

PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

HORSESHOE CRAB MANAGEMENT BOARD

**Crowne Plaza Hotel Old Town
Alexandria, Virginia
February 7, 2008**

TABLE OF CONTENTS

CALL TO ORDER.....	1
APPROVAL OF AGENDA	1
APPROVAL OF PROCEEDINGS.....	1
PUBLIC COMMENT.....	1
EXPIRATION OF ADDENDUM IV MANAGEMENT MEASURES	2
ECONOMIC IMPACTS OF A MORATORIUM ON HSC HARVEST STUDY	3
STATUS OF THE RED KNOT STUDY	10
USFWS SHOREBIRD TECHNICAL COMMITTEE UPDATE.....	15
ADAPTIVE RESOURCE MANAGEMENT WORK GROUP	19
HORSESHOE CRAB TECHNICAL COMMITTEE REPORT.....	20
POSSIBLE INITIATION OF AN ADDENDUM	21
OTHER BUSINESS.....	23
ADJOURN	24

INDEX OF MOTIONS

1. **Approval of Agenda, by Consent** (Page 1).
2. **Approval of Proceedings of October 30, 2008, by Consent** (Page 1).
3. **Move to initiate draft Addendum V that would contain the provisions of Addendum IV and an option for moratorium (Delaware and New Jersey) for one year; The Addendum could be extended for one additional year by Board Action** (Page 21). Motion by Jack Travelstead; second by Eric Smith. Motion carries unanimously (Page 23).
4. **Motion to adjourn, by consent.** (Page 24).

ATTENDANCE

Board Members

George Lapointe, ME (AA)	Bill Goldsborough, MD (GA)
Sen. Dennis Damon, ME (LA)	Russell Dize, MD, proxy for Sen. Colburn (LA)
John Nelson, NH (AA)	Jack Travelstead, VA, proxy for Steve Bowman (AA)
Bill Adler, MA (GA)	Ernest Bowden, Jr., VA proxy for Del. Lewis
Najih Lazar, RI, proxy for Mark Gibson (AA)	Catherine Davenport, VA (GA)
Gil Pope, RI, proxy for Rep. Naughton (LA)	Jimmy Johnson, NC, proxy for Rep. Wainwright (LA)
Eric Smith, CT (AA)	Malcolm Rhodes, SC (GA)
James Gilmore, NY (AA)	Robert Boyles, SC, (LA)
Pat Augustine, NY (GA)	John Duren, GA (GA)
Brian Culhane, NY, proxy for Sen. Johnson (LA)	Bill Sharp, FL, proxy for Gil McRae (AA)
Peter Himchak, NJ, proxy for D. Chanda (AA)	April Price, FL (GA)
Roy Miller, DE, Chair, proxy for P. Emory (AA)	Steve Meyers, NMFS
Bernard Pankowski, DE, proxy for Sen. Venables (LA)	Bill Archambault, US F&WS,
Harley Speir, MD, proxy for H. King, (AA)	

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

Ex-Officio Members

Gregory Breese, TC Representative
Larry Delancey, TC Vice Chair

ASMFC Staff

Bob Beal
Toni Kerns

Brad Spear

Guests

Neal Etre, Industrial Economics, Inc.

The Horseshoe Crab Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel, Alexandria, Virginia, February 7, 2008, and was called to order at 12:50 o'clock p.m. by Chairman Robert H. Boyles, Jr.

CALL TO ORDER

CHAIRMAN ROBERT H. BOYLES, JR.: Good afternoon, everyone. My name is Robert Boyles. I am the Chair of the Horseshoe Crab Management Board. I would like to call the meeting to order. The first item on the agenda is for Board consent. You've been provided a copy of the agenda for this afternoon's meeting. I appreciate everyone's forbearance in starting this a little bit early. I know a number of us have some travel plans that we've got to attend to. Are there any additions to the agenda? Pete.

APPROVAL OF AGENDA

MR. PETER HIMCHAK: Mr. Chairman, thank you, two items to add under other business. They can be very brief. I'll mention the items now and then we'll talk about them at the end of the meeting. One is a report of horseshoe crab aquaculture activities in New Jersey that has been under a scientific collecting permit.

We have a report, and it's called "2007 Horseshoe Crab Positive Mortality Replacement Experiment," and I'm just requesting that this go the technical committee for review. Then the other is just an update on a series of conference calls between a consortium of Delaware, New Jersey and NCOs regarding a symposium on May 17th and 18th in Lewes, Delaware, in 2008. Thank you.

CHAIRMAN BOYLES: Okay, thanks, any other additions to the agenda? Seeing none, the agenda will stand as approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN BOYLES: The next thing is approve the proceedings from the October 30, 2007, meeting. Those were distributed on the CD. Are there any additions, deletions or corrections to those proceedings? Seeing none, any objection to those meeting minutes being approved? Seeing none, the minutes stand approved.

PUBLIC COMMENT

Next we've got on the agenda an opportunity for public comment like we do before all management

boards. Those members of the public who signed in and indicated an interest in speaking on items that are not on the agenda, we have some time for that right now. I will note, with for the Board's forbearance, because we are starting earlier, I may come back, after the 1:30 hour, at the appropriate time and ask this question again if there are any other public comments. I know we've got Charles Givens who would like to make a statement. Mr. Givens, please come to the microphone and state your name for the record, please.

MR. CHARLES GIVENS: My name is Charles Givens. I'm a commercial fisherman from New Jersey. I would like to touch on what Pete mentioned about the positive mortality replacement program. It was a study that I participated in with four other fishermen and two other scientists. It was Dr. John Quarter from New Jersey and Dr. Nancy Jackson, from New Jersey.

Dr. Jackson is a specialist in beach morphology and John Quarter is a well-known biologist with Rutgers. They both assisted us in the experiment. We took crab eggs and replaced them on the beach, and we also took some eggs and put them into commercial crab shedding facilities in order to shed those eggs into miniature horseshoe crabs, which then went through several series of molts.

We made a few observations and recorded our data, and it's all in that report. I hope you are all provided a copy of that. Just two other things I'd like to be brief on. There was a letter distributed to New Jersey horseshoe crabbers, which said that the regulations for the two-year moratorium had expired and thus New Jersey is now back to the 150,000 crab male and female harvest, which would be obviously out of compliance with what Atlantic States requires.

To that, a fisherman, Michael Litchko, has filed a petition for rulemaking with the Office of Administrative Law in New Jersey that will enable only a male-only hundred thousand crab harvest that would be in compliance with that. That is in the works and that will be published in the New Jersey Register later this month. I believe it's the 17th or 19th of this month that it will be in the works. Also, there is a lawsuit that's underway now. There was just oral argument last Tuesday, and I guess the judge's decisions will be in four to six weeks. That's all I have to say.

CHAIRMAN BOYLES: Thank you, Mr. Givens. I will note for the Board that you have some materials

that you were going to share with Brad and that Brad will share with members of the Board as well.

MR. GIVENS: Yes, I promised Brad a PDF copy of the mortality report, and he has one hard copy today.

CHAIRMAN BOYLES: Thank you, Mr. Givens. Pete

MR. HIMCHAK: Just one comment, Mr. Chairman. Yes, Mr. Givens is correct that our moratorium had a sunset date of December 31st, 2007, so our regulations revert back to what was previously on the books, which was 150,000 horseshoe crabs, male or female, and we have a proposal to extend the moratorium for 2008 and years thereafter.

It went through a public hearing process. The comment period closed and our Marine Fisheries Council will be discussing it next Monday night to see if they will endorse it or remain silent, so we should have regulations in some format very soon. Thank you.

CHAIRMAN BOYLES: Thanks, Pete. I'd also like to note that staff passed out a letter that Brad received yesterday signed Dr. Charles Duncan of the Western Hemisphere Shorebird Reserve Network. You just got just for the record. Any other public comment at this time? Again, we will probably come back to it after the 1:30 hour in accordance with what our scheduled meeting was. Pat, did you have something?

MR. PATRICK AUGUSTINE: Yes, a question, Mr. Chairman. I'm wondering if Dr. Duncan's group has looked at other competing animals, or birds in this case, on the horseshoe crabs. As I recall, I think in 2004 Caroline Kennedy's group, sponsored by the Pew Foundation funds, had several scientists review the plight of the red knots. One of the reports addressed the issue of the over-abundance of black-backed seagulls and others that are now on the grounds where the horseshoe crabs typically are, and went on to further note – I don't remember the exact wording, but basically what it said was since the landfills in Staten Island were closed and other places, these birds appear to have moved to the coastline and have pretty much taken over.

I have personal friends who go to the Delaware Bay to observe the red knots and their plight, if you will, and fight, if you will, for horseshoe crab eggs, being beat off the food by these other animals, or birds in this case. Yet there is nothing stated in here whether

a report has been made or a study has been conducted following that.

All of this points up to the fact that the horseshoe crabs are the "only food" for these birds. I really would ask either Brad or someone within our group to get in touch with these folks and ask if that study has been done. To me it's a big, black hole. This is a one-way document and I think it's unfair to those folks who have been doing their best to help this horseshoe crab population. Jim will respond to your next line item as to what has been the economic impact of these moratoria. Thank you, Mr. Chairman.

MR. BRADDOCK SPEAR: Pat, just to respond to that quickly, I don't know if there have been any studies on the seagull competition specifically. One note in that letter is that group is aware and has been involved with other studies of potential causes of the shorebird decline; not necessarily focused on Delaware Bay but other regions.

They did offer in their letter to make a presentation to this Board, the technical committee and the shorebird technical committee. I think the two technical committees are probably the most appropriate venues, and then you'll get the information through that.

MR. AUGUSTINE: Thank you for that update; it's very important.

EXPIRATION OF ADDENDUM IV MANAGEMENT MEASURES

CHAIRMAN BOYLES: Okay, folks, the next item on the agenda is Brad is going to talk to us about the expiration of Addendum IV. Recall that when this Board passed Addendum IV, there was a two-year provision that will expire at the end of September. Brad is going to go over the implications of this. Note that there is an agenda item at the very end of the meeting about a possible initiation of another addendum. What I would like to do is just call on Brad now to talk about what this means for us in terms of timing, but let's hold off any discussions on a possible initiation of an additional addendum until the proper time on the agenda.

MR. SPEAR: Thank you, Mr. Chairman. This will just set the stage for the rest of the meeting. Again, the Addendum IV provisions, several of the provisions will be set to expire September 30th of this year. Just to refresh everyone's memory about those provisions, there is a hundred thousand crab male-

only harvest requirement for New Jersey and Delaware that will be set to expire.

There was a provision in Maryland that prohibited the harvest of crabs from January 1st to June 7th. There was also a provision in there that Virginia would harvest no more than 40 percent of its crabs from east of the COLREGS lines – basically, that’s east of the Chesapeake Bay – and that harvest would comprise no more than – it would comprise at least a two-to-one male-to-female ratio. One note, as the addendum is written the Virginia provision does not have a sunset clause attached to it, and, therefore, will continue until it’s changed through Board action.

Just to go through the scenario, if no Board action was taken, essentially the management in New Jersey, Delaware and Maryland would revert back to Addendum III. Just to refresh your memory of Addendum III, it requires or allows up to a 150,000 crab harvest, male or female, in New Jersey and in Delaware, and there is no prohibition of harvest in Maryland from January 1st to June 7th.

The possible timeline if action were taken today, with your guidance staff would provide a draft of an addendum sometime between February and April and bring that back to you at the May Spring Meeting Week, at which point the Board would have a chance to refine and approve the document for public comment, solicit public hearings and public comment during the summer; and, for the Board meeting week in August you would have the chance to approve that document. That should allow time for states to implement the regulations by that September 30th date.

To refresh your memory about what went out to public comment during the Draft Addendum IV process – and this may help kind of frame the discussion for later on – in Addendum IV there was range of options that went out, starting with status quo, which was Addendum III regulations. For New Jersey and Delaware, again, that’s the 150,000 crabs each.

There was a partial moratorium option, which is essentially what is in place right now, a male-only harvest limited to 100,000 crabs. There was also the option of a full moratorium. The options for Maryland and Virginia, again, status quo, which is Addendum III. There was the delayed harvest option, which was the one adopted for Maryland; a partial moratorium, male-only harvest; a multiple measure approach, which was the one that was adopted for Virginia; and a full moratorium.

Addendum IV also included options for the biomedical harvest; essentially what were the options that were sent out for New Jersey and Delaware, status quo, partial moratorium and a full moratorium. Thank you.

ECONOMIC IMPACTS OF A MORATORIUM ON HSC HARVEST STUDY

CHAIRMAN BOYLES: All right, thanks, Brad, so everybody knows where we are with Addendum IV. Any questions for Brad? Seeing none, the next item, we have Neal Etre from Industrial Economics who is going to talk to us about the economic impacts of the moratorium on horseshoe crab harvest.

MR. NEAL ETRE: Thank you, Mr. Chairman. Board members, thank you for having me. I’m a senior associate at Industrial Economics. We’re an environmental consulting firm out of Cambridge, Massachusetts. We were asked by the Board to conduct this assessment, and the Committee on Economic and Social Sciences has reviewed our assessment and agreed that we have complied with the options that the Board chose.

With that, here is what the Board asked us to do. They contracted us to conduct an economic assessment of the Horseshoe Crab and Dependent Fisheries; namely, the horseshoe crab, American eel and conch fisheries. You will see that the report is being passed around now, and we’ll refer to it a little bit during the presentation so please keep it on hand. The Board also chose the study via the option, and the study were those to be most likely affected by Addendum IV. Those states were Delaware, Maryland, New Jersey, New York and Virginia. As part of the charge to IEC, the Board asked that we employ trip-based data to characterize the following for each fishery and state in the study area.

Those are total and average, average meaning per harvester; landings and X-vessel revenue for the most recent five years for which data is available; and identify key harvest periods for each species; and try to relative the relative importance of the three species compare to total fishing effort for each harvester. In addition, the Board selected to conduct a regional impact analysis using the IMPLAN model, which is an input/output model which we’ll discuss at the end of the presentation.

The first step in our process was to obtain data, and at the suggestion of the Board we worked with the Atlantic Coastal Cooperative Statistics Program,

ACCSP, to obtain three separate data sets for use in this analysis. The first, which is our sort of main data set that we used, was known as the NMFS Consolidated Data Set.

Essentially the Marine Fisheries Service receives state data. The data is basically – it can be trip reports and also some dealer-based data as well. They sort of bring it together, they try to remove duplicates and create a master set. This data was presented to us as monthly roll-ups by species, and we were able to get both landings and X-vessel revenues from this data.

The second data set that we obtained from ACCSP was a portion of the SAFIS dealer data base. For those of you familiar with SAFIS, ACCSP is trying to implement a real-time data base for dealer information that's hopefully going to be across the entire Atlantic coast. It's in various stages of implementation at this point.

And, finally, for additional analysis we received from ACCSP Virginia and Maryland harvester report data directly from the – the states gave it directly to ACCSP and they gave it to us. The few important limitations to think about when you could consider these sources, the first and really most important is how reporting requirements vary from state to state.

Some states require both dealer and harvester reporting for specific fisheries; others do not. It really is a bit of a patchwork right now. Another consideration is we do not have a good handle on what the level of under-reporting is due to non-compliance or illegal harvest. Right now that's pretty much unclear, and I think it was a question that was difficult for the state fisheries administrators that we talked to to answer that question as well.

In addition, the data that we were able to obtain, given that the study was done mainly last year, covers from 2000 through 2006. That was the recent that we had available, and so we were unable to estimate changes resulting from Addendum IV, given that Addendum IV went in place in the fall of 2006.

Another consideration that we talked about a little bit is the availability of SAFIS data does vary from state to state. And, lastly, the Virginia and Maryland harvester report data that we'll talk about in a little bit does not include any federal data. To try and supplement some of the holes in the data, we also talked to probably a lot of folks in the room and talked to state fisheries administrators and asked about your reporting requirements.

I tried to get a handle on the number of active participants in each fishery and tried to ask the administrators to evaluate the data that we had from the Fisheries Service. In addition, we conducted interviews with fish processors, distributors and harvesters for each of the fisheries. We tried to contact folks from each state in each fisheries; however, that proved to be a fairly difficult task in getting hold of them.

Essentially, I think we believe we talked to about 13 different fishermen across a number of states in a number of fisheries. The questions we talked to those folks about – the major question we had was what was the effect of Addendum IV on your operations at this point? We also asked them about their relative importance in the use of horseshoe crabs as bait, and sort of how they report and the extent to which they feel like the data we had captured what was going on out there.

Finally, we asked them costs associated with fishing activity, and that was to provide inputs to the IMPLAN model, which we'll discuss in the regional impacts analysis. Because of the high level of uncertainty in the available data, we decided that the report might be structured best by presented it as sort of three different avenues to try and get to the same point.

The first was using the best available landings and X-vessel revenue information that we had. The second was doing a regional analysis to try and understand the contributions of the horseshoe crab fishery to the overall economy. Finally, it was to present the qualitative information that was given to us by both fishermen and the processors.

Next, I'm going to summarize quickly the landings and X-vessel revenue information that we came upon during this report. I know some of the tables may be difficult to see on the powerpoint, so I'll refer to page numbers and exhibit numbers in the report, if you choose to look along.

I did say landings, but I should amend that. For this presentation I'm just presenting revenue information, just for the sake of time, but there is landings information in the report as well. If we look at the table, it is Exhibit 6 on Page 14. This table presents reported X-vessel revenue, so keep in mind that when I say "reported X-vessel revenue", this is the X-vessel revenues that we have from the NMFS consolidated data set, so this is what was reported.

It shows reported X-vessel revenue for the horseshoe crab fishery from 2000 through 2006. A few things to note here is we estimate that the approximate X-vessel revenue from the entire fishery, all five states, is about \$470,000 in 2006. In general we see that this reflects a downward trend since 2000, and New Jersey shows the most significant decline of 97 percent from just 2005 to 2006. This is likely the result of the state-wide moratorium.

Delaware and Maryland also show notable declines in reported X-vessel revenue. However, Virginia and New York show moderate increases. The next table, which is Exhibit 7, which is on Page 15, shows average reported X-vessel revenue for the horseshoe crab fishery, and this is per harvester.

The per harvester numbers are based on the number of active participants that was provided to us by the states fisheries administrators. Overall we estimate that the average reported revenue is about \$4,800 in 2006 for the horseshoe crab fishermen. It represents a decline since 2000 as well. Similar to the previous table, New Jersey has experienced the largest decline, and the largest of that was between 2005 and 2006.

Incidentally, the executive summary in the report and in the body of the report we highlight more trends than I'm going over here; so, if you have additional thoughts, you can look at the report as well. The next slide is Exhibit 8, which is on Page 16. One of the other things that the Board asked us to do was try and get a sense for seasonal activity and try to identify peak periods for harvest or revenues.

So this is showing reported horseshoe crab X-vessel revenue by month from 2004 to 2006, so this is the last few years. The peak revenues appeared to be achieved in both May and June for the horseshoe crab fishery, and there is a drop in the winter months, which I don't think is a surprise for folks here.

So we're going to take a similar look at the American Eel Fishery, and we have sort of similar analogous tables to go through. I should note, though, that discussions with eel distributors in particular suggests that these number represent serious or at least underreporting in this fishery in terms of both revenues and landings.

The total reported landings that was available in the NMFS consolidated data set was about \$1.5 million in 2006, and that has proven to be a general increase over the time period that we looked at. Maryland appears to be responsible for the highest percentage of revenues, which is approximately 50 percent of all

eel revenues in 2006, and New York reported minimal revenues from the eel fishery.

If we look at Exhibit 13, which is on Page 19, this is, again, looking at average per harvester in a similar fashion to the previous table. For American eel the average reported revenue is about \$7,000 per harvester in 2006, and that represents an increase of about 76 percent since 2000. There were also large gains over the time period in New Jersey. Maryland and Delaware reflect the highest average revenues for the five states. Finally, Virginia reports the lowest average revenue per harvester.

If we take a look at Exhibit 14, which is on Page 20, looking at monthly revenues in the eel fishery from 2004 to 2006, we see that there are multiple peak revenue seasons that appear to happen each year. The principal months we identified were in October and in May; and, again, lowest revenues were reported for the winter months, particularly January and February.

So moving right along here, we've got a similar look at the conch fishery. This is Exhibit 18, which is on Page 23. Again, discussions with processors suggests that these numbers, again, underrepresent the true X-vessel revenue of what is going on out there. The total reported revenues in the NMFS consolidated data set for 2006 is about \$2.3 million, and this is down from a high of about \$3.8 million in 2001.

Both Maryland and Virginia reported declines in X-vessel revenue at 94 percent and 64 percent, respectively since 2000. New York shows an increase over the same time period. Exhibit 19 on Page 24 shows the average reported X-vessel revenue per active participant in the conch fishery. Looking at the averages, the average is about \$8,700 per harvester across the five states; and overall this was a decline in reported revenues of about 24 percent since 2000.

Virginia shows a fairly large decline in averages, down from \$21,000 to \$10,000 per harvester over the time period, and there is a significant drop in Maryland as well. If we look at the seasonal from 2004 through 2006 on Exhibit 20, it appears that May is the peak month for revenues in the conch fishery; although March, April and November show peaks as well.

There is additional information in the report as well about breaking this out by state for 2006 to give you a snapshot of what is going on at least in terms of reporting right now. The Commission also requested

that we estimate the expense to which fishermen relay on the horseshoe crab, eel and conch fisheries as part of their overall revenue stream versus other species that they may fish.

We know that some fishermen may target other species as well. The ones that fishermen had mentioned to us were flounder, blue crab, striped bass and others. Unfortunately, the NMFS consolidated data set, the main data set that we used, because it was rolled up monthly did not allow us to look at individual harvesters, so we turned to state data specifically from both Maryland and Virginia, which was given to us by ACCSP to perform that analysis.

Essentially, for each harvester we compared landings and revenues for horseshoe crab, eel and conch and compared it to their revenues for other species. There are two caveats for this analysis that you should be aware of. The first is that this just provides only a snapshot of one year in time and it's just two states. It's unclear whether these results are typical for other states or even other years.

Prices for the other species and for horseshoe crab, eel and conch were estimated using information provided by fishermen and data from the SAFIS data base, so to the extent that both of those are accurate, they reflect this data.

If you look at Exhibit 22, which is on Page 27, it probably requires a little bit of explanation. We made an initial assumption that if a species' revenues represented more than 10 percent of total revenue for that particular harvester, then the species may be considered an important revenue stream for that harvester. The reason why we made this assumption was looking at the data after some processing, there appeared to be clear break between folks who had revenues below 10 percent and those who had revenues above 10 percent for the three species of concern.

If you look at the table, what it's showing here is that if you look at horseshoe crab in Maryland, for example, that 63 percent of the horseshoe crab fishermen that we identified in the Maryland data reported X-vessel revenues from horseshoe crab that exceeded 10 percent of their total revenue stream.

In the report there are additional tables in the appendix that provide a little more of the data behind this. In other words, for these horseshoe crab fishermen, we believe that horseshoe crab is likely an important revenue stream for these folks. The 63

percent in Maryland contrasted with only 18 percent in Virginia.

Using the same process, looking at American eel, we see that actually the two states reported fairly similar numbers, with 47 percent for Maryland and 45 percent in Virginia reporting X-vessel revenues that exceeded 10 percent of their total revenue stream. For the conch fishery, we see 31 percent of harvesters in Maryland and 18 percent in Virginia.

Because Addendum IV took effect in the fall of 2006, the data available was really not likely to reveal impacts of the addendum on either X-vessel revenue or landings. We only had two months of data to really look at. The full impacts will probably be realized in later data sets for 2007 and 2008.

To try and get a handle on some of these impacts as the ultimate goal of the Board's request here, we did conduct interviews with fishermen and processors and distributors, and they provided some insight into the ongoing impacts. There is a section in the report that deals with these qualitative impacts. I'm just going to highlight a few of their concerns here, but there are more in the report as well.

The first and probably the one that struck us the most is that the fishermen reported significant negative effects on the conch and eel harvesters that stem from high bait prices. The bait prices are high because, at least according to the fishermen, there is a shortage of bait. The bait substitutes have been found to be ineffective, particularly as reported by the fishermen in the conch fishery.

Because there is a shortage of bait, the fishermen report using less bait to try and stretch their supply, and that has led to a decrease in productivity of the fishery. Interestingly, in Delaware the fishermen that we spoke to reported their efforts a little bit and to focus on other species; namely, flounder, striped bass and blue crab.

In discussions with processors in Virginia, they reported the potential elimination of the directed horseshoe crab dredge fishery in Virginia and some bycatch fisheries as a result of the two-to-one male-to-female ratio requirement in Addendum IV. Essentially, those who are using the dredge equipment cannot catch enough males to meet the requirement, and this has reduced the supply of available horseshoe crabs in Virginia.

The final analysis that we performed in response to the Board's request is a regional economic analysis. Our approach is to try and identify the total

contribution the horseshoe crab fishery provides to the regional economy and essentially try to understand how harvesters' expenditures ripple through the economy. This was done just for horseshoe crab, so that's important to keep in mind.

To do this we employ the IMPLAN model, which is an input/output model. I should really preface this part of the discussion to say that I, myself, did not perform the IMPLAN analysis. We have IEC staff who use this model on a regular basis for a variety of different tasks. However, I am versed in how the model operates and its outputs, but the report goes into a little bit more detail in terms of how it operates.

Essentially, what IMPLAN tries to do is it tries to measure what we sort of dub as upstream economic effects, so these are the effects upstream from fishermen. Fishermen purchase gear, they may have boat payments, they may buy bait, they may have other expenses. Then that money multiplies through the economy.

Essentially, if you think about boat payments, perhaps, or buying a new boat, there is a boat builder who gets money from this. There are folks who bring the wood or the fiberglass for the boat. That's how it sort of moves upstream through the economy, and that's how IMPLAN looks at things. The model draws upon data from several federal and state agencies; namely, the Bureau of Economic Analysis and the Bureau of Labor Statistics, to form a set of multipliers that move the money through the economy from the fishermen.

Our inputs to the model, we based it on our discussions with fishermen in terms of what their costs were. Those inputs are provided in the report as well. A few caveats to the IMPLAN model; the first is that it does not evaluate potential downstream effects; impacts to processors, distributors or consumers.

It's a static model in that it captures impacts or the contribution of the fishery at only one point in time. Because of that, it does not specifically address the contribution that was altered because of Addendum IV. Finally, the IMPLAN data that we used was from 2004 as it was the most recent available at the time that we did this study. I believe now a 2006 data set is available.

Any changes in the relationships between the various components in IMPLAN that have changed from 2004 to 2006 would not be reflected in our analysis.

The results of our regional economic analysis show that the total regional economic contribution from the horseshoe crab fishery alone, so this is just folks fishing horseshoe crab, is between \$2.7 million and \$4.7 million across five states.

The largest contribution is estimated in Virginia at \$1.1 million to \$1.8 million, while the smallest contribution is estimated in Delaware at \$0.3 million to \$0.5 million. One of the things that struck us here – and it's a little unusual with an IMPLAN analysis – is that the impacts appear to be relatively high compared to X-vessel revenues, which you will recall were just about \$470,000.

We think this may be the result of the horseshoe crab fishery being primarily a bait fishery. Since the fishermen are not generally selling their horseshoe crabs for high revenues, they are using them for bait, the revenues that are gained from using it as bait are often attributed to other fisheries such as conch and eel, and so that's how we may see this changing. If this IMPLAN analysis was done further downstream to look at conch and eel, we might get a different result that we'd want to consider.

That's my presentation. There is a big list up there, but we'd just like to thank notably the fishermen and processors who took the time to talk to us, particularly during some of the higher fishing season. We really appreciate their help. We appreciate the help of state fisheries administrators as well for providing the information that we requested in a timely manner. Thank you very much for having me; I appreciate it.

CHAIRMAN BOYLES: Neal, thank you, that's a very good presentation. Questions from the Board? Roy.

MR. ROY MILLER: Thank you, Mr. Chairman. Neal, I have two questions. Thank you for that report, incidentally. I wanted to make sure I heard you correctly. You said that the data from 2004 was used for harvest information; is that correct?

MR. ETRE: For harvest information we were using 2000 through 2006.

MR. MILLER: 2000 through 2006; what did you rely on for 2004 data only?

MR. ETRE: The IMPLAN analysis. Without getting into too much detail, there are a number of linear relationships that are developed within the model, as I said, between boat makers and wood suppliers.

There are a number of complicated relationships that are modeled within IMPLAN, and they only update those every so often. At the time that we were doing the analysis, we had 2004 data. As of now, I think 2006 has just come out.

MR. MILLER: I see, but if I may ask a second question, Mr. Chairman. Neal, you have conch landings information, but it's not clear from my quick look at this, since it's the first time I've seen your report, whether that is all conch pot landings or includes conch dredge landings. Would you elaborate on that?

MR. ETRE: Sure, that's a good question. It actually includes all conch landings. We realized that not all conch and eel are caught using horseshoe crabs. However, the data that we had made it fairly difficult to parse out which fishery was actually responsible for the landing. Rather than making a larger assumption as to, I don't know, making a guess about something like 15 percent or 20 percent, we thought the best course of action was rather than adding another layer of uncertainty to an already uncertainty data set would be to just present all of the information and allow the Board to see, without our manipulation, what the data says.

I think what is important to think about is what is actually in these data sets and making sure that going forward that we're able to compare a new analysis to this analysis. So, hopefully over time we'll be able to sort of parse out those parts of the data.

MR. MILLER: If I may follow up, Mr. Chairman, Neal, I know for our state we gave you both dredge landings and pot landings. Presumably that information was also available from other states as well? It seems to me that – forgive me for being presumptive, but was it not doable to just focus on pot landings since, frankly, the conch dredge landings are kind of immaterial to our discussion on horseshoe crabs. Thank you.

MR. ETRE: The information that we got from – again, at the suggestion of the Board we had started with the ACCSP, and the information was sort of given to us as the sort of best estimate of removals from the ocean, which is how it was presented to us. It didn't appear to have good data in terms of what gear was used to identify the data.

I know that the state information, specifically Maryland and Virginia had additional information, but by the time we got to that data, frankly, the budget was running tight. We were trying to provide

as much information for the five states as we could, so I think it's the next step in the analysis.

MR. HIMCHAK: I had two quick comments and then a short question for Neal. In principle I'm very supportive of this economic analysis and what we referred to as the dockside multiplier, which is now an upstream concept. I like that idea. The other comment is that I support it in principle if not financially.

The other comment is that the value of the eel fishery can be greatly enhanced. You reported it as a minimum. With the mandatory reporting of eels in 2007, I know that you can get much better data. For 2007, we had not gotten all our reports in yet. Then you can go back in time and use that as a percentage of miniature fyke licenses, so that number can definitely be improved on.

Then I had a quick question. On your last slide on the regional analysis, is that for a given year? Could you frame that in terms of the year or a number of years?

MR. ETRE: The analysis is essentially 2006. What it is intended to be is to try and give you an idea of the entire contribution of the fishery. It's not intended to show the change in contributions based on a particular management measure such as Addendum IV because we don't have that change in both revenues and costs.

What it's intended to be is here is the most recent information we have that shows that this is the expanded contribution of the horseshoe crab fishery as it's depicted in the IMPLAN model. Let's keep in mind that it is how the model moves these things through the economy and that's how it develops these relationships.

MR. JAMES GILMORE: Thank you, Mr. Chairman. I have some comments. It's actually not a question, but there were some other issues that goes with the economic analysis and also the population, so I figured I'd raise them now and maybe we'll bring them up again later. There seemed to be some unrealized impacts from both an economic and a population standpoint, particular in New York.

The closure in the Delaware Bay appears to be having some significant effects in New York in particularly and probably other states. We know that the per-crab price has increased dramatically in New York State, and this has resulted in a significant increase in harvest. More importantly, we suspect

there is an increasing illegal harvest going on with poaching.

Now, we voluntarily reduced our landings starting in 2004. Our ASMFC quota was 366,000. We went down to 150,000 in 2004 and hit that mark. However, the following year we went over 5,500; the next year it was 22,000; and last year it was 134,000, which is just indicating that harvest is increasing.

We can't quantify how much harvest is going on from this illegal take, but we think it's significant. There are a lot of anecdotal things going on right now. We're getting many, many calls from people that have had traditional horseshoe crab numbers during spawning times where they see thousands of crabs on their beaches and they're not seeing any.

The fear we're having right now is that this moratorium, this closure is having a big economic effect where we're having a lot of harvest going out because it's a very lucrative market right now and a lot of people are just jumping into it; and, secondly, the effect on our population may become devastating where we're going to be losing it before we find out what is going on and it may be too late.

So, again, it has an economic component to it that I don't think maybe it was – you know, what is happening now is beyond when your study was done, but it's something that needs to be considered now. If we are talking later on about extending any kind of a moratorium, I think we have to look at maybe doing reductions because this moratorium seems to be having a wider regional effect than just what's going on the Delaware Bay. Thank you, Mr. Chairman.

CHAIRMAN BOYLES: Thanks, Jim. Any other questions from the Board or comments from the Board? Okay, seeing none, Rick, do you have a question or comment?

MR. RICK ROBINS: Thank you very much, Mr. Chairman, Rick Robins for Chesapeake Bay Packing. I provided extensive economic information to Industrial Economics in the course of developing their survey. I think one of the takeaway points here is that there is a major disconnect between reported landings and actual economic activity.

Just to follow up on that, one bit of information I did not provide was average landings per vessel. When I looked through Neal's report at Page ES-3 – and this gets to the issue of economic dependency of the fishermen – it said we estimate reported X-vessel

revenues – this is for conch – at approximately \$8,700 per harvester in 2006.

Just to put that in context, our average purchases per harvester in 2006 were \$78,000 across part-time and full-time harvesters, so there is clearly a problem with reporting. To that, in Virginia in 2007, beginning July 1st, adopted mandatory dealer reporting in the conch fishery, and I think we can look forward to better data. I'm not sure how much of this is a problem on the state side versus the federal side. It's not clear where all the data gaps are, but certainly in our state we're working to correct that data problem. Thank you.

MR. GIVENS: Charles Givens, commercial fisherman. Neal, I wanted to know if this study is ongoing or is it now done? I mean, will you be including 2007 data in the future?

MR. ETRE: Currently right now the study is complete, and we've fulfilled our contract.

MR. HIMCHAK: Mr. Chairman, that was my next question to the Board. From what understand, this concept came out of the Committee of Economic and Social Sciences, and there were three proposals put forward. Unfortunately, we had the minimum amount of money, \$20,000, to do this initial work.

Where do we go from here, recognizing that the first contract has run its course and we're just getting into the impact of ever-changing regulations? As I said, we can improve on the eel reporting over the time series, so my question to the Board is do we continue to support the economic analysis and carry it forward additional years? The next question is who is going to pay for it?

CHAIRMAN BOYLES: Comments from the Board on that? Pat.

MR. AUGUSTINE: To follow on that, Mr. Chairman, it just seems that we have just got into the tip of the iceberg, so to speak, and I don't think we're going to even get a flavor for the impact of 2007. We've seen it with our fishermen, you know, taking a brand new six-wheeler, backing it up to the beach and loading it up and disappearing. We also have had folks who have bought refrigeration equipment and they're freezing them for future spending.

So, having only gone this far and only seeing the tip of the iceberg with 2006, I don't see how we cannot figure out where we can get – what is it – 20,000 bucks to carry this on to the next level. I don't want

that number is, but how we can afford not to direct some money to go on at least another year and see what the first full year of impact will do, Mr. Chairman.

CHAIRMAN BOYLES: Good comments. I'd just like to remind the Board, at the annual meeting we went to the annual operating plan. We've allocated the Commission's resources. My sense of things at this point is if this is something that the states think is important, given the unavailability of resources by this Commission, it may be something that we look to the states to. I'd like some feedback or comments from the management board from their perspective, but that's my sense of things. Any other comments? Pete.

MR. HIMCHAK: I agree with you wholeheartedly, Mr. Chairman, and I think the scope of the study should include the State of New York. Right now it's confined to the four states, so New York should be added to that.

CHAIRMAN BOYLES: Good comments. Any other questions or comments? Bill.

MR. WILLIAM GOLDSBOROUGH: Thank you, Mr. Chairman. I was not here when this study was conceived, so forgive me if there's a well-known answer to this question. I assume that we were seeking this information to be able to evaluate impacts of fishery regulations. Was there any thought given to trying to estimate the economic value of horseshoe crabs from a non-harvest standpoint, the ecological values and so forth so that you could look at both sides of the equation?

MR. SPEAR: The proposal and contract was specifically limited to the harvest value.

STATUS OF THE RED KNOT STUDY

CHAIRMAN BOYLES: Other questions or comments? Seeing none, we'll move on. Neal, thank you very much; I appreciate that excellent presentation. As we move into the next item on the agenda, the status of the red knot, I know my watch says 1:45. Those of you who maybe just entered this meeting expecting the meeting to begin at 1:30, we did start early.

There was an opportunity earlier for those people who wanted to make brief public comments on items that were not on the agenda, I'd like, with the Board's indulgence, to make that opportunity available one more time to folks in the audience to

make public comment on items that are not on the agenda. Is there anyone else who would like address the management board at this time? Okay, seeing none, we will move on into the agenda item. Dr. Larry Niles from the Conserve Wildlife Foundation is going to talk to us about the status of the red knot.

DR. LARRY NILES: Thank you very much for the opportunity to talk to you today about the red knot. I know we've all been through a lot on this. This has been a good year because we've had the joint committee meeting this past fall and from that came the structured decision-making modeling. We now have a joint committee working on that, and I'm really grateful to be part of that. There are a lot of good things moving forward here.

I'm going to talk about the status assessment that we just finished for the U.S. Fish and Wildlife Service. That was actually completed about a year ago, but since then we've worked on an update that we're about to send to the Service that will actually bring you up to the 2008 winter counts of red knot. These are the counts that were just completed in Tierra del Fuego two weeks ago.

The way I've structured the talk is to first talk about the major points of the assessment, the major accomplishments, and then I'll talk about the conclusions of the assessment. I'm going to cover that fairly briefly. Then I'll go on to the update of assessment, which includes all the authors of the assessment. The original assessment had 18 authors and 43 co-authors. It represented the collective expertise and opinion of all the people working on the red knot throughout the world, but focusing on the western hemisphere.

We just finished the update last week. We have most of the authors on. There is several still outstanding because they're on vacation. Karen Bennett is in the hospital. Kevin Kalasz has been part of this as have the British Trust Team. The status assessment was completed in August 2006.

The Service judged, based on the assessment, that the red knot deserved candidate status, but precluded listing because of priority and resources within the agency. Other endangered species had a greater priority. Then the Service made the assessment public on their website in April of 2007, so this past year.

Just to give you a brief familiarity again; I'm not going to go into any detail on this except to say that we're dealing with Rufa subspecies of red knot.

There are two in the U.S.; *Rufa* and *roselaari*, but there are four other subspecies that basically span the entire globe. We're talking about this subspecies that moves up and down basically the Atlantic coast of both continents.

Now, the birds are making a 10,000 mile journey one way. The southbound journey is not rigorous, lots of clams and mussels on all the beaches that they're flying past, but the northbound journey is the critical one. They're going up into the Arctic winter. They come to the Delaware Bay to recharge and then go on to the Arctic.

Just to give you a sense of how much the Delaware Bay plays out in their life in terms of time, most of their time is spent migrating and in the wintering area, very little in the breeding area. Now, the assessment, we spent a lot of area in the assessment on deciding the primary stopovers, wintering areas, and breeding areas for the knot, and we went into great detail.

That's the reason for all the co-authors and contributing authors because we've to detail that would help determine the threats throughout their entire hemispheric range. We got down to such detail that we were talking about individual beaches that were important. The bulk of the assessment dealt with the data; and as it turns out there was a lot of data, but most of it was site-related.

So we had to compile the data from sites as disparate as Cape Cod Bay and Bahia San Sebastian in Argentina with the intention of trying to determine trends in all these individual places, most of which had been showing declining trends unnoticed because most of the data had been unpublished.

We spent a lot of time on the Delaware Bay itself, focusing on bird forage ecology, the issues that relate to red knots in the Delaware Bay, the numbers, the issues of weight gain, foraging dynamics, the things that are important to us. We also spent a lot of time on crabs. This was one GIS mapping that was done by Rick Lathrop of Rutgers to determine the areas that were important for horseshoe crabs on the Delaware Bay and then the areas that were important for shorebirds.

To summarize, the assessment had five basic conclusions: First, that the hemispheric population fell between a hundred and 150,000 down to a current level of between eighteen and 33,000 individuals; that the decline was primarily a result of the decline in survivorship, the adult survival rates

that were linked to poor weight gain on the Delaware Bay; that the primary hemispheric threat is the threat to eggs on the Delaware Bay, but also oil spills on the Delaware Bay, as well as oil spills and habitat loss in other places.

For example, in Bahia Lomas, the primary wintering area, there are oil platforms and large oil transport facilities that have the potential for a catastrophic oil spill. The other is that – this was kind of a surprise to us – is that there is very little shorebird – not red knot but shorebird winter management in the U.S. or throughout the entire flyaway.

There are some refuges that manage for wintering shorebirds, but most do not and almost none manage for red knots. Almost all management experience comes from the Delaware Bay and the immediate area. Finally, the other subspecies is basically totally unknown. The status of it is unknown, and I'll speak to that a bit with the update.

We just finished the update to the status assessment primarily because the original assessment did not include 2007 and 2008 data. You'll be the first, really, to hear the results of this past season and especially the winter counts that have taken place just in December and January. First to the numbers of red knots on the Delaware Bay, in the 2007 season, this past May, the number of red knots seen in the peak counts – these are baywide aerial counts – was slightly lower than the previous year, but you can see that the numbers have been unchanged, relatively unchanged for the last five years, so there has been no improvement in that period.

One of the important issues for the red knots is their ability to gain weight. The rate of weight gain is one of the prime features of the modeling that's taking place. We take the percentage of birds that reach 180 grams, which is the weight necessary to complete their journey on to the Arctic, the number of birds that reach 180 grams relative to all the birds that we catch, and then just use that to get a percentage of the birds that are in the total population.

You can see that the rate of gain, the ability of birds to gain weight has not changed in the last four years, five years. Birds are still gaining at the same rate that they were five years ago that led to a lot of the problems that we're facing right now. Now we put a finer point on that this year in that we've discriminated – this is work coming out of Rob Robinson in the British Trust Ornithology – but we're discriminating three groups of birds coming to the Bay.

The first is the early group, the second is a middle group coming in around mid-May, and then a later group at the end of May. The mid and the late group have always been the body of red knots coming to the Delaware Bay. The first group is gaining weight at a fairly low rate, about four grams per day, and their rate of gain has not changed at all over the last ten years.

The second middle group gains weight at a faster rate, and then this late group gains at an even faster rate, and their ability to gain weight has declined significantly over the last ten years. The finer point here is that is not every bird is suffering when they come to the Delaware Bay when there are not enough eggs. It's usually the birds that are coming later in the season, and that makes sense. There is sort of a drop-dead date.

They have to be in the Arctic by the first week of June; so if they come late in the Bay, they have to gain weight faster. So when there is an abundance of eggs, then that means all birds get to the Arctic. If there are sparse eggs, then that means there is a triage going on, starting with the late arriving birds.

There has been no trend in the percentage of late arriving birds over the last ten years, which is one source of disagreement in our original assessment. To add this all together and to put it in the context with the data coming from the horseshoe crab technical committee, the technical committee is finding increases in the number of crabs in the ocean and the Delaware Bay Trawl, but the number of spawning females actually coming into the beaches of the Delaware Bay has not changed in the time since we've done the assessment, and it hasn't changed actually in the entire period of the survey, which I think is seven years or six years.

The egg densities in the same way have not changed over the last three years. New Jersey's Egg Survey goes back to 2001, and the density of eggs has not changed significantly in those seven years of the survey, as it hasn't changed in the last three years of the Delaware survey. I'll characterize this at the end, but the general picture is we're seeing increases out on the ocean shelf but we're not seeing them in the Bay and we're not seeing them in the density of eggs.

Now, to the population data, as I said, we just completed the counts of red knots in Tierra del Fuego and found an additional 3,000 bird decrease over the count from last year, so the 2000 data now points to further declines. It dropped from about 17,000 down to 14,000 birds, so a low population has gotten lower.

And, if I add this together with the Florida counts that we completed in late December or early January and the counts in Brazil that were done last year, we have an overall decline in the total number of red knots over the last four years, and in particular the three years since the assessment was done, of about 30 percent. The red knot population essentially is still declining, and it's declining significantly.

The Brazilian population lost nearly half their population. That was not re-surveyed this year. Florida, which actually started at about 10,000 birds as cited in the assessment, as far as we can tell is now down about 500 birds. Now, the Tierra del Fuego count and the Florida count were both led by Guy Morrison, who has probably done more aerial counts than any other person in the country, along with Ken Ross, who is a noted waterfowl surveyor.

Our conclusions are that the population of red knots is still in decline; that birds coming to the Bay, especially mid and late arrivals, are still having difficulty gaining weight; that the density of eggs available to shorebirds has not changed in at least the last three years; and the density of spawning crabs on the Delaware Bay beaches have not increased.

So, for our recommendations, the first two are essentially for the Service. The first is that the priority of listing for the red knot should be increased because the three main wintering populations have been shown to be declining. The second is essentially a side issue for the ASMFC, but the roselaari sub-population, we did a thorough review of the literature and interviews with biologists to determine a population and have found that it is in fact lower than the Rufa population, and so, therefore, it, too, should be considered for listing.

If the roselaari is considered for listing, then that means the species itself will be listed in the U.S. and not the subspecies, which would further increase its priority. And last and important to this Board is we're recommending that there be an immediate increase in the number of females breeding on the Delaware Bay, and that the only way to immediately increase females is through further harvest restrictions in all of the states that are taking crabs from the Delaware Bay.

Thank you for allowing me to present this talk. I'll be honest with you, last year, at the end of the assessment, we really focused on a recovery framework because we had fully anticipated that we would not see these kinds of outcomes in this year, so

we're as surprised as you may be right now. Thank you very much.

CHAIRMAN BOYLES: Thank you, Dr. Niles. Questions from the Board? Pat.

MR. AUGUSTINE: Thank you for that presentation, Dr. Niles, it was very thorough. The question still arises – and I went through all the literature that was passed out to us in the last three or four years on horseshoe crabs and the surveys and studies and so on, but I have not seen any documentation by the U.S. Fish and Wildlife that I recall that indicated how the increase in number of black-back gulls and other gulls competing for the eggs have showed up anywhere.

Maybe it was presented but I don't recall it. It just seems to me, as we further restrict the taking of horseshoe crab eggs, that I envision that, first, there aren't enough eggs when, in fact, I'm not sure that there are or not. I don't think any of us are unless we look at the beach, and you probably have, after the birds have arrived – I'm sorry, after the horseshoe crabs have arrived and the birds have left.

I guess the question is, are the residue eggs and in what quantity that are still viable for the birds to eat. Again, the double-crested cormorant became such a problem because we had protected it for so many years, and now we have one of those good orders which eventually will reduce the quantity of them predated upon winter flounder and so on.

So, I'm wondering what the status is of black-back seagulls and those others and how they relate to competing for the remaining red knots, which there is no question we have to protect. Do you have any information on that that you could supply us with?

DR. NILES: Yes, in the assessment we cite several studies that bring information to this. The first is that the – and it's really laughing gulls that are the primary – the number of laughing gulls and herring and black-back have not changed significantly in the last ten to fifteen years. There was a rapid increase during the seventies and into part of the eighties, but that leveled off and the population has been relatively stable, especially in the period that we're talking about.

So, the first point I think is that – and let me make the second point that the black-back, the center of breeding for black-back – I'm sorry, laughing gulls in the U.S. is this same region. So, there is a great number of laughing gulls in the Delaware Bay area,

and they are feeding on horseshoe crabs. But, the second point is that has always been the case; they've always been coming to the Delaware Bay and taking eggs.

So as the density of eggs have decreased, I think you could be fairly certain that they're getting their share first, but it's not a level greater than it was ten years ago because the population is the same. Also, in the assessment, we have taken steps to try to influence the access of the eggs by laughing gulls by erecting barriers on the beach that are sort of like the barriers you see at restaurants with the monofilament line.

We've had some success, and we probably, if necessary, could manage this in very small areas like two years ago we had success at keeping an area free of gulls and shorebirds, because they wouldn't use the area either, but the shorebirds were more likely to use the areas on either side of the enclosures.

We actually kept most of the population of red knots at that time in that general area because I think of the enclosures. But the following year the eggs, those that are available were much more dispersed and so the enclosures didn't really have that much influence.

MR. MILLER: Thank you, Mr. Chairman, and thank you, Larry, for taking your time to come to this meeting. The glare and the relatively small print of your last slide conspired against me. Could you repeat for me your final conclusion, Larry, because I did not get that? Thanks.

DR. NILES: We're recommending that the number of breeding females on the Delaware Bay beaches be immediately increased as best as possible. We're recommending that the only way possible to assure a significant increase is by further restrictions in the harvest.

MR. MILLER: Just to follow up, Larry, you probably have an idea of what harvest you're talking about; could you share that with us?

DR. NILES: Well, I can only go to the extent of the report as far as the co-authors. In the report we're simply asking for further restrictions in the harvest of those states that are taking crabs from the Delaware Bay so that we'd have significant increase in the number of breeding females. It's up to the management board and the states to decide how that's possible.

If you're asking my personal feeling, I think we should think about the possibility of moratoriums

until we have clear evidence that there is a significant rise in the number of crabs and the density of eggs in the Delaware Bay; and until we reach that point, then we should restrict the harvest further.

MR. MILLER: A quick follow up; you are, of course, aware that there is no legal harvest of female horseshoe crabs in the Delaware Bay, so I presume you're talking about whatever harvest is occurring of females that might be bound for Delaware Bay that takes place in other jurisdictions; is that what you're suggesting?

DR. NILES: Well, Stew could correct me on this, but my understanding of the harvest of females last year that come from the Delaware Bay, so that would include Maryland and Virginia, at least some portion of Virginia's harvest and whatever appropriate portion for Maryland's harvest.

Because of a shift in the sex ratios of the harvest, whatever was gained by the restriction of harvest of females in Delaware was probably offset by the increase in the harvest of females in the other states, so that the overall impact to the Delaware Bay may not have been as great as intended. So, yes, what I'm suggesting here is that all states that are taking crabs from the Delaware Bay be treated in the same way.

DR. MALCOLM RHODES: Thank you for the report. I had just a couple of questions. I know you broke down the arrival of the birds into the three cohorts and their weight gain. We've seen in other species and other migratory species that there has been a change in migration patterns. Have you all noticed that with the red knots in Delaware Bay; are they arriving earlier whether due to warming or whatever; and does their arrival coincide with the females coming on the beach to lay their eggs; or has there really been no change in arrival time in the Bay?

DR. NILES: That's an excellent question. It's been really the source of a lot of discussion amongst all the shorebird people. The question isn't just about arrival times but about departure times – well, primarily arrival times but all through the month of May are birds coming in later because of problems elsewhere, and so those late arriving birds have more difficulty, but it's a consequence of other factors.

So, we spend a lot of time trying to go through the – a lot of time not trying, but a lot of time going through the surveys – the surveys are done every week – as well as the trapping data, especially the resightings data because we put flags on the birds that

have unique IDs that can be identified with a spotting scope, and each season we have four or five people dedicated in each side of the Bay to just finding resightings.

So we have a good understanding of when birds arrive, when they leave and then how long individuals are actually staying within the Bay and moving around the Bay. We have yet to find any evidence of a trend towards late arriving birds. I don't think that's an issue in the short term, but I think it's fair to say that the effects of climate change will have sort of counter-impacts with will the crabs get earlier and then the birds will get earlier or will they just start to get out of sync and then we'll have a big problem. We haven't seen evidence of that yet.

MR. JACK TRAVELSTEAD: Larry, you seem to suggest, in response to Roy's question, that because of the regulations in Delaware Bay, which have virtually eliminated the harvest of females, that there is now an increased harvest of females in Maryland and Virginia. When I look at our harvest in Virginia, I don't see that.

As a result of the regulations that we put in place in late '06, we were unable to harvest our entire quota in '07. In fact, we harvested just slightly over half, and almost of that is coming from the Chesapeake Bay or the seaside coastal embayments, which would suggest that those are crabs that are destined for those beaches and not Delaware Bay beaches. I'm wondering where are these females that would need additional protection? I mean, they don't seem to be harvested by Virginia.

DR. NILES: You know, I might be wrong about this, but this was data that we saw at the joint committee, and I think it was Maryland's harvest had essentially flipped its ratio from one-third females to two-thirds males to two-thirds females to one-third males. Now, I didn't do an analysis of this, and I'm not going to stand behind it.

I think the point I'm making is that we need to see more eggs on the beach. It's good that we're seeing increases in crabs in the offshore trawls and Stew's Delaware Bay Trawl, but we're not seeing the same increase on the beaches of Delaware Bay. Now, one would hope that five years from now we're going to see significant change, but the problem we're facing is that the birds are declining still, so we haven't bottomed out.

We truly cannot afford anymore losses related to the Delaware Bay, and so I'm simply arguing that we

need to ensure that there is a significant increase in the density of eggs by increasing the number of females. The only reasonable choice I think we have is to ensure that there are no females being harvested.

If females are allowed to be harvested because in Virginia and Maryland some portion of their harvest is coming from sources other than the Delaware Bay, there should be some control on the sex ratios as well so that you can't compensate by taking more females because other states are restricted from it. It's just more of a reflection than it is a criticism of any of the individual states.

CHAIRMAN BOYLES: Dr. Niles, again, thank you for being with us today. I appreciate that presentation. Next we will hear from the Fish and Wildlife Service Shorebird Technical Committee, Greg Breese.

USFWS SHOREBIRD TECHNICAL COMMITTEE UPDATE

MR. GREGORY BREESE: Thank you. We did not have a Shorebird Technical Committee meeting since the joint meeting in October, but I was asked to come and give the Board information on who sits on the Shorebird Technical Committee and to talk briefly about the egg abundance survey. That's what I will cover; and if there are any questions, I'll be happy to take them.

What you see before you is a list of the members of the Shorebird Technical Committee: myself, of course, up at the top; Kevin Kalasz, who represents Delaware; Amanda Dey, who represents New Jersey; James Lyons, who is within our Migratory Bird Program and lends a population ecology expertise to the group; Annette Scherer, who is with our Endangered Species Program and is the lead for the red knot as a candidate species; Larry Niles, who you just heard from; Dr. David Mizrahi, who works with New Jersey Audubon; Nellie Tsipoura, who works for New Jersey Audubon.

Dr. Mizrahi has done extensive work comparing weight gain with sandpipers and Semipalmated Sandpipers, and you've seen that information in past years as reported through the Shorebird Technical Committee. We also have Joanna Burger, who works at Rutgers University, who has done a lot of work on the Bay.

Robert Gorrell, who works for NMFS, which brings us some cross-fertilization from the fishery end of things and from the NMFS perspective; Stew

Michels, who works from Delaware in the Fisheries Program and is a member of the Horseshoe Crab Technical Committee. When we formed this committee, one of the things we tried was have some cross-fertilization or some interaction between the two committees rather than have them totally separate and independent, and so having a representative from the Horseshoe Crab Technical Committee was felt to be valuable.

And, Mike Millard, who is the Chair of the Horseshoe Crab Technical Committee and is within our Fisheries Department and has done work on horseshoe crabs in the Delaware Bay; again, to give broader picture, a two-species focus rather than just a single species. Then in addition, when the committee formed, there was interest in having some people part of the committee who probably couldn't attend regularly but could provide valuable insight and expertise at times.

So this Observing Member Category was created and originally had just Dr. Allan Baker from the Royal Ontario Museum, who has done extensive work across the Western Hemisphere on red knots. Then in the last few years we've gotten valuable input from the other three gentlemen, Brad Andres, who used to be the chair of this committee; Dr. Nigel Clark with the British Trust for Ornithology; and Dr. Humphrey Sitters, who is also in the UK and an independent shorebird biologist.

I'm missing one person, sorry about that, who just got added this summer, and that's John Bart with USGS, who has done some work with Larry in New Jersey in looking at indices that might identify thresholds for recovery of the species. These advisors, if you will, technical experts or subject experts, have joined the meeting and attended the meetings and participated on an occasional basis rather than a regular basis.

As far as the Baywide Egg Survey, there is still discussion about how to report that data and how to analyze that data. The only information I have at this point is from the first year when some of the summary results were provided, which are on this slide. The survey is run on both sides of the Bay once a week through the season.

There has been quite a difference in egg abundance on the two sides of the Bay, and Mispillion is like the mother lode of eggs from what we can see in the data. It's planned to continue, and understanding is that the analyses are still being done on the last two years of the data. That's all I have.

CHAIRMAN BOYLES: Greg, thank you for that report. Any questions from the management board members? Rick, you had a comment.

MR. ROBINS: Yes, sir, Mr. Chairman, I had two quick comments specific to the assessment report, if I can cover those quickly, please. The first relates to the recommendation as it relates to Virginia and Maryland. Virginia's harvest dropped by 40 percent, approximately, in 2007 from 2006 to 2007 as result of Addendum IV.

Maryland did have a slight change in its sex ratio, but its industry and department, as I understand, are working cooperatively to try to address that. That's reflected in the technical committee. The real displacement was in New York. That's being addressed there.

My comments are specific to the 2007 assessment document that was included in your briefing book. On Page 3 of the executive summary the report makes the following claim, which was completed in May of 2007. It says, "The latest information is that the crab population may have stabilized, but there is no evidence of recovery."

This finding is contrary to the findings of the ASMFC Technical Committee since 2005 when the committee found that several independent surveys were showing substantial and significant improvements in juvenile and sub-adult crab abundance in Delaware Bay. The finding is also contrary to the 2006 results of both major horseshoe crab surveys.

The 2006 Virginia Tech Trawl Survey indicated that the population of mature female crabs had doubled since the survey's low point, and the 2006 Delaware Bay Spawner Survey showed a 20 percent increase in the baywide index of female spawning activity. Both of these reports were available when the assessment was conducted and completed.

More recently the 2007 Virginia Tech Trawl Survey results confirmed that the relative abundance of primiparous and multiparous females has doubled in the core survey area of the Delaware Bay Region since the survey began. I would encourage the Board to contrast these findings of the Red Knot Assessment with the recent findings of your own technical committee, which reached the following conclusions after reviewing the most recent scientific data:

"Relative abundance of all demographic groups in the Virginia Tech Trawl Survey in the Delaware Bay area continues an apparent increased trend since 2003 or 2004. The data from multiple lines of evidence indicate that the Delaware Bay Horseshoe Crab Population is experiencing positive population growth.

"The Delaware Spawning Survey shows stable to increasing adult females and increasing adult males. The USGS and Fish and Wildlife Service Tagging Study conducted from 2003 to 2005 showed increases in juveniles seven to eight years of age during that time." At best, the assessment's finding that there is no evidence of horseshoe crab recovery is an outdated conclusion.

Unfortunately, the assessment's unsupported finding that the horseshoe crab population is not recovering is being reiterated by PBS, and millions of viewers can look forward to being misinformed this Sunday evening on the issue when PBS airs its Horseshoe Crab/Shorebird Documentary.

This Board and Commission deserve credit for the ongoing recovery of the Delaware Bay spawning horseshoe crab resource, the relative abundance of which has doubled according to the past two years of data from the Virginia Tech Trawl Survey. Instead, the Commission can expect to be inundated with criticism as a result of this misleading finding.

Stakeholders and management alike are looking to the Fish and Wildlife Service for objective information and guidance on this highly politicized issue, and I believe the situation warrants additional review and oversight by the Service. Thank you.

CHAIRMAN BOYLES: Thanks for your comment, Rick. Bill.

MR. BILL ARCHAMBAULT: Just a clarification on that, thank you, Mr. Chairman. The Service, at this point, has not reviewed the assessment so we're looking forward to looking at it. At that point in time I think we can come back with some additional findings and recommendations, but we do look forward to looking at the assessment.

MR. AUGUSTINE: Mr. Chairman, a follow-up question. Should the states that are bound on Delaware Bay be concerned about restricting our harvest based on a report we had from the Shorebird Technical Committee or are we status quo until Bill's report comes in from Fish and Wildlife?

MR. ARCHAMBAULT: I don't want to speak for Greg, but I would recommend, Mr. Chairman, the Shorebird Technical Committee takes a look at the report and also the Horseshoe Crab Technical Committee.

CHAIRMAN BOYLES: Okay, folks, you have heard from the Fish and Wildlife Service that the Shorebird Technical Committee is going to meet, and I was going to call on Greg to talk about when we're going to meet again before we get anymore discussion about this.

MR. BREESE: I might just clarify a little bit. There may be some confusion because people are saying "assessment report". The assessment report was contracted by the Fish and Wildlife Service as part of the Endangered Species Assessment or analyzing the red knot for candidate species purpose, so in the sense it has been analyzed or reviewed by the Fish and Wildlife Service.

It hasn't been analyzed by the Shorebird Technical Committee and a summary provided to this Board by that committee, and the new findings haven't been gone through. Although they have reviewed the report, we haven't come up with a summary statement about that I think is what needs to be clarified.

As far as the Shorebird Technical Committee, I anticipate the next meeting would be some time in April, trying to make sure that we get that in prior to the next Board meeting so that the Board can have input from the committee on the latest findings and whatever indices we have available to us.

CHAIRMAN BOYLES: That would be very helpful, Greg. Pete, did I see your hand?

MR. HIMCHAK: Yes, Mr. Chairman. My question is the same thing. I mean, we have on the CD-Rom a 287-page Red Knot Assessment Report, and then the assessment report that we have been talking about at this meeting includes 2007 data. Has that been vetted through the U.S. Fish and Wildlife Service? I mean, are they the overseer of the assessment or is it the Shorebird Technical Committee or who exactly?

MR. BREESE: The assessment report was contracted out to New Jersey, and that was done in support of analyzing whether the red knot should become a candidate species. That report was completed and that information fed into the U.S. Fish and Wildlife Service in that assessment which led up to it being determined as a candidate species.

The report has been made available to the Shorebird Technical Committee as well as the Horseshoe Crab Technical Committee, but the Shorebird Technical Committee hasn't given their thoughts on it to this committee. The newer data that Dr. Niles brought in today, which is very valuable, has not been vetted through the Shorebird Technical Committee as this point, but we anticipate doing that at the next meeting.

MR. AUGUSTINE: Just a quick follow-on, Mr. Chairman, I think that's my concern. After listening to the presentations, a question mark came up of had it been peer reviewed or vetted. Then Rick was kind enough to send us a letter of information as he presented here, and, again, my concern was had that been incorporated, and obviously it hasn't been reviewed totally yet, so I was glad to hear that you're going to be doing that, and we're going to have a meeting in April of that group. Thank you.

CHAIRMAN BOYLES: Yes, I think I speak on behalf of the Board that we would very, very much like to have the Shorebird Technical Committee take a look at that in time for us to consider it at the May meeting. All right, we're going to move on now to the next agenda item. We're going to have Dave Smith from USGS talk to us about adaptive resource management, and you're going to cover some of the technical committee stuff as well?

MR. DAVID SMITH: Yes, a little background. Thank you, Mr. Chairman, I appreciate the opportunity to review some of the recent assessment and monitoring data with respect to horseshoe crabs, to some extent coastwide but really focusing on Delaware Bay.

The kind of bottom line of those assessments and recent monitoring data, the bottom lines are that the horseshoe crab population structure coastwide is very definitely regional or embayment specific, which has obvious management consequences. Some of the consequences have been discussed here in this room.

Assessments and monitoring within the Delaware Bay population, we're seeing some encouraging signs that population is increasing, and we hope that continues. With regard to management within Delaware Bay in particular, the link between egg availability and horseshoe crab management requires a multi-species assessment framework, and I'll end with a little mention of the progress in that regard. We'll take kind of these points one by one and provide just a little background. This will provide the Board background, I hope, for the technical

committee report that Mr. DeLancey will provide. This issue of meta-population structure along the coast is supported by multiple lines of evidence, including genetics, recent work on juvenile dispersal, tagging data, trends in indices and regional-specific patterns in those trends, as well as some look at harvest effects and harvest rates within specific embayments.

There has been a flurry of activity in what I'll call assessment estimation and monitoring, and they include population models that have been either in the form of reports or publications, both in the New England Region as well as the Delaware Bay Region; abundance estimation within the Delaware Bay Region; and then monitoring and trend assessment, both coastwide and focusing on Delaware Bay regional population.

The general picture that's emerged from this work is that the relative abundance had declined during the 1990s substantially. It had stabilized somewhere around 2000, and it's showing signs of increase. The fishing mortality rate exceeded FMSY, but the fishing mortality rate peaked around 1998 and has been declining since then.

Some level of harvest – the model seemed to indicate that some level of harvest is sustainable and would be compatible with population growth, and those predictions are being supported by recent monitoring data. At the same time as these assessments have been going on, as the Board is very well aware, there has been harvest reductions, focusing most on the Delaware Bay but also coastwide.

As a result, coast-wide harvest has declined substantially from the peak in 1998. Also, an important harvest control was the establishment of the Carl Shuster Horseshoe Crab Reserve that was established in 2001. The reason that is important is because it protected older juveniles and newly mature females from harvest before they could spawn. That was a critical piece in the harvest regulations that have taken place in this decade.

Also, the Delaware Bay region is really where the reductions have been focused most recently, and we're now at a point where reported landings are in the vicinity or if not below what was being reported in the 1990s. For example, according to NOAA records, reported landings in New Jersey, Delaware, Maryland and Virginia were 207 metric tons in 1990 and 148 metric tons in 2006.

With regard to the encouraging signs of population growth, I'll just step through a few of them. We initially started to see an expanding size distribution among juveniles across the time of 2003 to 2005 within Delaware Bay, and these came from a large tagging effort that also incidentally collected juveniles in Delaware Bay at that time.

About 9,000 or so were measured and we saw an expansion of the size distribution as cohorts started to appear and be recruited into our sampling gear. That was a defined study so it was only ongoing from 2003 to 2005. Recently Dave Hata from Virginia Tech, in his report on the Offshore Trawl Survey, also reported that they found an influx of immature horseshoe crabs recruiting to their gear, indicating a new cohort appearing.

This year in 2008 will be the tenth year that the spawning survey has been conducted in a standardized way in Delaware Bay. The trend from 1999 to 2007 indicates at least stability for the female spawning activity or density, but this year, because of the interest in the male-only harvest and the effect of that, we started to report on the density of males. There we see a clear increase.

The reason that I think that's encouraging is because in horseshoe crabs males mature one or two years earlier than females, so this signal of males increasing I think could be viewed as an early indicator or leading indicator of what we should see in the near term for spawning females. The Offshore Trawl Survey reported that they're seeing an increase in all demographic groups that are recruited to their gear since 2003 to 2007. That increase is widespread and uniform.

If you look at the growth in growth rate, the apparent growth rate, in that increase, the instantaneous growth rate would up 0.35. The reason I mention it is because Gibson and Olszewski, in their report, when they were doing an assessment of the Rhode Island Narragansett Bay population, they looked at the maximum intrinsic rates that we would expect to see in a species like horseshoe crab, and found it to be about 0.5.

The Delaware Bay population we don't think would be able to grow at a maximum rate because there are some density-dependent factors taking place and there is harvest. One more note there, of concern with that report of the Offshore Trawl Survey is that in the New York Apex catches of immature appears to be decreasing, and that gets to some of these redirected harvest issues as harvest is reduced in one

area and moved into another area, and the populations are structured it's a signal – and it has been in the Board already – that these other populations may not be able to absorb the additional harvest.

As encouraging as these signs are, horseshoe crab management is essentially a multi-species management problem. If it was only about horseshoe crabs, these signs of increase would be very good, indeed, but there is another species that – the objective of management involves another species.

ADAPTIVE RESOURCE MANAGEMENT WORK GROUP

There really is a need for a multi-species assessment and modeling to explicit link management to red knot recovery, and this has led to what we're calling the Adaptive Resource Management Workgroup, and we hope that our efforts there will meet that need. As has been mentioned earlier the horseshoe crab and the shorebird technical committees met jointly for the first time in October.

One product of that meeting was the formulation of this workgroup, and a primary task of this workgroup is to develop a joint assessment model that will assist managers in making these multi-species decisions. The predictive model, the components here came out of two workshops that took place in July and then again in October. There are four components to the proposed model.

One is a horseshoe crab dynamics model. One component links horseshoe crab abundance to egg availability to shorebirds. Then there is a model that links egg availability to the proportion of red knots that reach critical weight gain by a target departure. Larry had alluded to that in his presentation as well. Then finally there would be a red knot population model that relates this proportion of making weight to productivity for red knots, including survival and reproduction.

So all these elements have been kind of schematically and conceptually developed by this group, and there have been some equations that have been written down for these as well, but we're definitely in the midst of this activity. It's not complete. The group is co-chaired by Jim Nichols – he is also with USGS, and he is at Pawtuxent – and myself, and then there are members from the Shorebird and Horseshoe Crab Technical Committee. They include people from the states as well as Fish and Wildlife Service.

A key member of this is post-doc that we hope to hire with funds that we're attracting – external funds that we're applying for. That post-doc will then provide the time and energy and to do the modeling work that we've kind of laid out. As a product, the group will submit periodic reports to both technical advisory committees and keep those lines of communications open.

So, the bottom lines, again, were this regional structure of the horseshoe crab population has consequences to management, especially in terms of redirected harvest. There are encouraging signs of population increase in the Delaware Bay population, and the multi-species assessment framework is required to really inform management for recovery of red knots as well as horseshoe crabs. That's all I have prepared.

CHAIRMAN BOYLES: Dave, thank you for that report. Pete.

MR. HIMCHAK: Thank you, Mr. Chairman. David, I had one quick question. You had commented about the sexual maturity schedule of males preceding females by about two years. How can that be determined?

MR. SMITH: Well, there is literature on that already, but a recent study that I was lead author on that looked at those size distributions and the growth rate – this is focused on the Delaware Bay – indicated clearly that the males matured earlier by one to two years, so the males were maturing starting at age nine and almost all of them were mature by ten.

The females started to mature at nine, matured also at ten, and then matured at eleven. Recent work by Ruth Carmichael in Pleasant Bay also supports that as well, although she concluded there was post-maturity molting that we did not see any evidence of.

MR. MILLER: Thank you. Very quickly, Dave, are you able to speculate about when the Adaptive Resource Management Workgroup will finish their initial modeling exercise?

MR. SMITH: I'm not sure I'm willing to speculate on that right now, but a key will be to get this full-time post-doc who will be able to put all of their energies towards that with the advice of the workgroup. We hope, if the money comes, we will be hiring and bring someone on by April. Then we think that the development and initial implementation of this is a multi-year effort, so it looks like we have – so in terms of advice it would come within a year

from April, perhaps, initial advice. But, in terms of the project itself, we think it's a multi-year project to allow for development and initial implementation.

CHAIRMAN BOYLES: Great, thank you for that report. I appreciate your being here. We will move on now. The next agenda item here is for Larry DeLancey from South Carolina DNR to talk about the technical committee report.

HORSESHOE CRAB TECHNICAL COMMITTEE REPORT

MR. LARRY DeLANCEY: I am here as Mike Millard is undergoing training. He is the Chair of the Horseshoe Crab Technical Committee. We met a few weeks ago in Baltimore. A lot of content of that meeting has already been covered by Dave Smith, and you've heard some of the other stuff. I'm just going to hit a few of the highlights.

The Virginia Tech researchers were there led by Dr. Eric Hallerman, who is a geneticist. They have done a fair amount of work on shorebird and red knot feeding on horseshoe crab eggs in 2005. They found in the areas that they looked at that the eggs weren't being depleted, but that was sort of a cold spring. The birds may have missed the peak spawning and that sort of thing. That study will be published fairly soon.

Lately they have been working other populations of red knot. The one kind of knot that are really closely connected with Delaware Bay, there may be some interchange based on their bird tagging work, but those red knots are feeding on different prey altogether on the coastal beaches on DELMARVA, on the Virginia coast. They're feeding mostly on clams, Donax clams, crustaceans and worms.

They're going to do a bio-energetic study this coming year, and where they are they don't see any horseshoe crabs. Dr. Hallerman's work on genetics is a followup of Dr. King's work that's been done. Basically, there's probably four management units on the east coast, Gulf of Maine, Mid-Atlantic, South Atlantic and the east coast of Florida, and then a lot of slop in the Mid-Atlantic units.

The trawl survey is funded at least through next year tentatively. I think their funding has been reduced, however, and they may not be able to sample off New York this year, but they are going to look at a different gear to try to track better the smaller horseshoe crabs. They have the capabilities to train

port samplers to find the newly maturing females and then the multiparous females as well in the future.

Sheila Eyler of U.S. Fish and Wildlife Service has been collating all the tagging efforts and returns. She provided the technical committee with a report and just a couple of highlights. Since 1999 there has been over 80,000 horseshoe crabs tagged on the coast as part of a sail with the biomedical companies that did tagging in 1999. It happened in Massachusetts.

Penny Howell with the State of Connecticut also relayed kind of an ongoing tagging study that one of the colleges is doing up in that area. Over multi-years you can kind of get through a population estimate on a small area. She just mentioned if funding for tags are available, there could be more of this type of work which involves coordinating students and volunteers as well, but it's a nice tool.

Virginia Tech tags their crabs in the trawl, and most of what they've collected off New York and New Jersey are recaptured right there, but at least 36 percent of those go into Delaware Bay. Then some Delaware Bay tagging, Benji Swann who was at the October Board meeting has done a long-term study.

I believe that was probably the year before last, starting in the eighties, and found post bleeding, for the crabs that are tagged, that most don't go very far, but about 4 percent did actually move greater than 50 kilometers distance, so there is some movement between the populations. Dave Smith had mentioned that Mike Millard and Sheila had done their tagging and retention study mainly in 2003 and that did give a rough population estimate, although that wasn't the primary design.

Then in the Chesapeake and in Maryland and in Virginia, there have been a tremendous amount of crabs tagged by a medical company down around the Chincoteague area, I believe, and, again, this and other efforts down there show that there is some Delaware Bay spawners come down there and vice versa. Some tagged down there go up off Delaware Bay and maybe in other years.

Then this did involve tagging, but they've seen some nice information on – this is work that Steve Doctor, State of Maryland, reported in the Ocean City area. On their spawner survey, they've had increased numbers in the last two years, so that's at least one encouraging sign in one area. Then in South Carolina as of 2006 we've still gotten a couple of tag returns from the animals that Mark Thompson had tagged back in 1999.

The most recent landings are considered preliminary. I believe you all have this in the report. I think everybody is kind of aware of seeing the increase in Maryland and New York. These are some graphs Mike Millard did on landings reported by sex, and we are seeing that bump up in females in the last couple of years in Maryland and New York.

This is for some of the major states, again, still well below the overall quota, but at least a slight increase recently in the females, it looks like. Some of our committee's concerns, obviously Addendum IV, you know, there were some changes and increased harvest and displaced effort into some of the other states, as we've heard today; some increased female harvest. At least one fishery in Virginia was basically inoperable because of the two-to-one ratio requirement, and we'll continue to evaluate. We've got this fishing season coming up, and we'll be looking at that.

And, as David Smith had mentioned, Stew Michels in charge of the Delaware Bay spawning data, at least they can track what impacts there might be on the male harvest there on the subsequent spawning males. We certainly encourage the adaptive management efforts to move forward, and we're hoping they'll be able to get their needed funding. That's all I have.

POSSIBLE INITIATION OF AN ADDENDUM

CHAIRMAN BOYLES: Larry, thank you for that. Any questions for Larry on the technical committee work? Seeing none, we'll move into the next item on the agenda, which is the possible initiation of an addendum. Recall from Brad's discussion earlier, Addendum IV is set to expire in the Delaware Bay region September 30th, 2008. That's where we are. Jack, you had your hand up?

MR. TRAVELSTEAD: Mr. Chairman, in the interest of moving this along, I'd like to make a motion and then we can proceed from there. Before I do, I want to note that, again, Addendum IV will expire on September 30th. There is clearly a need to continue the provisions of that addendum. We can't let it expire and go back to the older regulations.

I think we've heard some relatively good news about the status of the horseshoe crab resource. Harvest is down 70 percent. The Shuster Sanctuary continues to protect juveniles before spawning. We're seeing recruitment of new cohorts, expanding size distribution. We saw a clear increase in the male horseshoe crabs with an indication that that may

suggest we'll see a similar increase in females in another year or two.

We're seeing increased growth across multiple ages. With that in mind, I think that the provisions of Addendum IV are working. Perhaps the resource isn't responding quite as quickly as we would like, but I think that's more a function of these animals coming to maturity and moving into the beaches to spawn.

With that in mind, I would move that we direct staff to prepare Addendum V that would contain all of the provisions of Addendum IV; that is, status quo across the board; and that that addendum continue for a period of one year, with an additional provision that it could be extended for a second full year by a simple vote of the Board.

Let me explain that. I don't want us to be in a situation where a year from now we have to go back through another full addendum. Of course, if the ARM Report is done and it suggests other things, we take out on a different course, assuming it's finished. If it's not, I don't want the staff to have to go back through an entire paperwork process and public hearings for an addendum, but simply allow the Board, by a vote at one of our meetings, to extend the addendum for a second full year.

CHAIRMAN BOYLES: Jack, thank you for that. I've got a motion by Jack; do I have a second? Seconded by Eric Smith. Bob, I have a question in terms of the charter. If this is, in fact, in the addendum, as Jack pointed out we wouldn't have to go and initiate a separate Addendum VI necessarily to extend it if conditions warrant?

MR. ROBERT E. BEAL: Not necessarily. If the document is developed and we essentially put the public on notice, and as we go out to public hearings that Addendum V is considering extending Addendum IV for a year and may extend it for a second year based on Board action in the interim, that is consistent with the charter provisions, and it's an acceptable way to go. Administratively, it's the least burdensome way to go for the Board.

CHAIRMAN BOYLES: Okay, we've got the motion and a second. Any discussion? Pete.

MR. HIMCHAK: Thank you, Mr. Chairman. I'm very sensitive to the timeline of developing Addendum V and yet we talked today about the presentation on the stock assessment on the shorebirds and needing the Shorebird Technical

Committee's input on the particular presentation today.

I'm looking at the timetable and the meetings, so we can't begin the initiation of an addendum at the May meeting. However, sending out a Draft Addendum V with just the option of continuing the adopted measures of Addendum IV, in light of this uncertainty or the preview of what we've seen today, I'd like to offer – and I say this tongue in cheek – a friendly amendment to Jack's motion to include an option of a moratorium in addition to the existing status quo, which is Addendum IV.

CHAIRMAN BOYLES: Pete, can you clarify the geographic area you're talking?

MR. HIMCHAK: I think it would just include the area that has the no harvest from January 1st through June 7th, and then a male-only harvest from June 8th through the rest of the year at 100,000.

CHAIRMAN BOYLES: Okay, Jack, I'm looking to you as the maker of the motion; is that a friendly amendment?

MR. TRAVELSTEAD: I think we went through this same discussion when we did Amendment IV and ended up where we are now. I'm not going to object to the addition of that. It's clear to me that the current measures that we have in place are working, but if the Board wants to have an opportunity to discuss that again, that's fine. I think we'll end up in the same place.

CHAIRMAN BOYLES: Okay, that's an affirmative. Eric is the seconder; do you consider that? Okay, as a friendly amendment: Move to initiate Draft Addendum V that would contain the provisions of Addendum IV and an option for a moratorium for one year. The addendum could be extended for one additional year by Board action. That motion is by Mr. Travelstead and seconded Mr. Smith. Roy.

MR. MILLER: Thank you, Mr. Chairman. I would like to ask our colleagues from New York State is it premature to consider adding some option relative to the perception that over-harvesting may be occurring in New York waters? Is it too soon to add consideration of an option for a cap on New York harvest lower than the existing quota? Thank you.

CHAIRMAN BOYLES: Jim, do you want to address that?

MR. GILMORE: Roy, right now our quota was 360, so we have reduced that down. I don't know we're at that point yet because we're still having a lot of odds from the fishermen, so we may be get there, but I don't think we're at that point yet.

MR. MILLER: May I follow up? Would ASMFC action be helpful to you in this regard or at this point or is this something that you can deal with internally?

MR. GILMORE: We're going to try this year internally. I think we're going to try to – well, actually, we've got a few ideas. We're going to put a couple of spawner sanctuaries in and then try some different ideas this year to see if we can get the harvest down. I think we'll try it this year by ourselves; and if we don't do it, we'll have to consider it later.

MR. SPEIR: I'm sorry, Pete, I still don't understand the moratorium language. You said it would cover that area covered by the Shuster Sanctuary as well as those waters that are included under the January through June 7th closure period. Are you saying then that moratorium would be extended outside of that closure period?

MR. HIMCHAK: No, I made no specific reference to the Shuster Reserve because, de facto, there is no harvesting there. I have to find the exact section in Addendum IV that – maybe this is just specific to Delaware and New Jersey. Roy is nodding his head. That's my impression without combing through Addendum IV, so I think the 100,000 male-only harvest that I am offsetting with the option of a moratorium would apply just to Delaware and New Jersey at this point in the draft addendum.

CHAIRMAN BOYLES: Okay, I'm going to look at Jack and Eric just to make sure they got that. Okay. Pat.

MR. AUGUSTINE: After this is over, I'd like to ask the states to give us an idea as to how they handle their reporting of the harvesters.

CHAIRMAN BOYLES: Okay, any other discussion from the Board? Seeing none, how about members of the public? I see Rick Robins; Rick, come up and address the motion.

MR. ROBINS: Thank you, Mr. Chairman. Roy, I don't see the need to include a moratorium option for the Delaware Bay, having gone through this discussion last year and looking at the improvements we're seeing now. Having said that, I would just, as

a point of clarification, encourage the Board to identify those states in the motion where it says there is an option for a moratorium for one year. Let it say for Delaware and New Jersey just so that it's clear for the benefit of public. Thank you.

CHAIRMAN BOYLES: Rick, thank you for that. I think from the perspective of the discussion and the exchange that just took place between Pete and Harley, I think it's clear that the option for the moratorium would apply to the states of Delaware and New Jersey, and that is on the record. Any other comment from the public? We have a motion. All those in favor, signify by raising your right hand; opposed, like sign; abstentions; null votes. The motion carries unanimously, 12 votes for.

Brad, have you got direction from the staff perspective? All right, we'll be back in May to deal with this. Thank you for that great discussion. We're down to other business. Pete, you had asked for some time to talk about two items.

OTHER BUSINESS

MR. HIMCHAK: Thank you, Mr. Chairman. The first item I asked to discuss under other business, I believe Mr. Givens has already given his report to Brad Spear for distribution to the technical committee, so that will be done. The second item – and this has ramifications for states outside of the Delaware Bay area, and I refer specifically to a two-day symposium in May.

I think it's the 15th and 16th. It's being called for by both Secretary Hughes from Delaware and Deputy Commissioner Watson from New Jersey. It's a two-day symposium and it has to do with the impact on the Delaware Bay population of horseshoe crabs. To that extent and through a series of conference calls, there is a developing agenda.

I want to make sure that people in Maryland and Virginia are aware of this because there will be a list of attendees being drawn up, and you will be included on this. It looks like it's moving towards a holistic baywide conservation plan.

Of course, this would not have any regulatory authority for states outside of Delaware Bay, but I just want to keep the interested parties in the loop and make sure that they get all appropriate correspondence and have the opportunity to participate. The second day will be a panel discussion. I don't know if the panel has been developed yet, but it would be in other states best

interest to make sure that they attend and participate. Thank you.

CHAIRMAN BOYLES: Pete, thanks for that. Can you share that with staff so maybe Brad can get that out to the member states? Pat, you did have another piece of business you wanted to talk about.

MR. AUGUSTINE: I was going to ask are all the states that are harvesting horseshoe crabs having their harvesters report on a weekly basis, biweekly or monthly basis. I'm not sure if there's consistency across all the states, and maybe some of you are doing things that maybe we could incorporate into being a little more tightened – or tightened up on our method of doing things.

CHAIRMAN BOYLES: I was asking Brad if that was in the individual state compliance reports, and he indicates that it is. Brad suggests he could bring that back to the May meeting.

MR. AUGUSTINE: That's fine. One final thing; have we any report on horseshoe crab substitute baits? I know we've had some in the past. I have heard some anecdotal information that they don't work very well, but I'm not sure where we are with that. And, quite frankly, with the continuing tightening of the rules and regulations and lack of bait, all we can see is a continuing drain on our horseshoe population of New York, and we're concerned.

CHAIRMAN BOYLES: Roy, I'll direct that question to you.

MR. MILLER: I can provide one update fairly quickly. I reported the last time we got together on the joint University of Delaware/DuPont Company effort to construct an artificial bait for conch and eel fishing. Progress to date, there is some encouraging progress. They have a matrix; that is, a substance to carry the bait that appears very promising. However, they're still using ground-up horseshoe crab as the attractive substance.

They have yet to synthesize those substances artificially. Their goal is to isolate an amino acid chain or sequence or something of that nature on an off-the-shelf type of chemical that might be available and thereby eliminating all need for the use ground-up horseshoe crab as part of that bait matrix, but they're not yet, and that research is continuing. My department is funding the bulk of that research, but the DuPont Company's time and expertise is donated. Thank you.

ADJOURN

CHAIRMAN BOYLES: Roy, thanks for that. I'll just ask Brad if there are any changes in the status of any breakthrough developments, Brad will bring that back to the May Board meeting as well. Any other business to come before the Horseshoe Crab Management Board at this time? Seeing none and no further business, I'll take a motion to adjourn. We stand adjourned. Thank you for a great meeting.

(Whereupon, the meeting was adjourned at 3:10 o'clock p.m., February 7, 2008.)