessment. But right now we give them 15 percent mortality. Does that answer your question?

DR. MILLARD: Two questions and a comment. Clearly Option Number 4, at least in my mind gets us the most correct answer. I could certainly support that. One question would be, is there a precedent for that or are we going to hit a road block down the road for this lack of transparency thing that is currently unforeseen, or have we done this before?

The second question pertains to this notion of the 15 percent mortality. Having read the supplemental material I know that the biomed firms have some issue with that number. I would say if they have data that would be better, for us to get a better estimate of that mortality associated with bleeding; we would love to see it. Can we ask them to either generate or produce data? Once they enter into this assessment routine, can we ask them to produce data that gets us a better estimate of that mortality?

EXECUTIVE DIRECTOR ROBERT E. BEAL: Well, I can comment on Mike's first question which is is there any precedent for this type of assessment with the commission. The short answer is no. This would be a unique arrangement. The longer answer is, at times the Technical Committees and other groups, Stock Assessment Subcommittees when they're working on assessments will look into one or two datasets that are confidential,

and they'll close the doors for a little while, and then reopen them and go on with the assessment.

But this would be, due to these confidentiality constraints it would have to be from beginning to end closed door Technical Committee meetings and Stock Assessment Committee meetings; definitely for the north and the south. We'll see what we can work out in the Mid-Atlantic, but that may be a problem as well.

It would just be the information coming back to the Board would be much less detailed than your standard assessment, because it would just be trends, probably not even link back to real numbers with those trends. You just see a line moving up or moving down, and the magnitude of that line would be a bit of a mystery to the Board and to the public. It creates a lot of problems for the commission, this issue.

MR. ROOTES-MURDY: To your second question regarding asking for a mortality estimate from the facilities. I think at this point we could look forward to doing an assessment where we would ask the biomedical companies to provide those estimates if they feel that they differ from what the current number is. That would be considered in the literature review, the review of the data. Much like we would do with any other assessment and trying to account for mortality estimates for the species.

MR. MCKIERNAN: If I could fast forward into the future when we do an assessment and we try to execute some management. My question is how important is the landings by the bait harvesters in various regions that allow it, relative to this number? If we're struggling with getting this number correct, and we don't have accurate numbers from our bait harvesters for a variety of reason, such as a lot of guys may be harvesting their own bait; and we don't have that dealer check, a second level of verification. Where are we going with this? How important is the other harvest, the bait level harvest? How important is that accuracy in the final assessment?

MR. ROOTES-MURDY: Dan, I'll take a stab at it. One of the reasons why this has continued to be a sticking point and coming back to the assessment is because since the late 1990s the annual amount of bait harvest has continued to drop through management actions. Over time as that number, the annual harvest for bait has gone down regionally and coastwise, the biomedical landings catch has both increased; but not quite on the same slope exponentially.

But what has happened is that the point where we're at now is that the proportion of the harvest that is going to biomedical is greater than it was say 20 years ago. That is where when we're looking at this data for an assessment purpose it needs, the TC and Stock Assessment Subcommittee feel that it needs to be considered, needs to be included in order to get the accurate picture for those regional populations.

In terms of coming out of the assessment for management decisions that is still to be determined how that would play out. Kristen I think gave a good overview of how that information can be presented to the public. But it is still unclear how the Board will need to consider the results of it when making management changes or decisions in the future.

MR. ROBERT BALLOU: At the appropriate time I am prepared to offer a motion, but before I do I am curious as to the timing of a benchmark. If the Board were to support moving forward, when would be the appropriate time to target a benchmark?

MS. ARNSTEAD: If we did a coastwide benchmark, doing it not regionally, transparent coastwide. That could probably be done in 2018, I think we said, and that would probably be the same timeline for the black box assessment. A turn of the crank update could potentially be done in 2017.

CHAIRMAN GILMORE: Okay based upon the discussion I think it's pretty clear, we need to

move the stock assessment along from a coastwide perspective, but also in my state it is getting more and more difficult to manage this resource with a lot of indication that the stock is in decline. Dan, my bigger concern, even from the bait is the illegal harvest that still seems to be going on I think in a bunch of places. On that note I'm looking for a motion. Bob Ballou if you would like to offer one.

**MR. BALLOU: Yes I would like to move to add horseshoe crab to the stock assessment schedule in 2018, and to task the Stock Assessment Subcommittee and Technical Committee to complete a black box stock assessment.**

CHAIRMAN GILMORE: Do we have a second to that motion?

MS. TONI KERNS: Question to Bob, is that a regional assessment or a coastwide?

MR. BALLOU: That would be regional. That would be a full benchmark that would allow for a regional. If we need to add that I just assumed that was inherent in the motion. That is certainly the intent.

CHAIRMAN GILMORE: Second by Bill Adler. Discussion on the motion?

MR. ADAM NOWALSKY: If we can't disclose numbers and all we're looking at is a line on a chart without any markings. How do we apply that to management?

MS. ANSTEAD: I'm not totally clear on this either. It would be a learning experience. I think we could still make advice. But that is one of the parts of doing a black box assessment. We could still find when we go into this assessment that the numbers haven't changed. We still may end up doing a trend analysis.

We don't have a magic solution if we go to the regional assessment. We still might end up doing a trend analysis for each of these regions, and come out with similar advice as we have in the

past. But there certainly is going to be a learning experience here in how we present this data. I don't know if you want to add anything, Kirby. It is a good question.

MR. ROOTES-MURDY: Yes, I think Kristen answered it well. The broadest way to look at it at this point is that the advice coming out of an assessment could either say that there needs to be adjustments to management to reduce mortality. Those pieces of advice could be done on a regional level.

The problem we run into is that depending on what region you're talking about that might present issues of confidentiality, right. We can't, for example in the southeast, disclose what the fishing mortality estimate might be without violating confidentiality. There will be some points in what comes out of this assessment that at this point, it is still unclear how that information could be presented to the Board to make management decisions.

CHAIRMAN GILMORE: Adam, we're breaking new ground here, we understand that. But we really need to get this assessment going. Because of this confidentiality issue, I mean we've got to try something. We don't have all the answers yet to it, but I think if we start, at least it is a good way to move this along instead of just sitting here spinning our wheels.

MR. BRANDON MUFFLEY: I had a similar comment to Adam. I mean I agree wholeheartedly we need to do an assessment, 2009 was the last one; and it was a trend analysis. I think we need to do something to get us to speed, in terms of where we are with this stock. I still grapple with how we're going to deal with this from a management perspective.

I agree that it may be the best way to approach it, but other than the TC having the best information in front of them and a good model, I don't know how we can apply it at the Board level; in terms of what we're going to do. I am just still struggling with how we're going to move forward with this.

I support the assessment and what we're trying to do. I just don't know how it is going to play out.

CHAIRMAN GILMORE: Understood.

MR. O'REILLY: I guess my question is about the regional specifics. Just a few years ago there was concern expressed for New York north, I'll call it a management unit, and that the mortality rates were perceived as high at that time. Once we go forward here, will we have the ability to have that type of advice coming back from the assessment using this approach, which I certainly understand what Robert Boyles said. I agree with that. But at the same time, are we going to find ourselves in a situation where we can't definitively indicate a problem; even though we suspect there is a regional problem?

EXECUTIVE DIRECTOR BEAL: Jim, I'm kind of in the same spot as everyone else. We don't have all the answers. But I can envision an output from an assessment that has a lot of relative terms. In other words, fishing mortality is up 15 percent or down 15 percent or the stock is overfished and overfishing is occurring, some of the general terms that we use.

If you envision some figures coming out of this assessment, the vertical access may not have exact units on it. But we can use some relative terms there, and with the years across the horizontal access to inform the Board. It is going to confound things, but hopefully we can provide at least some general terms that are valuable to the Board.

We had a bit of an internal dialogue, or at least I did with one of the assessment folks on, if we reported F rate in one panel and biomass in another panel, could someone do the math, go back and recalculate what landings were from one of the segments? It is pretty hard to do that. That means you would have to have the code of the assessment and everything else.

I think as this evolves, and we study the confidentiality rules, I think we can work with the

Board to present something that is of some value; not just a wiggly line on a piece of paper that doesn't mean anything. I think there is going to be some relative growth in the stock or decrease in stock; the same thing with the F rate. We'll see what we can do.

MR. BORDEN: I see this as two separate issues, and the two separate issues are basically, I think the commission should attempt to do the best possible stock assessment we can do on the species. That is one part of it. I think that is pretty easy to do. All the TC and people that are working on the stock assessment are bound by the confidentiality rules, so they do that. It's a black box. Then you've got this whole separate issue of how we disseminate it.

I think Bob just characterized a couple of really good points. But I would add to what Bob just said that to a large extent it is going to depend on the results of the assessment, as to how you can disseminate it, what ways you can mask it; and so forth. I support the motion going forward; and what I would suggest is we continue to work on the second part of this as that information comes along.

CHAIRMAN GILMORE: Good point, Dave. I would like to go to the public now and take a couple of comments from them. Benjie, did she disappear on us? There she is. Oh, okay go ahead.

MR. ALLEN BURGENSEN: Hi, my name is Allen Burgenson; I'm with Lonza Walkersville in Walkersville, Maryland. I actually had some responses or answers for Mr. Millard's question. Several years ago I presented to this Board our collection of mortality complete; for a couple of years. Our mortality rates that we've seen are between 3 and 5 percent.

Yes, we do dispute the 15 percent number. It is just not true. The original number was set by a paper from Rudloe, using collection methods that we don't use, the entire industry do not use. Several years ago we also as an entire industry, came up with the fisheries best management

practice on how we collect and treat the animals, and then return them to the sea. Like I said before, our numbers that we believe are between 3 and 5 percent. We've also worked with Dr. Jim Berkson of Virginia Tech. We supported graduate students at that facility for many, many years. There are many graduate theses out there on collection of horseshoe crabs and different mortality rates due to bleeding.

Like I said, the numbers are out there and they have been presented to this Board before. One more comment that I did have though, or two more comments. One is the idea of harvest for the biomedical industry. We don't use the term harvest, because harvest implies they are dead. We don't kill them. We use the word collection.

We collect, we bleed, and we return to the sea. Like I said, 3 to 5 percent of the crabs may unfortunately die. But one more issue about our product. We're not manufacturing product just to manufacture product. Our product is required by law in the United States and other foreign companies. Pharmaceutical companies are the ones who are driving our demand.

We're not making it and storing it up in a warehouse somewhere. We're making it, and as soon as we make it, it is already spoken for by a pharmaceutical company; if anything were to happen to that supply chain, where we could not meet our customers' needs. Our pharmaceutical and medical device customers needs; that has serious implications for the health system in the United States and around the world. That's it for me.

MS. SWAN: I had a couple comments, but a couple of them were already addressed. The one was that if we expose the Delaware Bay numbers that one company in New England or the one company in the southeast, their numbers would no longer be confidential. I did have one other suggestion. I am uncertain how the low estimate for biomedical mortality would affect the modeling conclusions.

I would maybe suggest, and I don't know if this is hard to do or not, but we run the model attributing all the biomedical mortality, the estimate; the 78,000 to the region, and then run the model attributing 0 mortality, and see if there is a difference in the conclusion. Possibly you could report it maybe as a range; that the range can go and treat it that way. It is just something you could look at to see if it would really matter, what we're arguing about, if it would really make a difference in the conclusion.

CHAIRMAN GILMORE: Back to the Board, other comments on this? Go ahead, Stew.

MR. MICHAELS: Well, I'll support this, but only because I have to. I mean I am really concerned about what is going on in New England and New York, and I think that we need to try and better understand what's going on up there so that we can move forward with management. I am very disappointed that we can't come up with a better solution than this. I am uncomfortable with the precedents that it sets. But simply in the interest of moving forward I guess, I am kind of forced into supporting this motion.

CHAIRMAN GILMORE: Any other comments before we take this to a vote? Okay seeing none; do we need any time to caucus? Okay I guess not. **All those in favor of this motion please raise your right hand; all those opposed any null votes, any abstentions? Okay motion passes unanimously.**

#### **REVIEW OF THE ALTERNATIVE BAIT COST COMPARISON**

CHAIRMAN GILMORE: The next order of business is a review of the alternate bait cost comparison; and Kirby is going to do a presentation on this.

MR. ROOTES-MURDY: We're running a little bit behind, so I'm going to try to go through this as quickly as possible, but field any questions you guys might have. Just a quick background, in February of 2014, the Board requested that the alternative bait made by LaMonica Fine Foods be

tested through an Alternative Bait Working Group.

In the fall of 2014, Rhode Island and Connecticut took part in those bait trials, and in February of this year the Board requested a cost analysis be conducted, based on the results of that alternative bait trial in Rhode Island and Connecticut. We had the Alternative Bait Working Group meet via conference call on March 30th, and we discussed some of the results and lessons learned from the trials in 2014.

The working group is made up of Delaware representatives, Rhode Island, Connecticut and Massachusetts; and Delaware and Massachusetts were both interested in taking part in these trial to begin with, but were unable to – well, Massachusetts was unable to secure the bait and Delaware found that they didn't have an adequate number of conch fishermen that were willing to take part in the bait trials.

The general sentiments from the working group, was concern about how logistically it played out last time. Securing the bait from LaMonica proved to be difficult for Connecticut and Rhode Island. The consistency of the bait that was used also presented challenges in using it in a bait bag or cup; and storage was another factor.

They had a couple of questions for LaMonica moving forward, on whether it would be really effective or not. The group kind of put forward a couple of cost considerations. One of the big things to note is that the cost of horseshoe crabs varies by region. Between the Mid-Atlantic and the New England region you get different cost, not only by crab but by sex.

In the Mid-Atlantic females are valued approximately two-to-one, approximately \$2.00 for a female \$1.00 for a male. In New England both males and females are valued approximately the same at about \$3.50 to \$4.00 per crab. Other cost considerations we were trying to look at was refrigeration and transportation. Staff reached out to LaMonica Fine Foods to get some more

information on really the cost specifics. One of the key things was some questions about what the actual bait cost per piece of bait.

What we found was that the price per box of bait was about \$40.00; and what that broke out to was there were assumed to be 50 pieces of bait in each of these slabs of the bait that came from LaMonica. They individually cost a little less than a dollar, at \$0.80. I spoke with Mike LaVecchia, of LaMonica Fine Foods, and he said that moving forward he would be interested in maintaining the price at \$40.00 per box.

It should be noted that the TC, and this is included in the memo that went out with the meeting materials; that they needed to double up many time on the dosage or the amount of crab that was used, so while it was \$0.80 per piece, if you have to double it you're getting into more, \$1.60 maybe \$2.00. Another point that was brought up of concern by the TC was delivery cost. It turns out there was not any charge, delivery cost, for deliveries to New Bedford, and Mr. LaVecchia made a note that he could deliver to New Bedford moving forward, and Mid-Atlantic locations and possibly South Atlantic locations if requested. But he is looking into trying to secure facilities for that. The other main question was the number of crabs that goes into the Eco-Bait that Mr. LaVecchia makes.

It should be noted that the Eco-Bait as it was labeled alternative bait in the alternative bait trials. Eco-Bait does contain horseshoe crabs, and depending on how the mixture goes, it is approximately 4 to 5 female crabs per slab or 8 to 10 male crabs. In terms of each piece of bait, your range could be anywhere between a tenth of a crab to a quarter of a crab per piece of bait.

Now keeping in mind if you need to double that dosage, then it could be anywhere between one-fifth of a crab or half a crab. Mr. LaVecchia also noted that crabs used in the bait came from all over the coast. He didn't just secure them from the Mid-Atlantic or New England or southeast, they were from all over, and wasn't able to

provide specifics on where each bait-slab came from; in terms of the crabs.

There was an AP call, the AP summary is included in the meeting materials as well, and feedback from the Advisory Panel on the alternative bait trials was that it should be noted conservation measures are already in place in a number of states. The AP feels that this should be kind of considered when looking at making any requirements or changes or using Eco-Bait moving forward; and that most buy their bait from the dealer that they operate with, in order to sell either their conch or eel.

It is a direct exchange in going out on the open market and securing Eco-Bait would be a transition for many of them. Another key thing is that Eco-Bait has been labeled as I said, alternative or artificial; and many of the AP members felt that this is misleading, as it does contain horseshoe crab; it just strives to have a lower amount of horseshoe crab in each piece of bait.

The last recommendation that the AP made was that further bait trials and studies should be conducted along the coast. Off of that I wanted to get a better handle on what the regulations were along the coast. This is the best collection I was able to get for looking at conch and whelk regulations.

This is trying to look at specifically if there are any requirements at the state level on the number of crabs that can go into a bait bag or cup. From what I was able to find, only Delaware and Virginia have specifics on the record that outline out how much crab can go into your bait bag or cup. Other states don't have any specifications on that when it comes to conch or whelk.

If you take issue with these please let me know, because I got this information primarily from Technical Committee members. I also looked at it for American eel, and I received information from TC members on this. Similarly there are limits on

the amount of crabs that people can take who might be using them for eel bait bags or cups.

But these are daily trip limits and these are not the number of crabs that go into a bait bag; so that is the ones that have an asterisk next to them. As noted, South Carolina has no allowance for horseshoe crabs that can be used. New Jersey has a requirement that if there are crabs that are being used by eel fishermen, they have to be collected from outside of the state of New Jersey; and have a receipt of that. In summary, the Table 4, looking at this cost comparison is included in the memo, it is Table 1. Overall it is unclear that the Eco-Bait that LaMonica Fine Foods produces is cost competitive; that is cheaper, easier to secure, a better option than what current fishermen are using in their process of making their bait bags and cups right now, with an amalgamation of crabs, green crabs, finfish along the coast. At this point I'm happy to take any questions people have on the memo and my presentation.

MR. WILLIAM A. ADLER: This is more of a question for Delaware and Virginia. On Page 3 of the handout, where no more than one-half of a female horseshoe crab or one male horseshoe crab can be used as bait in a conch pot. I am just wondering how that is enforced. Apparently Delaware and Virginia are okay with it, but I just don't understand how that is enforced. I don't know who is measuring a half of a female or one male in a conch pot. Does anybody have any ideas? Maybe Delaware and Virginia can explain to me how that is done.

MR. MICHAELS: Mr. Chairman, the gentleman to your right happens to be our enforcement agent in Delaware, and I think Mr. Messeck can probably handle that.

LIEUTENANT DOUG MESSECK: Good morning, my name is Doug Messeck; I'm a Law Enforcement Committee representative, and also an enforcement agent from Delaware. In answering your question, it can be very subjective; but what we're looking at is when we open up the bag is

we are best at we can do piecing that crab together.

What we are finding is becoming an ongoing issue is it is in colder weather. If you put bait in one day how it handles and goes to the next day, and then if you can add additional to that; but you're still locked into the half crab per day or the one full crab. When we're pulling these pots in Delaware at least, we are pulling up. We are inspecting the bags, and we are physically looking at what's inside the bag.

MR. ADLER: Okay.

MR. O'REILLY: I'll respond differently. I think there is a lot of incentive, and our industry maybe 10 years ago was aware that VIMS was doing a lot of study, and that is where the bait bag idea came from and using half a crab. At the same time, it isn't always the case that there is an abundance of horseshoe crabs.

That certainly happened within the last five or six years that supply was getting very low. I think it is more of an incentive. I don't know, I can't say for a fact that there have been any tickets written for improper use of the bait bags. I don't know that. But I know more about the incentive part of it.

That bait bag followed a lot of experiments with different types of bait for the conch fishery. That is what I know about that. My question from earlier does refer to the advisory panel, and Kirby I think you did a really good characterization of what occurred there. It was very interesting to read those situations that they had, and the information.

What I'm wondering about the advisory panel, do they talk about quantities of horseshoe crabs? Do you get an idea on a coastwide basis for the whelk fishery, channel whelk fishery or for the eel fishery what is the amount of horseshoe crabs? Because that eventually might give us some idea about this different bait type, as to what it would really do in terms of be a conservation agent. I don't know whether they've had that

conversation at the advisory panel or not. I am very aware that recently within the last couple years there was some back storage of horseshoe crabs in freezers. I think that came out somewhere in the report as well, but again that is sort of an ebb and flow of being able to have enough product available.

MR. ROOTES-MURDY: Just so that it is fully clear, the AP is made up of representatives from both the biomedical and the bait industries. For the call and subsequent e-mails out to the AP, I didn't receive a lot of comments from AP members who were in the bait industry across the coast. Rick Robbins took part; he is on the AP from Virginia; and a couple of others.

But there frankly isn't great representation right now of the bait industry along the coast. To get a handle of how the number of crabs is used per state, I wasn't able to characterize that very well in an informal, anecdotal way relative to what the regulations are. But again I would like to use this as a pitch that states should come back and look at what their current Horseshoe Crab AP representation is, and make sure that they are participating and taking part in this process.

CHAIRMAN GILMORE: Other questions, Bob Ballou.

MR. BALLOU: Well, more of a comment if it is okay. I do feel that this is a very important initiative; and I really appreciate the work that has been done so far. Clearly more work seems to be needed, and I would strongly support moving forward with the recommendations offered by the AP. On the one hand we're essentially looking a gift horse in the mouth, in that we have LaMonica Foods, a private sector entity, willing to engage. I really think we should keep the momentum going for that reason.

As well, what has come out so far are some pretty impressive figures; both in terms of conservation benefits with crab savings in the range of a half to a fifth of what it would otherwise be used. The Eco-Bait, in my view, does look appealing from

the standpoint of utilizing less crabs, or reducing mortality on crabs in the bait fishery; to put it that way. Then the cost issue is still to be determined, and I think that's why we need to do more work. But if you use the Delaware standard, and I guess perhaps the Virginia as well of let's say half a female per trap.

By New England standards, in terms of the cost that equates to about \$2.00 per trap, and if you double up the Eco-Bait that is \$1.60, so I calculate a 30 percent savings right there for New England fishermen using Eco-Bait. For all the right reasons the arrows seem to be going in the right ways on this. For that reason I think we should keep the momentum going.

I can certainly volunteer Rhode Island's continued participation, given all the challenges of course in terms of logistics and the issues associated with getting this Eco-Bait to fishermen. I realize that's a challenge. But I think it's an important issue, and I think we should continue moving forward on it.

CHAIRMAN GILMORE: Well that kind of gets us half of what we need. I got a good recommendation to continue this. But I think we need more participation, I think is part of the problem. I'm not sure, and I don't want to put anyone on the spot. But it would be helpful to have other states that would get into these trials that I think would help this along. Go ahead, Roy.

MR. ROY W. MILLER: It is my understanding from these trials that the substitute baits were used in conjunction with the conch fishery or whelk fishery. I wondered, had they been used in an eel fishery if the baits that were comprised of female horseshoe crabs might have proven to be more effective.

It is my understanding, and perhaps Craig Pugh can chime in on this, that a female horseshoe crab is better bait for eel fishing. That may influence the amount of bait and the price of bait and everything else. I wonder if in future trials we

might seize upon the opportunity to do some tests with eel fishermen as well.

#### ADJOURNMENT

CHAIRMAN GILMORE: Any other questions? Okay so it sounds like we've got at least a good recommendation to continue with these trials, and we'll see if we can improve this as we move along. We're down to just other business. Is there any other business to come before the Horseshoe Crab Board? Seeing none; I will entertain a motion to adjourn; Bill Adler, seconded by everyone. Thank you, everybody.

(Whereupon the meeting adjourned at 11:46 o'clock a.m. on May 3, 2016.)