

**PROCEEDINGS OF THE  
ATLANTIC STATES MARINE FISHERIES COMMISSION  
WEAKFISH MANAGEMENT BOARD**

**The Westin Alexandria  
Alexandria, Virginia  
May 5, 2016**

**Approved February 7, 2018**

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1. **Motion to approve agenda** by Consent (Page 1).
2. **Motion to approve proceedings of November, 2015** by Consent (Page 1).
3. **Move to approve the 2016 Weakfish Benchmark Stock Assessment and Peer Review Reports for management use** (Page 17). Motion by Adam Nowalsky; second by John Clark. Motion carried (Page 17).
4. **Motion to adjourn by Consent** (Page 22).

**ATTENDANCE**

**Board Members**

Nicola Meserve, MA, proxy for D. Pierce (AA)	John Clark, DE, proxy for D. Saveikis (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)	Ed O'Brien, MD, proxy for Del. Stein (LA)
Jason McNamee, RI, proxy for J. Coit (AA)	Lynn Fegley, MD, proxy for D. Blazer (AA)
David Borden, RI (GA)	Rob O'Reilly, VA, proxy for J. Bull (AA)
Colleen Giannini, CT, proxy for D. Simpson (AA)	Cathy Davenport, VA (GA)
Mike Falk, NY, proxy for Sen. Boyle (LA)	Doug Brady, NC (GA)
Steve Heins, NY, proxy for J. Gilmore (AA)	Chris Batsavage, NC, proxy for B. Davis (AA)
Emerson Hasbrouck, NY (GA)	Robert Boyles, SC (LA)
Tom Fote, NJ (GA)	Spud Woodward, GA (AA)
Russ Allen, NJ, proxy for D. Chanda (AA)	Pat Geer, GA, proxy for Rep. Burns (LA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)	Nancy Addison, GA (GA)
Craig Pugh, DE, proxy for Rep. Carson (LA)	Jim Estes, FL, proxy for J. McCawley (AA)
	Wilson Laney, USFWS

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

**Ex-Officio Members**

Joe Cimino, Technical Committee Chair

**Staff**

Bob Beal	Katie Drew
Toni Kerns	Max Appelman
Megan Ware	

**Guests**

Jeff Brust, NJ DFG	Robert T. Brown, MD Waterman's Assn.
Dan McKiernan, MA DMF	David Bush, NCFA
Jack Travelstead, CCA	Arnold Leo, East Hampton, NY
Jeff Deem, VMRC	

The Weakfish Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 5, 2016, and was called to order at 8:00 o'clock a.m. by Chairman Russ Allen.

#### **CALL TO ORDER**

CHAIRMAN RUSS ALLEN: Good morning everyone, let's get this started. My name is Russ Allen; Jersey Fish and Wildlife, I'm the Chairman of the Weakfish Board.

#### **APPROVAL OF AGENDA**

CHAIRMAN ALLEN: First off, everybody has seen the agenda. Are there any changes to the agenda, edits, or comments? Seeing none; we'll consider the agenda approved.

#### **APPROVAL OF PROCEEDINGS**

CHAIRMAN ALLEN: Also I would like to get an approval of the proceedings from the last meeting in November of 2015; any edits, comments? Seeing none; we'll consider those approved.

#### **PUBLIC COMMENT**

CHAIRMAN ALLEN: This is where we open up public comment for anything that is not on the agenda today. I do not have anybody scheduled for public comment, anybody in the audience? Seeing none; we will jump into this.

#### **WEAKFISH BENCHMARK STOCK ASSESSMENT**

CHAIRMAN ALLEN: First up is the 2016 stock assessment. Jeff Brust is going to give the stock assessment overview, and then Pat Campfield will give the Peer Review Panel. In between if there are some clarifications that we need from Jeff, we can do that; but I would like to save most of the questions until after both reports. I'll turn it over to Jeff now.

#### **STOCK ASSESSMENT OVERVIEW**

MR. JEFF BRUST: Yes, my name is Jeff Brust. I am the Chair of the Weakfish Stock Assessment Subcommittee. I'll be presenting the summary of the stock assessment that we just completed earlier this year. Obviously this was not just my work, so I would like to acknowledge my partners in crime here for the Stock Assessment Subcommittee, as well as we also had significant input from the Weakfish Technical Committee.

If you see any of these folks say thank you. Just a real quick overview of the critter that we're dealing with, weakfish, I'm sure we're all familiar with it. It has a moderate life span, they live 12 to 15 years, and they've been recorded as old as 17 years. They have highly variable growth, you can see down here that a two-year old fish could be anywhere from 100 millimeters up to about 650 millimeters, so anywhere from 4 inches to two feet.

We do consider them recruited to the fishery around Age 2. You can see that a lot of them are about 300 millimeters by Age 2, and that is roughly the minimum size in most of the fisheries we have. They do mature very quickly; they are 90 percent mature by Age 1. They have a typical migratory pattern for a lot of the Mid-Atlantic species; north and inshore in the spring.

Moving up from Hatteras and areas south as the waters warm, and then as they cool off in the fall they'll head back down south and offshore for the winter. It is primarily a commercial species. You can see in the top figure the bottom, the blue; you can see it is about 50 to 80 percent commercial harvest. The next largest would be the recreational harvest, but you can see as we've added more and more regulations the discard mortality has had an increasing impact on the removals. The bottom figure, it is pretty similar for the recreational as well. That is the commercial harvest by state, and you can see that North Carolina, Virginia, and New Jersey are the top harvesters for commercial; as well as

recreational. Those are the three big states that we're dealing with.

A quick overview of how we got to where we are, in terms of the assessment. Most of the previous assessments were done using ADAPT-VPA; it's an age-structured model that works backward from the current year. Prior to the 2009 stock assessment, we were seeing these signs that productivity in the stock had been changing, and it wasn't related to fishing.

We were suspecting natural mortality, so at the time for the 2009 stock assessment, we put a lot of effort into identifying ways to capture this trend in natural mortality. How can we model what is happening with natural mortality? We were looking at things like food habits, environmental drivers, and predation and competition.

We went to the 2009 peer review that was conducted through the SARC process, with a lot of models that focused on these extended factors. The outcome from that SAW panel was that natural mortality is increasing. These extended models, so we had population models that were trying to incorporate predation and competition into the models.

The Panel didn't necessarily approve those. They said it is good work, but there is no empirical evidence. We didn't have any direct evidence of weakfish in striped bass and spiny dogfish stomachs. The models were good, but they couldn't support those, because we didn't have the empirical evidence to show that it was specifically predation or competition.

The accepted model from that SAW-SARC was a very simple, non-aged structured relative F model. But the outcome was the same that the population is depleted, and fishing mortality didn't appear to be the driving factor in what was causing the stock to decline. That is where we started from for the 2016 stock assessment.

Our focus for the 2016 assessment was to continue to explore these methods to identify changes in natural mortality. We wanted to explore different modeling frameworks that were better capable of handling the assumptions about the stock, about the natural mortality, as well as the uncertainty that we had in the data that was going into the model. Also, because natural mortality is changing our reference points, which at the time were based on equilibrium assumptions that natural mortality wasn't changing; are not very appropriate in that condition.

We were looking for non-equilibrium type reference points. That was the focus for 2016. Moving into the models then, we had the regular cadre of data sources, we had commercial harvest and discard data, we had recreational harvest and discard data, we had indices of abundance from all of the state trawl surveys; as well as a fishery dependent index from the recreational fishery.

We also had the biological data from all of those different sources; lengths, weights, ages, and things like that; so nothing new there. Here are a couple of figures of the processed data that went into the model. The top left you can see is the harvest. It is very similar to the one that I showed before. You can see that back in the 1980s we had very high harvest, and that it has declined pretty steadily since then, both through regulations and declines in population. The bottom right figure shows the age composition of what we were harvesting. You can see early on that we had a lot of very small fish that were being harvested.

But as regulations went into effect, we actually had some stock rebuilding, and in the middle of the graph on the right hand side, you can see more, older fish that were showing up in the fishery; but they were also showing up in the population as well. There was a bit of stock rebuilding during that period, and since then

because of the increase in natural mortality, those older fish have all pretty much gone away.

Here are the indices. We had 8 adult indices and 7 young-of-year indices. There is a lot of noise there. We were seeing two general patterns in the adult indices. There was this apparent inshore pattern in what the abundance was looking like, and there was a different offshore pattern. That was going to make it a little difficult for the model to fit.

The young-of-year indices, we tried a new method. We had 7 different indices, and we used a method that was able to combine them all into a single coastwide composite young-of-year index, which is very helpful for the model. One of the terms of reference was to, like I said; see if we could figure out what was happening with natural mortality

We looked at a number of different methods to see if we could model that or at least track how it was changing. Food habits didn't give much information. We looked at time varying growth. That didn't help us very much either. We had 3 models that gave some level of support to this, and some level of corroboration that natural mortality had been changing over time.

The figure on the right shows 3 of these methods. Basically it looks like natural mortality has increased from about 0.15, 0.25 in that area up to around 1.0 in recent years. You can see that the scale varies and some are noisier than others, but the timing in that change is pretty coherent and it matches well with when we were seeing these declines in stock abundance.

One thing that we didn't look into, because the last Panel didn't really like it, was the predation competition. But I just did want to mention that the 2016 Panel suggested that we look into it again, just in terms of how much predator biomass is out there and what's the potential for weakfish consumption. That is probably something we'll look into in the future.

We had three candidate models that we were looking at. We had the continuity run, the very simple relative F model that we used in 2009. We had a statistical catch-at-age model, the ASAP model, which is better than the VPA at handling uncertainty in the data. It is much more robust. Then we had a model that was developed by some researchers at Virginia Tech, I think you've all met Dr. Yan Jiao at Virginia Tech.

We've been working with VMRC to develop a model specific for weakfish. This was our preferred model, and it incorporates two very novel components. It estimates natural mortality internally, which is usually very hard to do. It also allows for spatial and temporal changes in stock abundance for each of the different indices. For example, if we see one of the indices, just say for example Virginia's index was going down. It is not necessarily because the stock is going down there; it is because the stock may have shifted to a different area, such as New Jersey or Rhode Island or something like that. It incorporates these two very novel components into the population model, which we thought was very helpful in identifying what was happening with the stock. That was our preferred model. The results are shown here. Very similar to some of the other models that we looked at, you can see for spawning stock biomass, at the beginning of the time series it was very high. It declined some, and then around the mid-1990s you can see it started to rebuild; I mentioned that before.

We had the stock rebuilding during the 1990s, and then by the late 1990s spawning stock biomass started to decline. Recruitment is shown in the lower right. Again, similar pattern in terms of the number of one-year old recruits coming into the fishery. Here is a plot of the fishing mortality and the natural mortality together on one plot.

Fishing mortality started relatively high, around 0.6, declined during the early nineties; that

allowed the stock to rebuild a little bit. But then as the stock started to decline, it crept up again, even though harvest was down, you can consider fishing mortality as sort of a ratio of what's being harvested, relative to what's out there.

As the stock started to go down, even though our harvest didn't go up, the harvest rate went up. Then the recent regulations in 2008, 2009, dropped the fishing mortality rate again. But you can see the red line is the natural mortality overlaid on top of the fishing mortality. You can see that certainly in recent years natural mortality has been a larger impact on the stock than fishing mortality.

Just for comparison with the other candidate models that we looked at. The top left shows the fishing mortality, and you can see there is some disagreement. Well, they all start in the same place, but there is some disagreement towards the middle of the time period about what's happening. The red line is the ASAP model, and that is assuming that natural mortality is constant, and so it is throwing all of that other mortality into fishing mortality.

If you look at the figure on the top right, that is total mortality, so that is fishing mortality and natural mortality combined. You can see that the two are much more similar during that period when natural mortality is increasing. The bottom left is SSB, same pattern just a different scale; and on the bottom right is recruitment.

Same pattern, pretty much the same scale. You can see that all of these models are showing very similar results. There is a little bit of scaling difference, and some differences in the assumptions that are going into the model. But overall it is comforting that the results that we're seeing from all of these models are very similar.

Those are the models. That is sort of where we stand. Just the bottom left, the SSB that is sort of what we're looking at here; very low. It looks like it might be coming up a little bit in the last

couple years with the recent regulations, but still very low relative to what we saw in the early time period.

Moving into reference points, after the 2009 assessment we don't have any fishing mortality reference points, because as I said as natural mortality is changing, your fishing mortality is sort of a moving target. We decided not to have fishing mortality reference points. Currently we have a spawning stock biomass target and threshold that are defined as the target is 30 percent of an unfished stock, and the threshold is 20 percent of an unfished stock. Because we have more evidence that natural mortality is changing, and those previous reference points assume that natural mortality is not changing. We were trying to take into account; we wanted to develop these reference points that took that into account.

They are based on not just fishing mortality, but fishing mortality and natural mortality. We looked at a range of different things, should we use a low natural mortality, a high natural mortality, a time varying natural mortality, and average natural mortality? What we came up with based on historical performance of the stock, and just what seemed reasonable for the productivity of the stock.

A lot of the reference points are based on an average natural mortality of  $M$  equals 0.3, so that is the time series average of the  $M$  that came out of Yan's model, the Bayesian model. We set a total mortality target of 30 percent of total mortality of 0.93, and a threshold that is 20 percent, but gives us 20 percent of an unfished stock. The  $Z$  20 percent is 1.36.

For the SSB, again the ones that we have are assuming a constant  $M$ , which we know isn't true. We proposed one, again using the time series average  $M$  of 0.43. The target is a little harder to define, so we use just a threshold. We set the threshold at 30 percent of the SSB, which gives us a threshold of 6,900 metric tons.



Then the way that we're proposing that these be used is not individually as a Z reference point and an SSB reference point, but use it as a two-stage evaluation. The first thing we need to do is look at SSB. If our SSB is below the SSB threshold, whether it is from fishing or natural mortality or the combination of the two, regardless of the driver if SSB is below that threshold, we do nothing. We have to keep fishing mortality low.

If the SSB is above that threshold, then we might have some room to increase our fishing mortality, or to allow some fishery. If Z is above the threshold, if our total mortality is above the total mortality threshold, we can't do anything. Then total mortality is too high on this stock, and fishing mortality should be constrained.

If total mortality is somewhere between the target and the threshold, then we could possibly allow some limited fishery to occur. If Z, if our total mortality is below the total mortality target, then we could start looking again at SPR reference points F-SPR reference points; so taking the natural mortality out of the reference points.

We've got a two-stage control rule here, which is different than what we use for most species. Given those two reference points and the outputs from the model, here is the stock status. On the top left we've got mortality, so that is total mortality. The dashed line is our target, and the solid line is our threshold.

You can see that for most of the last decade and half, we've been above the threshold, so our total mortality has been too high. Then the last year we fell between the target and the threshold, which is a good sign that things might be coming down, but you can see in the lower right that we're still very far below our SSB threshold. You remember that the recommendation from the Technical Committee is if SSB is below the threshold, then we shouldn't be doing anything to open up the fishery. The outcome from all this, the stock

status is SSB is below the threshold, so the stock is depleted. Again, it appears that it is not fishing mortality necessarily that is driving the stock that low. Total mortality in the terminal year is somewhere between the target and the threshold, but it is only in that terminal year.

The recommendation from the Technical Committee is that these reference points need to be exceeded either Z, below the threshold, or SSB above the threshold for at least two consecutive years before any management action is taken, just because of the variability in some of these parameters. They bounce around a bit. Just for an extra level of caution, we're recommending two consecutive years before any management action is considered. That is my presentation, Mr. Chairman. I'll take any questions.

CHAIRMAN ALLEN: Thank you for that very uplifting assessment of the weakfish stock, Jeff.

MR. BRUST: My pleasure.

CHAIRMAN ALLEN: Before I get Pat up here to give the Peer Review summary, I don't really want to take too many questions at this time, but any clarifications you may need from Jeff.

MR. THOMPAS FOTE: Jeff, last December off Island Beach State Park there were schools of weakfish and they were getting chopped up by bluefish and swallowed by striped bass. I could basically do pictures of what the bluefish were spitting out. We weren't doing gut samples, because most of the striped bass were all released.

But would that be helpful to you to show pictures with the size of the weakfish? These were about 7 inch weakfish being chopped up. I that day had 20 bluefish in a row, and they either spit up a head or a tail, so would you want pictures of that to help and basically prove that they are basically doing that?

MR. BRUST: I would love to see the pictures. It is one of those things. We know they are getting eaten. Is it to the point that it is controlling the stock? We've seen weakfish in striped bass stomachs; we've seen weakfish in bluefish stomachs. We know they are getting eaten; it is just to what extent are they getting eaten?

It is also sort of a ratio thing, are there so many predators out there that it doesn't even take that much? One of the analyses that we did for the last assessment said that if each predator out there ate less than 10 or 12 pounds of weakfish in a year, it would be enough to drive the stock. Whether that is real or not, I don't know.

Yes, it would be useful to have pictures like this, but I think there are still folks who don't necessarily agree that natural mortality is changing, so I'm going to call them the naysayers. What they want is a scientific study that shows how much. Empirical, quantitative evidence of how much is being consumed. This anecdotal type of information is very helpful. We have several figures like that. But the more we get, it just bolsters the case.

CHAIRMAN ALLEN: Follow up, Tom?

MR. FOTE: I would have called it episodic event, because it sounds good. But anyway, there were so many bluefish, so many weakfish all there. I thought there were schools of bunker instead I started seeing them spit them up. It was just amazing how many they were ripping through, and these bluefish were only two pounds, basically eating 7 inch weakfish and chopping the heck out of them.

MR. ROB O'REILLY: I just wanted to ask Jeff to go over again the recommendation and perhaps maybe we talk about it, but when that starts on the TC recommendation about Z and SSB. Would you go over that one more time?

MR. BRUST: The reference points themselves or just the recommendation on where we stand right now?

MR. O'REILLY: The latter, your last statement up there on the slide.

MR. BRUST: This one? Sorry, just for clarification, this one up here, Rob?

MR. O'REILLY: I can't read that far, but on my screen it says TC recommends Z below.

MR. BRUST: Oh, okay, all right just that last statement. If we go up one more slide, you can see that the total mortality value is between the target and the threshold. Now, if for example, this is not the case. But if the SSB was above the SSB threshold, we only have one year where that Z value is between the target and the threshold.

Because there is variability in those estimates, and potential for some level of retrospective pattern as well, we're recommending that we need at least two years where the mortality value is at least below the threshold; just to account for the uncertainty in the estimation procedure. Does that answer your question?

CHAIRMAN ALLEN: Follow up, Rob?

MR. O'REILLY: Yes that does and I guess now I'm wondering, the Peer Review recommendation at first seemed to say stay away from the SSB as a biological reference point. It came back that well no; you can have that as part of the management, but don't rely on it as a biological reference point. Do I have that right that the Z biological reference point is really the main one that we're looking at, and SSB is a; I wouldn't call it secondary, but it is sort of a reference force. How did that finally turn out?

CHAIRMAN ALLEN: I think we're going to get to that in Pat's report, Rob, so if you could just hold off on that.

MR. O'REILLY: Yes.

MR. JOHN CLARK: Thank you for this very impressive piece of work, Jeff, great presentation. I'll want to get back to natural predation later, but I understand we're going to hold that. I just had a question about the juvenile index you showed. It looked like with the composite you had for all the states combined that the JI has been fairly consistent for the past, even during this whole time of the increasing natural mortality; even showing an uptick there at the end. Is that what you're seeing there with it?

MR. BRUST: For the most part yes it doesn't show as strong a pattern as the model output does. But it is hard to see on this figure, because of that one value that goes up to ten there. But what actually happens is that it increased, it leveled off, and then it has decreased over the last decade, decade and a half; which sort of mimics what the model was showing us. It is not as steep a decline as the model is indicating, but yes, in the last couple years it does look like it is bouncing back up a little bit.

MR. CLARK: But it hasn't shown the type of crash we've seen in the overall stock. I mean it's been amazing that they've been able to maintain this level of reproduction.

MR. BRUST: Correct. Yes, we've all, the Technical Committee; we pondered that for quite a while.

CHAIRMAN ALLEN: Yes, ponder for a long time. I have Wilson and then Robert.

DR. WILSON LANEY: John asked part of my question, which was about the composite young-of-year index. But I know one of your criticisms for an earlier assessment, Jeff, was the discard information. Did we have better discard estimates this time for the South Atlantic shrimp fishery in particular? I ask that in the context of the South Atlantic Fishery Management Council

having worked with the Commission to require bycatch reduction devices in trawls.

I'm just wondering if that is still a source of mortality that should be of concern to us, relative to those juveniles. We're getting robust reproduction; it looks like, but if we're still losing a lot of them in the South Atlantic shrimp fishery, maybe that's something we could look at from a management perspective.

MR. BRUST: We did look at discards for a number of different sources. We redid the adult mortality from the Northeast Fishery Observer Program. We did look at North Carolina specific; we did look at the Southeast Shrimp Trawl Fishery. There was still some uncertainty in the data there. There wasn't as much data there as we hoped. If I remember this correctly, we did use it as a sensitivity run. My recollection is it did not have much impact at all on the results. Is that correct, Katie? Katie did the analysis.

MS. KATIE DREW: Yes, so I think when we looked at the shrimp trawl data, which again is, in the southeast at least, is not as robust as we would like to see, in terms of observer coverage of those fisheries. The majority of those fisheries were the Age 0, or the majority of the fish that were caught were the Age 0 young-of-year, which are not included in the model. There is definitely some kind of disconnect going on between what we see in the juvenile index, and then where we start the model, in terms of what's happening to that Age 0 class, so that could be contributing.

But the data aren't really strong enough for us to be able to come up with a good estimate of the mortality to those Age 0s. Then I think one of the recommendations of the Panel was, well I guess we can get into that. But to improve the discard mortality estimation, but also to consider trying to model some of what's happening in actually that Age 0, which is very difficult to get a handle on.

CHAIRMAN ALLEN: Wilson, you had a follow up?

DR. LANEY: Katie, if there is a lot of Age 0, if we could improve those discard estimates for the South Atlantic, and if there is a biological connection between the South Atlantic and the rest of the range, i.e. if a lot of the reproduction of the whole coastwide stock is coming from those South Atlantic estuaries. Could that be a possible explanation for some of the increased natural mortality rate that we're observing?

MS. DREW: Potentially, but I think what you have to also keep in mind is so that Age 0, for any species is a rough year for those guys, in terms of making it to the next stage of actually recruiting to the fishery and the adult population. We are seeing, and it is not like they get past that Age 0 stage; and then everything is great.

They do come in as Age 1s, Age 2s. But they just can't make it any further. Whatever that mortality is that is acting on them, it is not only on the Age 0s; it is also on the older fish as well. The discard mortality may be a component of that. But it seems like there is also additional mortality that's coming in on those older fish, and it's not just a function of what's happening in that Age 0 year of their life.

MR. ROBERT H. BOYLES, JR.: Jeff, thank you for a great presentation, a lot of information and very helpful. Speaking of maybe something where Wilson was going. Was there not a term of reference about looking at what's going on in the South Atlantic? Because anecdotally and certainly the data that we see, there just appears to be a disconnect between stock status and what we're seeing, maybe south of Hatteras. Was that a term of reference for the assessment?

MR. BRUST: There was no regional term of reference for this assessment. For the 2009 assessment there was, and we did look at it as best as we could. There is some, I'm trying to recall seven years ago. As I recall there is some

evidence that there might be some stock structure there, but the ways the fisheries operate and the way we collect our data; we don't have the information to separate the stock into two separate assessments.

Now, I'll also continue, because even though it wasn't a term of reference, it continues to be a point of concern for this board; and so we were looking at ways to see if there were different patterns in life history traits and things like that. One thing that we did was to try to look at growth over time by region, by state, by survey; things like that.

There just wasn't enough information in those data to discern anything. It is not that we're ignoring the fact. If we want to go that route, we would need to start collecting data in a different way that could support an assessment in that fashion.

MR. JASON McNAMEE: I am going to jump back to the line that Rob O'Reilly was kind of following, but first I'll say Jeff, you guys did an amazing job on this assessment. The care that you guys used in the treatment of all the data inputs are really incredible, the discard analysis that you did.

All that stuff was really impressive, and gave me a lot of good ideas. I think you guys did a lot of unique and interesting things, so nice job and my complements to the working group. I was thinking about this, you guys chose this metric of two years, and I'm wondering, I understand the reasoning behind it. My question is, so the mortality threshold and target. They're pretty close together, at least on the chart. There is not a lot of space there. Did you guys test other amalgamation of other years, like three years, four years, something like that; and was it based on the fact that the variability that currently exists in a year-to-year estimate of that. Does it have a tendency to jump up and down over those, the threshold and the target?

MR. BRUST: The two years wasn't tested. It was just looking at the variability in the data, it was in my recollection it was more of an uncertainty. Let's be safe with this stock, it is really not doing well currently. Let's not, hey if we get one year let's not open this fishery up right away. There wasn't any quantitative method that we selected those two years. It was just sort of a "let's be safe" kind of thing. I don't know if that answers your question.

MR. McNAMEE: Yes, it does. That was what I was trying to get a sense of, if it was some analytical process.

MR. BRUST: Not that I recall.

MR. McNAMEE: The reasoning is sound; I just wanted to check on that.

CHAIRMAN ALLEN: Great questions, I think I'm going to turn it over to Pat now to give the Peer Review Summary, and then we'll take it from there. Rob, you had something?

MR. O'REILLY: Yes, I just wanted to comment if I may on two things, very quickly. One, the shrimp discards. When the croaker assessment of 2006, I think it was, was being conducted. I know that John Foster, who is with NMFS now, went to the earth's end to try and get this discard information for croaker.

I've heard a couple comments about; we really need to improve that. I don't know how on earth that is going to be improved, but it does seem to me that with the bycatch reduction devices that were put in place in 1995, 1996 thereabout, that some of those earlier years could be, if you're doing a sensitivity analysis you should factor in the initiation of those bycatch reduction devices.

I mean that might be one thing you could look at. Just the idea that we can keep saying we can make something better. I think it's kind of tough on that end of it, and I just wanted to mention that. The other thing I wanted to mention about false hopes is that Robert's comment about the

sort of the stock composition and south of Hatteras. There are certainly some older studies that dealt with Maristics, you know Shepherd and Grimes was one, and Scholes from VIMS was another one back in the early nineties that pointed to stock differences as you go up the coast.

Maybe some of that is worth just kind of looking at. I know that when Mark Gibson was on a Technical Committee, and even on the board; he would bring up the idea that there were studies from the past that indicated stock separation as well. I think we're at a point where even though everyone has done a tremendous amount of effort here, and very impressive to me to watch that at least one day, through the peer review.

I think we need to start looking in some other directions here, and I think Jeff, your comment about we need to collect differently, essentially, and we know we aren't even collecting that many fish. We really have to have sort of, as we go forward I think we really have to have the good old eyes opened wide, and start to say, well what really can we practically work with. We've had a lot of years where this stock has been problematic. But at the same time, I think we've made some strides forward, and I certainly congratulate everyone who worked on this last round. I just wanted to make those comments.

#### **PEER REVIEW PANEL REPORT**

CHAIRMAN ALLEN: I am going to turn it over to Pat now for the Peer Review.

MR. PAT CAMPFIELD: Pat Campfield; giving the review presentation on behalf of the Chair of the Review Panel. Please don't ask me to sing the presentation. I cannot compete with our neighbors next door. The quick overview of the stock assessment process, the Weakfish Stock Assessment Subcommittee, and TC developed the new coastwide assessment.

The Review Panel consisted of three reviewers, the Chair, plus two additional technical

reviewers. In aggregate they had expertise in population dynamics, stock assessment modeling statistics, and weakfish biology. The focus of their review was only on the science, on the data inputs, and the overall quality of the assessment.

The major products from the assessment are the Assessment Report, and Review Panel Report, which you have received in your materials. Following the meeting week, we will provide an Assessment Overview for the public that will be available on our website. The Review Panel was comprised of Dr. Pat Sullivan, from Cornell, as the Chair, Jeff Buckel, from North Carolina State University, and John Deroba from the Northeast Fisheries Science Center and Woods Hole.

The Review Workshop took place about five weeks ago in Virginia Beach. The Review Panel's overall findings is the stock assessment passed peer review, and agreed with the assessment's conclusion that the stock is depleted, overfishing was not occurring, and 2014 the terminal year, and that total mortality is below the threshold, but above the target.

Again, over all, the Panel finds the stock assessment acceptable for management use. Next I'm going to go through each term of reference for the review, and highlight the Panel's major conclusions and recommendations for assessments moving forward. Term of Reference 1, was focused on evaluating the data that was considered and used in the assessment.

Their overall conclusions are that again, the data were well explored, although there remain several sources of bias in removal estimates, also that the MRIP statistics continue to be challenging for use as an abundance index. But the Assessment Team used MRIP appropriately; and also that there may be density dependence operating on the young-of-the-year fish.

Overall the standardization methods for the indices that went into the assessment were adequate, well documented, and appropriate. Panel recommendations regarding weakfish assessment data are to continue to evaluate quality of removal estimates, and the recreational indices of abundance, and to examine the sensitivity of model runs that include, as well as exclude, the Age 0 inputs, given that apparent disconnect between trends and young-of-year and older age classes.

The second term of reference was to evaluate evidence for constant or recent changes in natural mortality, predator/prey dynamics, productivity, and discard mortality. The Panel's overall conclusions are that although time varying M is difficult to estimate, the dramatic changes, decreases, and weakfish biomass over time, and the low levels of harvest recently may allow natural mortality estimation to be possible; which that is not necessarily true for many other stocks. Also due to improvements or corrections in the discard analyses that Jeff described, this newest assessment there is less evidence for discard mortality, as the primary cause for recent decreases in weakfish abundance. The Panel also reiterated, which we all know that there are clear cycles of weakfish abundance over time. However, the underlying causes remain unknown. There are probably a number of factors. Panel recommendations regarding natural mortality, productivity, and discard mortality are that factors influencing the estimability of time varying M should continue to be monitored and addressed.

The sensitivity of time varying natural mortality estimates to constraints composed by the Bayesian model, priors should also be explored further. They thought the Assessment Team did a sufficient job. But there are other options for setting priors in the Bayesian model, which may allow further exploration of time varying M, also, to examine a correlative or mechanistic link between weakfish and natural mortality, and

predict variables when developing weakfish population projections.

For example, one suspect is marine mammals, dolphins eating a lot of weakfish; you need more diet composition studies from marine mammals. The third term of reference, evaluate the methods and models used in the assessment. The Panel's overall conclusion is that the Bayesian statistical catch at age model is appropriate and justified for use in making management decisions, with some caveats to be considered, as outlined in the Review Panel's report.

The external evidence for temporal changes in natural mortality was inconclusive. Those parameter estimates may be confounded by other processes, and that the spatial asynchrony or disconnect in population density to account for inconsistent trends could also be confounded by other processes.

The Panel's recommendations moving forward on models was that these Bayesian models can over fit the data through inclusion of time bearing parameters. Exercise caution when interpreting the results. The biological reference points, based on historical performance, would need updating later as natural mortality and stock productivity change in the future.

Also that using historical recruitment indices to create projections will need to be reexamined if the stock productivity changes. Finally under the plus group, minimum age definition, the Review Panel recommends the sensitivity analysis in future assessments to evaluate where you set that plus group minimum age; and the impacts on overall model results.

Term of Reference 4 is to evaluate the sensitivity and retrospective analyses performed to determine model stability. The overall conclusions are that sensitivity to a range of data inputs was well addressed and understood in the

assessment. Given the model structure the outcomes were robust and reliable.

Also to note that remaining retrospective patterns observed were relatively small, and not a cause for concern relative to management action. Moving forward the panel recommends continuing to do retrospective analyses, even though the absence of a large retrospective pattern in this assessment is not a cause for concern.

It does not necessarily indicate the model is fully accurate or appropriate. Term of Reference 5 was to evaluate the uncertainty as it was characterized in the assessment. Overall conclusions from the panel are that the preferred Bayesian M4 age structured assessment model is preferred by both the Technical Committee and the Review Panel. It appropriately incorporates the uncertainty present at several levels through the use of the Bayesian hierarchical modeling, also that the MCMC algorithm used in the estimation of Bayesian population modeling, facilitates probabilistic predictions of key model outputs; including estimates of whether we are above or below critical thresholds.

Panel recommendations regarding characterization of uncertainty, are the use of the uniform distribution as an uninformative prior throughout the Bayesian hierarchical model, could be looked at in different ways or alternative approaches, as outlined in this paper by Gelman. Again, the panel didn't disagree with what the Assessment Team did, but there may be other ways to set your priors in Bayesian models; I'll leave it at that.

Term of Reference 6, regarding a minority report, there was no minority report submitted; so we'll skip through that. Term of Reference 7, recommend best estimates of stock biomass abundance and exploitation from the assessment. Again, the panel concluded that the Bayesian M4 age structure assessment model

and the spawning biomass per recruit reference points, under the  $M$  of 0.43, provide the best estimates for determining stock biomass abundance and exploitation for use in management.

Panel recommendations moving forward, in the future if this stock shows signs of recovery, alternative analytical approaches, as well as possibly a management strategy evaluation, should be used for determining updated exploitation rates as capacity for stock growth will likely change; due to changes in mortality or other drivers of production.

The Bayesian  $M4$  assessment model should continue to be applied, as long as the data inputs and biological processes are appropriately updated. Term of Reference 8 evaluates the choice of reference points and methods used to estimate them, and recommend stock status determination. It is challenging, it is difficult to determine a fixed set of reference points for a population that does not exhibit equilibrium; as Jeff described as well, because there are unknown drivers for changes in natural mortality and stock production.

They are highly variable. The Panel agreed though that the reference points put forward by the Technical Committee to establish a practical control rule are appropriate and should be used for management. An additional Panel recommendation on Term 8, the yield per recruit SPR reference points derived from this assessment with  $M$  at 0.43, should be updated if and when stock productivity appears to change.

The last term of reference was to review the research recommendations, comment on those put forward by the TC, as well as suggest possible new research recommendations. Under the category of the current research recommendations, the only suggested changes that the Panel had, was regarding weakfish mortality.

To try to better estimate weakfish mortality with tagging studies or alternative models, to compare with the results of the Bayesian models. Also, as we continue to evaluate predation of weakfish, again expand the suite of predators and their diet compositions that we're looking at; again marine mammals were something we haven't necessarily looked at before, and they want to in the future. In the context of the commissions multispecies models, currently they incorporate weakfish only as a predator, but also look at different angles or perspectives where we could consider weakfish, especially the younger year classes, as prey. We have monitored weakfish diets with data here and there. But there has been a shortage or a lack of weakfish diet information within the estuaries. I think Chesapeake Bay may be the best source, with the other estuaries there is not much information. Under the category of the Review Panel's new research recommendations, these are heavy on the modeling side, so I'll just touch on these quickly. Conduct simulations in a number of different fashions, but with a special note on examining the Z-based control rules. The second one is to conduct a meta-analysis of all factors influencing natural mortality, to see if the aggregate effect shows stronger statistical likelihood of occurrence than when evaluating each individual factor on its own.

The next one is more of a future assessment process recommendation. The Bayesian modeling code is in fairly unique software, and so they've recommended, and we've talked with Virginia Tech about transferring that to a more widely used statistical platform; which we think will happen.

The next recommendation, conduct a simulation estimation analysis to explore the estimability of time varying trends and natural mortality, and to continue to improve the process for organizing and collecting data; in order to feed the assessments and do so in a timely manner. To build on what Jason said, the Panel really



commended the Assessment Team, the Technical Committee, and how they prepared this assessment, including very thorough data collection. I think we'll stop here with the last slide.

Again, the Review Panel's overall findings, they concluded the Bayesian M4 catch-at-age model is the best model available for conducting assessment at this time, and suitable for determining the status of the stock. Again, the stock is depleted, overfishing not occurring in 2014. Total mortality is between the target and threshold. Again, consistent with the Technical Committee's recommendation about future assessments, the Review Panel agreed with an assessment update in two years, in 2018, and a benchmark in 2021. I think that's all we have.

CHAIRMAN ALLEN: I'll open it up to questions for Pat and/or Jeff, and once we get going here I would like to hopefully get a motion to accept both of the reports as you heard them here today.

DR. LANEY: Rob's comments earlier reminded me; if I remember right, Rob, help me out here. I thought I had the paper on my hard drive, but I can't find it. But Dr. Cynthia Jones, I believe, had done some otolith microchemistry work at one point in time that seemed, she felt, suggested that weakfish were possibly homing to their natal estuaries.

I don't know whether she followed up on that and did any more work on that or not. But if that is the case that could certainly have some implications here; that might warrant further exploration. I doubt we have the data to really get into that. The other thing I wanted to let Jeff and the Stock Assessment Committee know.

There was a paper, and I have that one in front of me, Sandra Diamond, Lindsay Cowell, and Larry Crowder's paper on population effects of shrimp trawl bycatch on the Atlantic croaker. Have you all seen that one? Are you familiar with

that one at all? I'll just go ahead and say they concluded that the bycatch mortality on late juveniles was not the most important factor affecting either population of Atlantic croaker. They looked at both Gulf and South Atlantic. But they did say bycatch mortality did have a large, negative impact on population growth rates, and reducing late juvenile or adult mortality by about 35 percent in the Gulf or 5 percent in the Atlantic should reverse population declines. I don't know whether anybody has followed up on their advice or not. But I wondered if there was any applicability of that to our situation with weakfish in the South Atlantic.

MS. DREW: We certainly saw the Diamond paper, at least when we were doing the croaker assessment in 2009. The rates of croaker bycatch are much higher than those of weakfish bycatch, so croaker, you get more croaker than you get shrimp in some of these observer programs. While weakfish is still up at the top of the list in terms of bycatch, the overall rates of weakfish bycatch in these trawls is not nearly as high as it is for croaker.

I would expect that while it certainly may have some effect on population growth, it probably would not be as severe as it is for croaker; which appears to be extremely vulnerable. Of course you have to also consider like the timeframe in terms of, how abundant were these populations when they were doing these studies? But it is certainly something we can consider, but it is probably not as large a factor for weakfish as it is for croaker.

MR. O'REILLY: If I may just quickly respond to Wilson. The study was really something, Dr. Simon Thorrold, who is now with Woods Hole Oceanographic Institute, had done some of this work earlier. I always think of it as looking for divalent ion concentration in the fish, because that's really the microchemistry part of it.

He had done that with cod, I believe, in the Scotian Shelf, and then Dr. Jones worked with

him. They did find there was homing by weakfish, but the situation is they looked at nursery areas, and then they looked, I think two years later. You don't have the full population, as far as the adults, what happens later on and Wilk, even back in 1979, indicated the movements are more northerly with the larger fish.

I think everyone kind of wonders what happens after Age 2 with those fish. That is what I know, but the other thing I wanted to mention. I didn't say it before, but I'll say it again. I think Robert Boyles question is pretty good. I think there is something there for all of us to think about, with stock dynamics.

The other part is the only genetic study was the one done by Graves et al back in 1990, I think. That is really what made the unit stock. That was mitochondrial DNA. As we all know now, that is not the top of the line way to do stock discrimination. You know there is something there as well before we start tagging and doing everything else. It is all about cost.

The other factor I wanted to talk about that I liked from the approach here, from the peer review that I saw, was the idea of this meta-analysis, because I'm familiar back with the previous assessment that I think ended in 2009. The situation was there was linkage through the Henderson-Steele model with predators.

Certainly striped bass and inferences about spiny dogfish, but I don't recall anyone talking about cannibalism. Weakfish are highly cannibalistic, compared to a lot of other fin fish. There are other things that have occurred with weakfish in the past. I don't know whether they go on now, because of lack of a stock to really look at these things, but fin rot was really sort of a real problem in New Jersey back in the eighties, and was undergoing a lot of study at Sandy Hook, with the National Marine Fisheries. I thought that was a great suggestion to sort of look at

everything that's involved, and move forward from there.

Then the last thing I wanted to mention, it is a comment. There were no reference points after 2009. I mean that was the real dilemma, and everyone realizes that because this new assessment has been done that weakfish still are depleted. But I feel very good that there seems, to me at least, to be some security blanket here with what has occurred by the work of everyone who worked on this assessment.

We have something at least that we can build from, and I think that's really important. We didn't have that before. We really didn't have even a reference point, so that's really very strategic. I want to thank everyone, especially Dr. Jiao as well, but you know everyone involved with this. Thank you.

CHAIRMAN ALLEN: Good points, Rob.

MR. CLARK: I would like to get back to the natural mortality predation point. I hope I don't sound too unhinged by the end of this. I was pleased to see that the Review Panel did recommend expanding the suite of predators on weakfish, to look at what is happening there. In the assessment itself I saw that studying predation on weakfish has only been a moderate goal, in the goal section of that.

It was put down there in the moderates. I know Jeff mentioned that there is still some skepticism about the impacts of predation on the weakfish population. I think your model itself showed that the real increase in natural mortality began in the late nineties, correct? It was around '97 that it really started taking off there.

That really fits in; just with everything we've seen in Delaware Bay. Our commercial and recreational catches in the Bay, between '98 and 2008, both decreased by 99 percent. This is before we put more controls into place there. We've been seeing, as you showed with the

juvenile indices. We're still getting reproduction; it's coming from the one year olds.

We still a bunch of those. We tried tagging them, this started in about 2007; thinking that we would get an idea of what was happening to these small weakfish, why they weren't coming back as bigger fish. Knowing that weakfish do shed tags pretty easily, we did some tag trials. We actually kept t-bar tags in weakfish in tanks for over a year; this was over at Delaware State.

The shedding rate was pretty high, it was about 30 percent. But we figured we would still get some returns, and we tagged probably about 1,000 weakfish over the time. We didn't get a single return. We're still just not seeing anything coming back from these one year olds we were tagging. I thought well, maybe it was the shedding, maybe those made them more vulnerable to predation.

But I am sure some others in here are aware that a PhD student at North Carolina State, Jacob Krause, has been putting telemetry tags in weakfish off North Carolina. He came up to Delaware last summer, to tag some weakfish in Delaware Bay. We had a heck of a time getting him. He was only looking to tag 30 of them, but we could only come up with 18 that were in the size range. He needed at least a 13 inch weakfish to tag. He has not gotten a single ping from any of those weakfish that were tagged in lower Delaware Bay last summer. As you know, we probably have more receivers; Delaware Bay is probably one of the best covered areas on the coast, in terms of telemetry receivers. That leads me to my unhinged part, is that this is all anecdotal. I just seem to see a lot more bottlenose dolphins, particularly around the mouth of Delaware Bay.

You can't go down to Cape Henlopen without seeing huge pods of dolphins just working the area. I am getting to the point where I stand onshore yelling at them to go away, leave the weakfish alone. Anyhow, I know it would be

really difficult to do a study. There have been some studies done of dead dolphins down off of Carolina, and they've looked and found weakfish as being a major prey item there.

I don't know how we would do it, live dolphins; I know it's a sensitive subject. But as I said, I think there are things; there are a lot of predators out there that may have increased their populations over the past decade or so. I think it is something that we really do need to look at, because we also did, on the subject of whether weakfish are getting enough to eat.

We have been looking at the condition factor, and we have been looking at stomach contents of these one year olds we've been getting. There is no problem there. These weakfish are getting plenty to eat in Delaware Bay. They are healthy, their condition factor aside, they have belly fat in them. Something is getting to them. They are just not coming back. Sorry for ranting on like that but I just want to let you know.

CHAIRMAN ALLEN: Not too unhinged, John.

MR. McNAMEE: I had a question. In the reviewer comments they brought up this discussion on the uninformative priors. It is just sort of a general comment that they make. I'm not sure if it goes to Katie, Jeff, or you, Pat. I'm just wondering if the discussion was a little more in depth. My concern is there were these uniform priors placed on a number of the parameters.

They mentioned overweighting the tails, and my concern is that if there was a discussion on how that uncertainty now, which is probably expanded because of that. If that propagates through into the calculation of the biological reference points, the terminal estimates, any of that stuff. Even if it is the case, I don't think it's a big problem now. But it is something that we should consider. But I'm mostly interested in if that was an item of discussion, so that we can get

a sense of if we're looking at inflated uncertainty at this point, or not.

MR. BRUST: I'll try. I certainly can say with confidence that I didn't understand all of what was being said at the review. But Dr. Sullivan and Dr. Jiao had a very, it wasn't heated, but it was an in depth discussion on the priors. I guess the priors that Yan was using, she was using uniform priors, which appear uninformative but in long space or whatever, they become informative.

Dr. Sullivan was suggesting moving from, rather than variance, use one over the variance. There is a more recent paper than the one Dr. Jiao was using, by the same author, it was Gelman, I think in 2011 or so; rescinded basically what he said in a previous paper, and Yan was using the older one and Pat was suggesting using the newer one. There was in depth discussion. I don't think it got to the point of whether we have too much uncertainty in the estimates that we're getting from the model. It was just sort of a research recommendation, improved or more recent recommendations; in terms of how to parameterize these models. It didn't get down to, how did it affect the results? That was more of a research recommendation. The next time you do this, check it. But it was more than just, you should try this. There were two or three times for a half an hour at a time, they went back and forth on this, so there was some good discussion on it.

MR. CAMPFIELD: The only thing that I would add, not being a Bayesian modeler, but in talking with Pat Sullivan, and to answer your question about how pervasive it may be throughout the model estimates. His concern was mostly around the estimates of natural mortality that you get out of it.

With the uniform distribution you may be constraining the higher magnitude natural mortality that you may see with Gaussian distribution and that the uniform distribution may be, I think not the most accurate way to

estimate natural mortality. But the overall magnitude of it, I think they were comfortable with. As Jeff said, exploring that different distribution in future assessment modeling is recommended. But they were okay with how they went forth here.

MR. FOTE: Yes, I was sitting here just thinking about what Roy was talking about bottlenose dolphins. I'm looking at pictures in Vonnegut Bay in December of 25 seals sitting on a little Sedge Island in there. I've been there since '79 taking boats out, have never seen anything like that before.

When I used to go to Cape Cod in the seventies and fish a lot in Martha's Vineyard and along the Cape, I didn't see a seal. I went back 15 years later; it was like the beach was covered with them. Do we have a report on the growth of seal and dolphin populations? Is NOAA basically monitoring that?

Maybe we need to factor that into the equations when you start dealing with natural mortality. I mean I know the whales are up. We see a lot more whales, we see them basically inshore eating menhaden, and this year they're eating Atlantic herring along the beach, because for some strange reason had a lot of Atlantic herring right on the surf. I was just curious.

CHAIRMAN ALLEN: We can have someone look into that, Tom. Nichola.

MS. NICHOLA MESERVE: Great work by the Stock Assessment and Technical Committees. I had a question about one of the Peer Review Panel slides that there was a comment about the use of the MRIP as an index of abundance. Was that a comment specific to weakfish, because of the rate at which they're targeted or encountered at this point, or could that be interpreted as a more wide ranging comments on the use of MRIP as an index? I apologize if this was already addressed. But I'm looking for further clarification on the Review Panel's

recommendation that the SSB reference point be used outside of the control rule.

MR. BRUST: On the MRIP index, it is more of the latter. It is the general concern that changes in catchability over time, and recreational fishing may in some cases overestimate the number of, in this case weakfish that are being caught or harvested. Regarding the SSB versus Z reference points, I think they recommended caution with SSB, because it is so difficult to estimate; and to use the Zs as the primary reference point, but continue to monitor SSB, to see if it agrees.

**MR. ADAM NOWALSKY: Mr. Chairman, I would like to make a motion to accept the stock assessment and the peer review for management use.**

CHAIRMAN ALLEN: Seconded by John Clark. We have a motion on the board to approve the 2016 Weakfish Benchmark Assessment and Peer Review Reports for management use. Motion by Mr. Nowalsky, seconded by Mr. Clark, is there any discussion on the motion; any objection to the motion? **Seeing none; the motion passes.** Emerson, you had something?

MR. EMERSON C. HASBROUCK: Yes, I had a question. But I don't know if we've moved beyond any discussion about the assessment. Is it appropriate or not appropriate to ask a question at this time?

#### **DISCUSSION OF NEXT STEPS FOR WEAKFISH MANAGEMENT**

CHAIRMAN ALLEN: Well, since we got everything approved, I think it is just time to open up the floor to a discussion on what we're going to do for management use here in the future. I will let you start that off.

MR. HASBROUCK: I don't have a suggestion right now. That wasn't the intent of me raising my hand. I'll yield the floor right now.

CHAIRMAN ALLEN: Sounds good. Anybody want to start this off? Jay.

MR. McNAMEE: We've approved the assessment and the peer review for management use, so within both of those documents there is a suggestion on kind of a new and unique way to manage the biological reference points. I guess my question is there is some action needed, I'm not sure if it is an addendum.

I think, because I don't think that is how we're managing weakfish now. I guess I am asking the Chair a question as to whether it's an addendum or an amendment that is needed to begin to set up the options to accept those reference points for management use specifically.

CHAIRMAN ALLEN: There have been cases in the past, especially menhaden, where we've accepted a peer reviewed report and assessment, and had new reference points but did not have to go through an addendum or amendment process to use those for the management in the short term. I think we're working on Amendment III now of menhaden, and that would have those issues in there.

There is precedent that we don't have to go ahead right now and do an addendum or an amendment, and somebody can correct me if I'm wrong on that. But I'm not sure that the board, maybe we just need to have a little bit of a discussion to see how we want to go about that. Next I had Rob.

MR. O'REILLY: Jay, I think your comment is something that I was talking about earlier on. I think we should talk about it at another meeting, as far as what exactly we're being guided by, because my understanding is the recommendation; at least from the peer review was to look at Z really as the biological reference point. Not abandon an SSB or any type of biomass type of reference point, but to have that as sort of guidance. I think we need to have a

discussion about all that. I don't know how that folds into an addendum, necessarily. We know for menhaden, for example, we've heard a number of times, and again just the other day that the board accepted that for management use, what came out of the stock assessment; but in essence there was no formal addendum approach for that. I think this certainly is something that needs discussion. Mr. Chairman, I also wanted to suggest that part of what I heard at the Peer Review on the one day I was there is that – and literally in these words; “that we have sort of an uptick, but let's not get carried away until we see more evidence.” I think that is where we stand. One of the things that I recall is with Amendment II, which goes back a few years.

We had some different types of indicators, health indicators of the stock or guidelines, and one of them I remember clearly was to look at the age composition. You know numbers by age, and to sort of track that until such time that it mirrored something along the 1989 to 1995 composite. I think those are the types of things that the management board is going to need, because we haven't had a reference point for eight years or so, at least.

We weren't really sure about the previous, I think F30 and F20 reference points that we had, or MSP30 and 20. I'm digging back a little bit. But we need some fortification. We need some things at the board that everyone can look at and say okay, I see we are making progress. There have been some bad missteps, and they have occurred with the management back in 2007.

You know the idea that we would set a cap on a harvest amount that we were already in the big swoon. I mean I think from 2002 to 2003, there was a 50 percent decline in the harvest overall, and yet we were setting a sort of a cap that we're not going to take more than this, and if we do we'll take action. That was a belated process, for those of you who were involved, and an extended process.

I mean that was over several meetings, hand wringing. It started out with reduce F by up to 40 percent. It was all sorts of convolutions. Now I suggest that we hold the line. I am going to put it that straightforward. We've got the bycatch going of 100 pounds. We have the one fish recreational.

It is time, now that we have at least a pretty good foundation for our guidance on the biological reference point for Z, and an ancillary reference with the biomass; that we start looking at developing a little more certainty on what the board can grab a hold of, as far as okay the stock really, this little uptick is more than just a little uptick. It sounds pretty qualitative, but it is a lot better than where we've been for many years.

To think of the Technical Committee reverting back to days when it used to have to do relative F, back when it looked at the recreational fishery in the Mid-Atlantic for relative F, and those types of approaches. I think overall I'm suggesting no management change right now. Let's start developing some information to back up our reference point that we have.

CHAIRMAN ALLEN: I think they are very good points. Hopefully the rest of the board feels that way also.

MR. FOTE: Rob said about what I was going to say. I mean I remember when we were looking at not doing anything, because we saw all these small fish and never saw the big fish; back in the early 2000s. Because I made the motion back then to go to 100 pounds and 1 fish, and I am thinking there is no reason to change it at this point in time. I'm with him; we need to hold the line. I don't think we need to go out with an addendum. That is a lot of work. We can just start using the reference points as is. When we go out, when the fishery recovers, which I'm hoping for, since weakfish was the fish that we basically used, because of Carper from Delaware, that basically put the interjurisdictional fisheries bill the Atlantic Coast

Conservation Act in place. It was on the back of weakfish. That is what my recommendations are.

MR. CLARK: Well, I'm just going to pretty much say, I'll keep it short; what Tom and Rob have said. I agree. There is no need for an addendum at this point. We've cut the fishery back as far as really we can. It is not having an effect, because of these other factors. I think we can just leave it alone.

MR. CHRIS BATSAVAGE: Most of what I was going to say has been said, of course. I guess a question I have, just kind of going to Rob's comments about trying to track things, as far as seeing how the stock is progressing in the meantime. Of course with that; I think having the assessment update in a couple years is going to be very informative, as far as the latest uptick.

But just as far as like biological samples, which all the states collect. It has been difficult to get those samples, because just the abundance of fish has been so low, and of course the catches are low with the current regulations. Is there any concern by the Technical Committee, at least in the short term, for I guess relying on the biological samples to kind of inform age class structure, based on just the difficulty in collecting those fish right now?

MR. BRUST: That is a very good point, and we did have discussions about it. We were wondering when we started this assessment whether we were going to have enough information to do an age-structured model. I think based on the results; a lot of those, at least a lot of my fears were nullified. We were able to do it. It is hard to get those samples, but we were able to do it with the samples that we have, so if we can just get everyone to continue doing what they're doing, at the very least, just go out and try your best to get those.

We know that those fish aren't coming in all that often. But when you hear about them, we need

to get folks down at the docks to get those samples. Yes it is a concern, but as long as we continue to do what we're doing I think we're okay. As the fishery starts to rebound, as the population starts to rebound eventually, we're going to need to continue to keep up with the increase so that the samples increase along with the population.

CHAIRMAN ALLEN: Lynn.

MS. LYNN FEGLEY: My question has been answered, thank you.

CHAIRMAN ALLEN: Back to you, Rob.

MR. O'REILLY: It was just a comment on this collection process. I know that Joe Cimino who is back there, who is the Technical Committee Chair, could tell you better how we're doing. In Virginia we don't collect as many as we have in the past. I mean we've collected a lot of biological data in the past, and we still try and stay ahead of the mandates that we have to collect biological data.

But my comment is that we ran into this with striped bass, believe it or not, years ago. The regionalization of collections becomes very important. I think the encouragement is at certain times, these fish do show up. Where they show up can take care of sort of this regional situation where they don't show up. I think everyone is just going to have to sort of pay attention to that. We do hear that there were fish that showed up; this goes back a few years, in abundance in New Jersey. Then we hear there are fish that are showing up in North Carolina. It is going to be a situation where we have to cobble together whatever we can on a regional approach. I still think it is a realistic objective.

DR. LANEY: I agree with everything else that's been said as well. It seems to me that there have been some points raised here that merit further exploration under the heading of the research categories. I know John and Tom both pointed

out that we may have had some significant increases in potential weakfish predators; like bottlenose dolphins and gray seals and harbor seals.

I think NMFS does track some of those. I think some of the take reduction teams do assessments on marine mammals, and possibly seals as well. We can probably get some information. It would be interesting to plot those population changes over the weakfish SSB estimates and see if there is any visual correlation, which might merit some additional work.

Then I think Rob had a great point about the genetics. There are a whole lot more sophisticated genetic techniques out there today. It would be interesting to see somebody relook at the stock structure question, using more sophisticated, modern genetic techniques, and also look at the natal homing issue, and look at some fish beyond Age 2; and just see if that may be a factor in the overall decline.

I think those are some productive areas for investigation between now and the next assessment, if we can find some academic folks that would be interested in doing the genetic work. I think that would be a priority from my perspective, and then definitely look at the population increases in those marine mammals. Finally, I neglected earlier to say Jeff and committee, you guys have done a tremendous job.

I do have one more question, which I forgot to ask earlier, and that was I know when we had a Technical Committee meeting a number of years ago, when we first started talking to Yan. She was at the time exploring integrating some environmental variability into the model that she was working on back then.

Having not read this in detail, did that get factored in at all? I know there was some reference to the AMO, and how that might be

influencing things. But I didn't recall hearing that she developed that part of it, and I just wondered if she was still working on that or if it did get incorporated and I missed it somehow.

MR. BRUST: The environmental information was not incorporated into the model. What she did though was the model estimated natural mortality. She then took that outside the model, and compared it to the Atlantic Multidecadal Oscillation, which is a sea surface temperature, and ran a correlation outside of the model.

There was some correlation. It was a significant correlation, but if you remember I showed a plot with the three trends in natural mortality. One of those, the red one, it didn't increase nearly as much as the others. That was the relationship based on the AMO. It didn't go specifically into the model, but we did look at it outside of the model.

MS. DREW: If I could just add, it didn't go into the final model, but Yan did a lot of work prior to the final formulation of the model that the Technical Committee used, where she did incorporate that explicitly, and it turned out it did not fit as well as if you just let the model estimate it internally, which suggests that it is probably part of that; but there are other factors going on. It is not only that environmental factor that is the sole driver, so if you just don't force the model to have an explanation for it, it fits better than if you try to force an explanation on it.

CHAIRMAN ALLEN: Not seeing any more hands up, I think we can summarize this pretty quickly. It seems to be, unless there is some objection to stay the course as we are on weakfish. Maybe task the Technical Committee to look at a few different things, and we can have those discussions.

If there is something you want the Technical Committee to look at over the next year or two, and then come back with that update



assessment in two years, and see if the recent uptick has developed into something more or not; and take it from there. Is there any objection to moving forward in that manner? Seeing none; is there anything else to come before the board today?

EXECUTIVE DIRECTOR ROBERT E. BEAL: Just kind of a clarification, back to Jason McNamee's question and point about an amendment or an addendum to adopt the new approach to reference points. I think by approving the assessment and peer review for management use, you have by default adopted those new reference points.

In our outreach materials and other things, we'll start using those new reference points, even though they have not been formalized in a management document yet. At this point, it is appropriate because under the old reference points and the new reference points, the guidance is really the same; which is the stock is still in pretty rough shape and opening up the fishery probably doesn't make any sense.

As you said, as we go down the road we can memorialize those in the next management document that the board works on, and then we can deal with the other management issues at the same time, rather than going through that process twice. If that is acceptable to the board, which I think is the direction you guys are going in.

CHAIRMAN ALLEN: Yes thanks for that clarification. I assume everybody is okay with that. Lynn, you had something?

MS. FEGLEY: I just wanted to convey a message. This meeting was Bill Goldsborough's last as our Governor's Appointee, and he couldn't make it in today, but he wanted me to send his regards to all, and just say it has been a pleasure working with you.

CHAIRMAN ALLEN: Thank you, Lynn. Bill will be missed at this table, that's for sure; anything else?

MR. O'REILLY: I would like to take this opportunity for everyone to share in on thanking Russ for being at the helm for weakfish. I certainly appreciate the fact that despite we didn't have all the excitement that we have for some other species; nonetheless there has been a lot of progress. What's happened while Russ was here, with everyone else involved, working forward with the assessment and completing that is really notable. I've been following this species closely since 1990, and my optimism is there, and I hope everyone else optimism is there as well, and thank you, Russ.

CHAIRMAN ALLEN: Thanks, Rob; I am sure you will step right in here with no problem.

#### **ADJOURNMENT**

CHAIRMAN ALLEN: Is there anything else before the board? Seeing nothing, I will take the liberty to adjourn this meeting; as I learned yesterday. Thank you.

(Whereupon the meeting was adjourned at 9:30 o'clock a.m. on May 5, 2016.)