PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

HORSESHOE CRAB MANAGEMENT BOARD

Webinar
October 21, 2020

Approved October 21, 2021

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David Borden, RI (GA)
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Craig Pugh, DE, proxy for Rep. Carson (LA)
Mike Luisi, MD, proxy for Bill Anderson (AA)
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Phil Langley, MD, proxy for Del. Stein (LA)
Pat Geer, VA, proxy for S. Bowman (LA)
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Carolyn Belcher, GA, proxy for D. Haymans (AA)
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Jim Estes, FL, proxy for J. McCawley (AA)
Chris Wright, NMFS
Mike Millard, USFWS

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

Ex-Officio Members

Allen Burgenson, Advisory Panel Chair
John Sweka, ARM Subcommittee Chair

Staff

Robert Beal
Toni Kerns
Maya Drzewicki
Max Appelman
Kristen Anstead
Pat Campfield
Tina Berger
Jeff Kipp
Laura Leach
Savannah Lewis
Sarah Murray
Caitlin Starks
Deke Tompkins

Guests

Bill Anderson, MD (AA)
Mike Armstrong, MA DMF
Pat Augustine, Coram, NY
Linda Barry, NJ DEP
Henrietta Bellman, DE DFW
Sharon Benjamin, NOAA
Alan Bianchi, NC DENR
Nora Blair, Charleston, SC
Jason Boucher, DE DFW
Jeff Brust, NJ DEP
Kristin Butler, US Senate Fellow
Mike Celestino, NJ DEP
Heather Corbett, NJ DEP
Jessica Daher, NJ DEP
Jason Didden, MAFMC
Lynn Fegley, MD DNR
Cynthia Ferrio, NOAA
Lewis Gillingham, VMRC
Angela Giuliano, MD DNR
Walker Golder, Audubon Society
Pam Lyons Gromen, Wild Oceans
Doug Haymans, GA (AA)
Brett Hoffmeister, Assoc. of Cape Cod
Adam Kenyon, VMRC
Kris Kuhn, PA FBC
Rob LaFrance, Quinnipiac Univ.

Guests (continued)

Christina Lecker, FujiFilm
Shanna Madsen, VMRC
John Maniscalco, NYS DEC
Kim McKown, NYS DEC
Jason McNamee, RI (AA)
Nichola Meserve, MA DMF
Steve Minkkinen, FL FWS
Brandon Muffley, MAFMC
Allison Murphy, NOAA
Eileen Murphy, NJ Audubon Soc.
Brian Neilan, NJ DEP
Ken Neil
Derek Orner, NOAA
Cheri Patterson, NH (AA)
Derek Perry, MA DMF
Michael Pierdinock
Tim Prudente, *Baltimore Sun*
Samantha Robinson, DE DFW
Tim Sartwell, NOAA
Bill Semrau, NOAA
McLean Seward, NC DENR
Alexei Sharov, MD DNR
Benjie Swan, Limuli Labs
Stephanie Sykes, Cape Cod Fishermen
Helen Takade-Heumacher, FL FWS
Beth Versak, MD DNR
Megan Ware, ME DMR
Anna Weinstein, Audubon Society
John Whiteside
Angel Willey, MD DNR
Jordan Zimmerman, DE DNR

The Horseshoe Crab Management Board of the Atlantic States Marine Fisheries Commission convened via webinar; Wednesday, October 21, 2020, and was called to order at 10:30 a.m. by Chair Joe Cimino.

CALL TO ORDER

CHAIR JOE CIMINO: Good morning everybody. Caitlin, do we have my slide?

MS. CAITLIN STARKS: Oh, you want to put that up now, okay. Maya, could you please pull up the last slide I sent you?

CHAIR CIMINO: Everybody, my name is Joe Cimino. I'm the New Jersey Administrative Commissioner. I'm Chair of the Horseshoe Crab Management Board. I was working on designing a 2020 logo with the ASMFC staff, because New Jersey was going to be hosting. The good news there is that we think we will be able to be hosting in person in 2021, which is the 80th year of the ASMFC Annual Meeting. A little bit of disappointment, but also going to be pretty exciting.

One other thing that bums me about this in particular, is that I'm not going to get a chance to spend some time with Dr. John Sweka, at the Fish and Wildlife Service, who hopefully is joining us virtually. John will walk us through some agenda items. I don't know if we can advance some of the slides here. But I did design a new 79th Annual Meeting logo for us all, for our socially distanced and new virtual reality that we're all living with here.

I just wanted to start out, hopefully get a few smiles from folks again. The best out of this for us in New Jersey, is that hopefully we'll get another crack at this next year.

APPROVAL OF AGENDA

CHAIR CIMINO: We'll move on to the agenda. Now we'll attempt to look at our most up to date version of this. First is Approval of the Agenda. Does anyone have any additions or corrections they feel need to be made to the agenda? Anyone on the Board?

MS. TONI KERNS: I see no hands, Joe.

CHAIR CIMINO: Thanks Toni, we'll consider that approved by consent.

APPROVAL OF PROCEEDINGS

CHAIR CIMINO: Next is the approval of proceedings from the last time this Board met, which was last October. Does anyone have any corrections to the minutes or modifications they would like to see made?

MS. KERNS: I see no hands.

PUBLIC COMMENT

CHAIR CIMINO: Very good, thank you. Next up we'll take public comment. Folks, this is public comment for any items not on the agenda. We have a couple items that are action items. We will be setting the 2021 harvest specifications, and as I mentioned, Dr. Sweka will walk us through the ARM model results. I know in the past there have been some public comments there, so I will, before we vote on a final motion for those items, also take public comment on those agenda items. Is there anything not on the agenda that the public would like to comment on?

MS. KERNS: I don't see any hands, Joe.

CHAIR CIMINO: Okay, Toni.

MS. KERNS: Anna Weinstein has now raised her hand.

CHAIR CIMINO: We'll open the floor, thank you.

MS. ANNA WEINSTEIN: Good morning Chair Cimino, members of the Horseshoe Crab Management Board, can you hear me?

CHAIR CIMINO: Yes, we can.

MS. WEINSTEIN: I'm Anna Weinstein. I am the Director of Marine Conservation for Audubon. I'm representing Audubon today. We're also part of the

Horseshoe Crab Recovery Coalition, which is a collaboration of scientists, NGOs and others dedicated to recovering horseshoe crabs on the Atlantic coast by 2030.

We submitted a brief letter this morning, and the letter describes that we are dismayed to see a continued lack of recovery of horseshoe crabs in the Delaware Bay survey region since the 1990s, as the supplemental materials show, and the decreased relative abundance of horseshoe crabs in 2019, relative to the last five years.

Plus reduced red knot numbers show the adaptive resource management framework is not working to recover horseshoe crab in the Delaware Bay area. The supplemental materials also described a nearly 50 percent increase relative to 2018 of estimated coastwide biomedical harvest. As you know, the rufa red knot was listed as threatened under the ESA recently.

We in our short letter, we list some concrete steps this Board must take in order to not just support, but actually allow recovery of the red knot, toward delisting criteria that are being established by the Fish and Wildlife Service, and also support the entire marine ecosystem that depends on horseshoe crabs. I won't run through all those, but we hope that you take a look at the letter, and we look forward to engaging with the Board toward recovery of horseshoe crabs by 2030. Thank you so much.

CHAIR CIMINO: Thank you, Anna. Yes, the Board will take a look at those materials. We will be getting an update on the ARM model. I would open it up if Dr. Sweka has any comments on the public comment here. From what I've read, I did see that some of the survey trends look better than the idea that it's all declining. Caitlin, we will turn it over to you now.

CONSIDER SETTING THE 2021 HARVEST SPECIFICATIONS

MS. STARKS: The first item on the agenda is actually going to be presented by John Sweka, and that is to consider setting the 2021 harvest specifications. I will go ahead and let him present on that.

DR. JOHN A. SWEKA: Okay, thank you Mr. Chair, thank you, Caitlin. I'll be speaking about the Adaptive Resource Management recommendations for harvest of Delaware Bay horseshoe crabs for 2021**.** Under our Adaptive Resource Management Framework, our objective statement is to manage the harvest of horseshoe crabs in the Delaware Bay to maximize harvest, but also maintain ecosystem integrity, and provide adequate stopover habitat for migrating shore birds.

REVIEW HORSESHOE CRAB AND RED KNOT ABUNDANCE ESTIMATES AND 2020 ADAPTIVE RESOURCE MANAGEMENT MODEL RESULTS

DR. SWEKA: In particular, red knots is our surrogate species for all shore birds, and the one that we're most concerned with. The red knot, so the Adaptive Resource Management model takes into account red knots and horseshoe crab population threshold, and the inputs of those annual harvest recommendations are the abundance of both red knots and horseshoe crabs.

Within the framework there are five possible harvest packages that we can select from, and annually we make harvest recommendations at this meeting, which will be implemented the following year. This table shows the five possible harvest packages to be implemented, and these were adopted back in 2012, when the ARM was accepted for management.

The harvest policies or packages range from a complete moratorium of no male and no female harvest up to a maximum of 420,000 males and 210,000 females within a year. Since the ARM Framework has been adopted for management, we have been consistently recommending Harvest Package 3, which is a 500,000 male harvest and 0 female horseshoe crab harvest.

The way the optimization program works is that the program looks through all the possible states of populations of those species, and different life stages of both species. Then it builds a giant matrix of the combinations of population sizes of red knots and horseshoe crabs, and applies a harvest package to that, and calculates the reward of that harvest under each possible state of population for both species.

Ultimately, this is how we select the optimal harvest package, given our current state of red knots and current state of horseshoe crabs. The population threshold should dictate when the harvest of horseshoe crab has value are based on abundance of both species. The threshold for horseshoe crabs is a female horseshoe crab abundance that is equal to at least 80 percent of the theoretical carrying capacity of horseshoe crab, or essentially 11.2 million female horseshoe crabs in the Delaware Bay population.

For red knots the threshold is 81,900 birds. These thresholds dictate that when the harvest of horseshoe crabs has value, and there is value in female horseshoe crab harvest if either one of these thresholds is met. If the red knots are meeting their threshold, we can safely say that horseshoe crabs aren't limiting red knot population growth and sustainability. If the female horseshoe crab meets their threshold, we can say that there are plenty of horseshoe crabs, and again not limiting red knots. This graph illustrates the population estimate of red knots stopping over in the Delaware Bay since 2011. You can see as it has fluctuated annually, and these annual fluctuations could be due to changes in stopover duration, or changes in the proportion of the total red knot population that visits Delaware Bay in a given year.

The 2020 estimates were slightly lower than 2016 to 2019 estimates, but there is greater uncertainty on our 2020 estimates, compared to the previous four years. Twenty-twenty was kind of a unique year, in that the abundance of red knots in the Bay at a particular point in time during the stopover season was greatest in the first time period.

Usually the population that stopped over at the Bay tends to increase through time, and then decrease as the birds eventually continue on in their migration. But 2020 was kind of a unique year, because the greatest number of birds encountered was at the first time period in the stopover. Also, in 2020, obviously with the pandemic going on, you know that impacted some of the resighting ability, which can also contribute to the wider confidence intervals on the estimate for 2020.

In 2020 the estimated stopover duration was 10.7 days, which was less than the 12.1 days in 2019. There is a typo on that slide, that should say 2020 estimated stopover population or stopover duration, and also, it's the 2020 population was estimated at 40,444 birds, which of course is below the threshold of 81,900 birds, but still within the range that we've seen since 2011.

The green line here on the graph just demonstrates the peak aerial counts that are observed each year since 2011, and you can see those have fluctuated somewhat through time as well. The abundance of horseshoe crab is assessed from the Virginia Tech Trawl Survey, which is generally conducted in the fall of the year, typically around October.

The Virginia Tech Trawl Survey did lose funding for a few years, so between 2012 and 2015, we used a composite index that was correlated to and based on the Delaware 30 foot trawl, and New Jersey's Delaware Bay trawl, and the New Jersey Ocean Trawl Survey, and we came up with a correlation to the overlapping years with Virginia Tech Trawl to fill in those missing years.

The 2019 estimates in the fall ended up being 4.7 million females, and of course this is also under the 11.2 million threshold for horseshoe crab abundance. 2019 did show a decrease in abundance from previous years. This is a little bit perplexing, we're not exactly sure why the abundance of horseshoe crab declined, you know from 2018 to 2019, but part of the reason

may be due to the timing of the Virginia Tech Trawl Survey.

In 2019 it was conducted approximately a month earlier than it is typically conducted. A lot of this has to do with, and since it was conducted earlier than normal, water temperatures were higher than normal. That earlier timing of the trawl survey, and also the warmer water temperatures, may have affected the catchability of the trawl survey.

Perhaps horseshoe crabs hadn't migrated to the coastal waters like they typically do another year, and just weren't available for the trawl survey intercepting and capture them. This is something that we are examining, moving forward, is to include the timing of the survey, and also water temperature, to try to standardize these catches, and take into account the possible effect on catchability. In the end, 2019 we had 4.7 million females, and 8.9 million males for our population estimate, which is then carried over to the spring of 2020, when the birds are stopping over in Delaware Bay.

Just a summary table here of horseshoe crab and red knot abundance estimates, for horseshoe crab 8.9 million males, 4.7 million females. For red knots, 40,444 red knots, both males and females combined. When we put these inputs into the decision maker that is generated by the ARM optimization routine, the recommended harvest package is consistent with previous years, and that is Harvest Package Number 3, that calls for a harvest of 500,000 males and 0 females.

At this time, you can think of it this way, since both of these population estimates for crabs and birds are still below their threshold, there is no value in harvesting females, and no female harvest is recommended at this time. When we apply our allocation schemes to the recommended total harvest of Delaware Bay origin crabs, it comes out to an allocation of 162,000 male only for Delaware and New Jersey.

For Virginia and Maryland, they are allowed to harvest more males, because not all crabs in their state waters are of Delaware Bay origin. For Maryland it's approximately 256,000 males, and for Virginia 81,000 males, and those states again are harvesting males. I guess with that I will take any questions that we have on the recommendations for 2021 harvest year.

SET 2021 HARVEST SPECIFICATIONS

CHAIR CIMINO: Excellent, thank you, John. We're looking for questions from the Board right now. Toni, do we have any hands?

MS. KERNS: So far Joe, I don't see any hands. I'll give folks a second. John Clark.

MR. JOHN CLARK: Thank you for the presentation, John. I was just curious, you mentioned that the Virginia Tech Trawl had to trawl a month earlier in 2019. Did you have a chance to look at the other surveys to get horseshoe crabs? The Delaware 30' trawl, the New Jersey Delaware Bay Trawl. Did they also show similar results, or were they more what you were expecting?

DR. SWEKA: Yes, John, I guess I should have looked at that prior to the meeting here. Off the top of my head I can't remember exactly how their numbers trended. I don't recall any significant decline like we saw in the Virginia Tech Survey, so again perhaps, you know it is a timing issue, and the hot water temperature issue affected catchability of Virginia Tech.

MS. KERNS: Joe, you also have Mike Millard.

CHAIR CIMINO: Okay great, Mike.

MR. MIKE MILLARD: Thanks, John, for the presentation. I think I ask this every year. Imbedded in that ARM process in the modeling, are three competing models that attempt to further explain the relationship between the horseshoe crabs and red knots survival. I'm not going to attempt to characterize those three. You might do it to remind folks. But I'm wondering, after another year of data, are we getting any closer to one of those competing

models showing strength, or showing that relationship stronger than the others? Are we learning anything from this process, after another year of data?

DR. SWEKA: Yes, thanks for that question, Mike. I'll just reiterate the three possible models governing the population dynamics for red knots are Model Number 1 is a no effect model, so red knot abundance and population dynamics are clearly independent of horseshoe crab population dynamics.

Model Number 2 is what we kind of term the fecundity only model, where horseshoe crabs have an influence on the probability of red knots gaining weight while they are stopped over in the Delaware Bay, and then there is differential fecundity for light versus heavy birds. Then Model 3 is essentially a full effect model, where horseshoe crab abundance affects both fecundity and survival of birds that stopover in Delaware Bay.

Yes, are we getting any closer to adding weight in one of the models? That is going to be part of our ongoing update and revisions to the ARM Framework, which I'll discuss also during this Board meeting. Really, right now the population of red knots has been fairly stable through time. Horseshoe crabs have trended upward, but now have trended downward.

Right now, Mike, I would say the decision on that, have we put more faith in one versus the other two of the red knot models? I would say stand by, and that will be something that we'll be examining and discussing as our third ARM revision for dates.

MS. KERNS: Joe, you have David Borden as well.

CHAIR CIMINO: Okay good, go ahead, David.

MR. DAVID V. BORDEN: I've got a question on red knots. Have the governmental agencies that manage it, I think primarily U.S. Fish and Wildlife Service, apportioned mortality on red knots, and looked at it from a perspective of, within the United States versus outside of the United States? Then the related question is, what are the major sources of mortality on the red knot population?

DR. SWEKA: Well, I must admit that I am not a red knot expert. But under the listing document, you know the listing decision by the Fish and Wildlife Service, the Fish and Wildlife Service has expressed climate change and conditions in the Arctic as possibly one of the major factors, you know influencing red knot populations. But specifically, you know dictating the relative merits of various mortality sources on red knots, I'm probably not the best person to ask that question to.

MS. KERNS: We have Mike Luisi and Roy Miller.

CHAIR CIMINO: Okay, go ahead, Mike.

MR. MIKE LUISI: Thanks for the presentation, John. When you were talking about the years when the trawl survey was not in operation, you discussed a composite index that was used to produce an estimate for the horseshoe crab population. Was that just a compilation of other work being done by the states in that surrounding area? Is that how that estimate was determined?

DR. SWEKA: Yes. We came up with a composite index through a linear mixed random effects model that included those surveys. That composite index was then compared to the years when we had overlap with the Virginia Tech Trawl Survey, and used it to fill in the blanks.

MR. LUISI: Okay, yes. Just a quick follow up, Mr. Chairman. I think it would be interesting, given the fact that the Trawl Survey in 2019 was conducted a month early. Personally, I think it would be interesting to see what the results of that, if you were to run that modeling like you did the years when the trawl survey didn't operate, and kind of compare those results with what occurred as a result of working a month early.
Personally, I think it would be an interesting comparison of the model output, based on other

surrounding work, versus the actual work, although it was early. Just wanted to throw that out there as an idea.

DR. SWEKA: That is certainly something we can look at.

CHAIR CIMINO: Thanks, Mike, that was a good thought. I appreciate that. Toni, it slipped my memory. Who's in the queue?

MS. KERNS: Roy Miller.

CHAIR CIMINO: Roy, go ahead, thank you.

MR. ROY W. MILLER: Thank you, Joe. Two questions for Dr. Sweka. That 2019 Virginia Tech Trawl Survey. I didn't catch the reason why it was conducted a month early. Was it strictly because water temperatures were warmer, or was it some issue with the vessel? The second question is, do you think there will be a trawl survey done this year in 2020? Thanks.

DR. SWEKA: Like any trawl survey, you know when they can get out on the water is weather dependent. They anticipate getting out on the water, and of course being that the survey is conducted in the fall of the year, looking at potential forecasts for hurricane season. It just so happened when they started the weather was apparently pretty decent.

They happened to be able to get all the trawls, all the tows in, in a quicker time period than normal. Other years, you know the survey can linger on in through November, given poor weather conditions. It was just an early start, given a potential forecast for hurricane season, to try to get all the sampling in. Your second question, to answer that, yes, Virginia Tech has funding to conduct the trawl survey this year.

MR. MILLER: Just a follow up, if I may. I assume that the 2020 survey will go forward as planned, barring any COVID issues. Is that a correct assumption?

DR. SWEKA: That is correct, yes.

MS. KERNS: Joe, you have Rob LaFrance.

CHAIR CIMINO: Broken up.

MR. ROBERT LAFRANCE: Thanks, Mr. Chair, and just a quick question. Thank you for the presentation. I'm new to this Board, and learning a lot, so I really appreciate it. Just a quick question, maybe this is speculative, but I'll ask it anyway. Are there any other reasons, we've talked about water temperature as being a potential impact for the downward trend? I'm just wondering whether there are other things we should be keeping our eye open for, for potential reasons for the downward trend.

DR. SWEKA: That is a good question. Like I said, we're examining the timing in the survey and water temperature as a possible reason why there was a decrease in the Virginia Tech catch. Other, I mean possible reasons could be just overall changes in migration timing of crabs into and out of the Bay, for whatever reason. But yes, it is very difficult to say why we saw that decrease. You know perhaps it is a change, a decrease in abundance.

MR. LAFRANCE: Thank you, I appreciate you giving me the time.

MS. KERNS: There are no other hands raised at this time, Joe. I lied. Hold on, we have two new hands, Chris Wright and Adam Nowalsky.

CHAIR CIMINO: Sure, okay. Go ahead, Chris.

MR. CHRIS WRIGHT: I just wanted to give a little bit more insight into the timing for 2019. When I was issuing the permit, they had requested to start a little earlier for that year, because of the New Jersey welk fishery, so that could be a reason also why they moved up and started a little bit earlier. At least I just checked my e-mail, that is what the rationale was that they were trying to avoid some of those gear conflicts in that area, in certain parts of the area where they were doing the survey.

CHAIR CIMINO: Okay, well thank you for that addition. We have Adam Nowalsky.

MR. ADAM NOWALSKY: Great, thank you very much. If you're ready for a motion, I'm prepared to make it.

CHAIR CIMINO: I think so, Adam. Unless Toni says we have any other hands.

MS. KERNS: No other hands.

MR. NOWALSKY: Great, I would like to go ahead and move to select Harvest Package 3, 500,000 male only crabs for the 2020 horseshoe crab bait harvest in Delaware Bay.

CHAIR CIMINO: Thank you, Adam, and do we have a second to that motion?

MS. KERNS: You have Roy Miller.

CHAIR CIMINO: Thank you, Roy. We had some great questions. Is there any discussion on the motion from the Board?

MS. KERNS: I see no hands, Joe.

CHAIR CIMINO: Very good, thank you, Toni. As I mentioned, I do want to give the public the chance to comment here. We do have a pretty tight schedule, as far as the time to get through this agenda. If there are any public comments, I would ask that you keep it to three minutes. Thank you. Toni, any hands?

MS. KERNS: I'm just going to give folks a second to see if they would like to raise their hand. I see no hands raised on the public.

CHAIR CIMINO: Very good, thank you. I'm going to ask, are there any objections to this motion?

MS. KERNS: Joe, no objection, but should it be 2021, or is 2020 correct?

MS. STARKS: It should be 2021, Maya, can you correct that typo? Thank you.

CHAIR CIMINO: Well, with that excellent correction, if there is no objection then I think we can just approve this by consent.

PROGRESS UPDATE ON ARM REVISIONS

CHAIR CIMINO: With that, we'll move back to John to hear more about the ARM Model itself, and the Updates and Revisions.

DR. SWEKA: This will go pretty quick. Last year at the October 2019 Board meeting, the Board approved moving forward with a revision of the ARM Model. The 2019 stock assessment was approved for management use, and the big advancement in that was the Catch Multiple Survey Analysis for horseshoe crab was peer reviewed and deemed acceptable the estimated abundance of horseshoe crab.

We also have more than twice the amount of red knot data since the ARM was initiated and we first started working on this back in 2008. The bottom line is that we know more now about those species. Very briefly, this is a synopsis of our terms of reference in the ARM revision. That is to incorporate the stock assessment model, the Catch Multiple Survey Analysis, into the ARM Framework, and account for all sources of mortality, which includes bait, dead discards, biomedical, and natural mortality.

We want to reevaluate the definition of Delaware Bay crabs, update on red knot models, given the new information on red knots and their relationship to horseshoe crabs. We also need to move the model into a new step software platform, because the previous platform is obsolete, and isn't maintained anymore. We're moving it to a new software that can be updated, and continued to be run. We also are going to be conducting sensitivity runs to compare platforms of the previous model platform and the new model, to make sure that we can get the same relative answers and possible harvest decisions.

Our progress to date, we have been in collaboration with Bryan Nuse, who is a University of Georgia Admin post doc student, and Paul Fackler from NC State to

convert the optimization model from ASDP to MDPSolve. Paul Fackler, he's the one who originated MDPSolve, so he is the expert on that.

In April 2020 we had our data workshop, bringing all the information together on horseshoe crab and red knot. In July of 2020 we had our first Assessment Workshop, where we discussed replacement of a horseshoe crab age structured model, with the Catch Multiple Survey Analysis model to describe the population dynamics of horseshoe crab, and how this would be done.

We also refined our dead discard estimation method with additional input from literature and TC members. We refined our natural mortality estimates of horseshoe crabs, based on more recent tagging information. Since that time, we've had biweekly meetings of a subgroup of the entire ARM Workgroup. The subgroup is specific to modeling and coding of the models in the new platform.

Our future activities, the reanalysis of red knot tagging data is ongoing by Jim Lyons of USGS. We anticipate by January or February of 2021 having our second assessment workshop, where all the models will now be in their updated forms. By April 2021, a preliminary report completed, May 2021, it will be presented to the Delaware Bay Ecosystem TC, and the Horseshoe Crab TC for review.

In July, we plan to have our peer review workshop, and then by either the August or October 2021 Board meeting, we will present the results of that peer review workshop to the Management Board. Hopefully it is accepted for management use by that time. I think yes that's all, and so I am happy to take any questions on our current progress, and where we're headed.

CHAIR CIMINO: Thank you, John, I appreciate all the work that you guys are doing, especially digging into any available information on the discards. I know that was a concern with our last assessment, and rightly so. Toni, do we have any hands for questions?

MS. KERNS: We have John Clark and Bill Hyatt.

CHAIR CIMINO: Go ahead, John.

MR. CLARK: I'm just curious, what did you mean by reevaluate the definition of Delaware Bay crabs?

DR. SWEKA: That was a term of reference. I mean there has always been some discussion, you know the farther away from the mouth of Delaware Bay you get, what proportion of those crabs are truly Delaware Bay origin crabs? We defaulted to the definition of Delaware Bay origin crabs are crabs that could potentially spawn within Delaware Bay during some portion of their life. We know that there is mixing of populations, both to the north and in the south. We've looked at tagging information on how crabs migrate. We've looked at genetic information on how populations in various areas along the coast are related.

Kind of a spoiler alert, not much is going to change. Essentially, the Delaware Bay population is the area that is sampled by the Virginia Tech Trawl Survey. Given the most recent genetic information and tagging information, it is reaffirming that when that Virginia Tech Trawl Survey was originally set up, they had a good idea of what were really Delaware Bay crabs. That is essentially going to be our population of interest.

CHAIR CIMINO: I'm sorry, was it Bill Hyatt next?

MR. WILLIAM HYATT: Yes, thank you, this is a question for John. It doesn't have to do specifically with the information that he just presented, but it is a follow up to some discussion that took place at previous meetings. I think a year ago the question was raised regarding the crab egg densities on (broke up) and some concern that those densities are going down over time, and may have decoupled from our index estimates of a number of female crabs.

At that time, you responded that there were some problems with that egg density data relative to the methodology being used to collect it, and the time series information that was available, and the fact that actually different methods were being used to collect it in different areas.

My question this time around is, is there any research that you're aware of underway to improve the methodology being used to monitor egg densities, or to identify a better methodology to be applied, or is there any research underway to better explore and understand the relationship between female crab numbers, and ultimate egg densities that are produced? The assumption here is that while there may be a relationship between the number of female crabs and red knots, the direct link is in effect eggs that are deposited on the beach, and the energy source that they represent to the birds, thank you.

DR. SWEKA: Yes, there still are egg surveys being conducted in New Jersey, you know Universities and other NGOs are refining the methods that are being used in collecting the egg density data. Those methods in the past, as you mentioned, in the past there were differences in methodology between New Jersey and Delaware.

Delaware is no longer doing any egg surveys, but they are still being conducted on the New Jersey side of the Bay. Methods are continually being refined by the stakeholders that are still interested in the egg density data. Hopefully, you know with more refinement in those methods, if additional information, we can still examine and look at to see how it correlates with abundance estimates of horseshoe crab.

But one of the problems with egg density data and will always be a problem, you know the number of eggs that you select and count on a beach is not only a function of horseshoe crab, but it's also a function of the weather conditions, you know prior to when those eggs were sampled. You know wind and wave action will obviously influence the density of eggs, especially the density of eggs in the surface sediment that are actually available to shore birds. It's something that we will still continue to keep an eye on and monitor. Whether or not that was the plan, a direct linkage to abundance of horseshoe crabs remains to be seen.

In our modeling and estimation within the ARM Framework, the new analysis of bird tagging data. If we can have a direct link or make that link between abundance of horseshoe crabs, the timing of their spawning, and possible weight gain and survival of red knots. That is actually an easier avenue to go down, because we have more confidence in our estimates of horseshoe crab abundance than what we would in egg density, given all those environmental factors that could influence egg density on a beach at a given point in time in a particular year.

MR. HYATT: Very good, thank you.

CHAIR CIMINO: Thanks for the question, Bill. Toni, any other hands?

MS. KERNS: Chris Wright has his hand up.

CHAIR CIMINO: Go ahead, Chris.

MR. CHRIS WRIGHT: Some of the materials that we had; I think it was noted that 118,000 roughly crabs were caught in the biomedical mortality. I was wondering, what percentage of those 118,000 were female crabs?

DR. SWEKA: That would be a question for Caitlin. If we can give that data out publicly, I'm not sure.

MS. STARKS: Sorry, could you repeat the question? I was having a sidebar.

MR. WRIGHT: There was 118,000 plus crabs that were caught, or the mortality rate was slated at 118,000 or estimated at 118,000. I was wondering how many of those were female crabs because it wasn't really specified, and I couldn't recall.

MS. STARKS: It's not specified, and I would have to go back to the data given to us by the biomedical facilities to sort that out. I don't have an answer in front of me right now.
MR. WRIGHT: Okay, thank you, because it was up a little bit higher this year compared to previous years. I was just wondering if there was a little bit more female mortality. Anyway, we can follow up later.

CHAIR CIMINO: Very good, thank you, Chris. Toni, any other hands?

MS. KERNS: No additional hands, Joe.

CONSIDER APPROVAL OF THE FISHERY MANAGEMENT PLAN REVIEW AND STATE COMPLIANCE FOR THE 2019 FISHING YEAR

CHAIR CIMINO: Okay great, thank you again, John. With that our next agenda item is Consider Approval for the Fishery Management Plan Review and State Compliance for the 2019 Fishing Year, and that is over to you, Caitlin.

MS. STARKS: We are running a little bit behind, so I am going to try and condense this. This is the management history. We've had seven addenda since the FMP was approved in 1998, and those are listed here, and for time I will skip to the next slide. This figure shows the coastwide bait harvest, biomedical collections, and estimated biomedical mortality over time.

Coastwide bait harvest declined following the establishment of the FMP, and it's remained fairly stable since about 2004. Then similarly, coastwide biomedical-only collections and estimated mortality have been fairly consistent since 2010, with some increases in the last few years. Then in 2019, the bait landings totaled 660,091 crabs, and that number does exclude unreported landings from Massachusetts, and confidential landings from Rhode Island.

Of the states that reported those 2019 landings, New York, Delaware, and Virginia contributed the most, and they account for 73 percent of the total when combined. The total landings equate to about 42 percent of the coastwide ASMFC quota, which is 1.59 million crabs. But again, that number is likely higher when you account for Massachusetts.

Then Delaware did exceed their adjusted state quota for 2019 by 5,014 crabs, and therefore they reduced their quota for 2020 to account for that overage. The biomedical only crabs that were collected in 2019 totaled 748,376 crabs, which is a 46 percent increase from 2018 collections, and the biomedical-only mortality estimate for 2019 is 102,758 crabs.

This number includes the reported number of crabs observed dead before bleeding, plus 15 percent of the reported number of biomedical-only crabs bled. That total biomedical mortality estimate represents 15 percent of the total directed removals in 2019 with that total, including biomedical mortality and bait harvest.

The biomedical mortality in 2019 does exceed the biomedical mortality threshold of 57,000 crabs that was established in the FMP. For horseshoe crab the states that qualify and requested de minimis were—and jurisdictions—were PRFC, South Carolina, Georgia, and Florida, and they all meet that criteria set in the FMP. New Jersey also meets the criteria, but it does not request de minimis status.

In this year's review, the Plan Review Team has continued to recommend that long term funding be established for the Virginia Tech Trawl Survey, which is currently funded through 2021. The PRT found that all states appear in compliance with the requirements of the FMP, and they recommend approval of the FMP review, state compliance reports and de minimis requests.

However, they did note some concern regarding New York's bait harvest, which increased by 25 percent in 2019, despite the poor stock status in that region. The PRT recommends that the Board make an effort to encourage and monitor actions for the New York region that would improve the population trend. The PRT also notes that the biomedical mortality threshold has been exceeded in 2019, which requires the Board to consider management action.

Then lastly, the PRT recommends the Board consider efforts to annually characterize dead discard removals in other fisheries, and specifically they're calling for increasing access to and use of data from the Northeast Fishery Observer Program, and that would allow for improved monitoring and estimation of discard mortality. Next slide, that's a brief summary of the FMP review, and I can take any questions.

CHAIR CIMINO: We are looking for a motion here, and we are running late, but that was a lot of information. Are there any questions from the Board?

MS. KERNS: You have two hands up, Tom Fote and then Mike Luisi.

CHAIR CIMINO: Go ahead, Tom.

MR. THOMAS P. FOTE: Yes, can you refresh my memory. Is this the first time or is this a trend with the biomedical industry by going over?

MS. STARKS: This is the 12th year in the last 13 years that the biomedical mortality estimate exceeded that threshold. Previously, in the stock assessment, it was found that the levels that were occurring prior to 2019 did not appear to be having a significant negative impact on the stock. Just noting that the level this year, or last year, did increase from that level before. But yes, it is a trend in the past years.

CHAIR CIMINO: Follow up, Tom?

MR. FOTE: I'm looking at this trend over the years. You know we pride the states to stay in compliance, but the biomedical are supposed to be good partners. But they need to stay in compliance, and we let them slide for twelve years in a row, maybe we need to take some action.

CHAIR CIMINO: Okay, we'll look at it, Board members, if there is interest. You know I have had some conversations with staff, and we have some ideas on discussions that need to be run through our Technical Committee first. We have Mike Luisi.

MR. LUISI: Based on your request to have a motion if you're ready for that.

CHAIR CIMINO: Yes, go ahead, Mike.

MR. LUISI: All right, I would move to approve the FMP Review for the 2019 fishing year, state compliance reports and de minimis status for Potomac River Fisheries Commission, South Carolina, Georgia, and Florida.

CHAIR CIMINO: Thank you, do we have a second?

MS. KERNS: Malcolm Rhodes.

CHAIR CIMINO: Thanks, Dr. Rhodes. Any discussion on this?

MS. KERNS: You had two additional hands come up, Maureen Davidson and Bill Hyatt. It was before Mike made the motion.

CHAIR CIMINO: If there are further questions then we'll go to Maureen. We can, I think wrap them into this discussion. Go ahead, Maureen.

MS. MAUREEN DAVIDSON: I just wanted to respond to some of the comments made concerning the assessment findings for New York, where we had the decrease in abundance. For 2020, New York State did take further management efforts in response to the decrease in abundance of horseshoe crab. We did harvest closures around the last moon in May, and the first moon in June, and we also decreased the daily trip limit during that peak spawning period. Now obviously this went into effect in 2020, and the effects of that have not been seen.

Unfortunately, because of the COVID-19 pandemic, we're concerned that our harvest for horseshoe crabs for this year are not really going to be normal, as they would have been in a normal year. But I just wanted to say that New York state has taken steps in response to the noted declined of horseshoe crabs in our local waters. Thank you.

CHAIR CIMINO: Thank you very much for speaking. That is important information for the Board. Bill.

MR. HYATT: Yes, I just wanted to speak briefly in support of the comment that Tom Fote made. I understand that the stock assessment determined that the previous overages were not affecting the population significantly, but the increase to 2020, the last increase was very significant, and I think regardless of whether or not there is a decision made to take action, we at least need to have some assessment done, as to whether or not that increase is significant.

CHAIR CIMINO: I don't disagree at all. In the interest of time, as I said. I've begun those discussions with staff. I think for our next Board meeting we will have some report out from the Technical Committee, or the Plan Review Team. To the motion, are there any other hands, Toni?

MS. KERNS: No other hands.

CHAIR CIMINO: Okay, we're good. Is there any opposition to this motion?

MS. KERNS: I see no hands in opposition.

CHAIR CIMINO: That sounds good to me. We'll consider the approval of the FMP review for 2019 unanimous**.**

REVIEW AND POPULATE ADVISORY PANEL MEMBERSHIP

CHAIR CIMINO: That brings us to, we have the AP nomination, so the Advisory Panel and Tina, if you could run us through that quickly. Thank you.

MS. TINA L. BERGER: Yes, I would offer for the Board's consideration the following, Christina Lecker as an addition to the Horseshoe Crab Advisory Panel. She is a biomedical representative from the Commonwealth of Virginia.

CHAIR CIMINO: Okay thank you, and that information is in the Board materials. Do we have a motion?

MS. KERNS: Pat Geer, seconder, Mel Bell.

CHAIR CIMINO: Go ahead, Pat. Pat, I think we're good, unless there was anything you wanted to add.

MR. PAT GEER: Yes, I was muted. I talked to Ms. Lecker a couple times. She's the Plant Manager of FUJI Wako Chemical U.S. Corporation. She's been there for a number of years, and they've been bleeding horseshoe crabs since about 2002. You know from my discussions with here, I think she would be an excellent representative to the Panel, you know representing the eastern shore of Virginia, Maryland and DelMarVa area as well for biomedical.

CHAIR CIMINO: Okay thanks.

MS. STARKS: Sorry, I just wasn't sure that the motion got read out loud, so I wanted to make sure that we did that.

CHAIR CIMINO: Much appreciated, I can do that. This is a motion to appoint Christina Lecker to the Horseshoe Crab Advisory Panel, motion was made by Pat Geer and seconded by Mel Bell. Is there any opposition to this motion?

MS. KERNS: I see no hands raised.

CHAIR CIMINO: Very good, we'll consider that approved by consent.

ADJOURNMENT

CHAIR CIMINO: I believe that wraps us up. I apologize for running this a little late. We had some great questions for Dr. Sweka, I think that was important for us all to hear. With that do we have a motion to adjourn?

MS. KERNS: Yes, Pat Geer.

CHAIR CIMINO: Pat again, thank you, we are adjourned, and Toni, sorry to run us late.

(Whereupon the meeting adjourned at 11:30 a.m. on October 21, 2020.)