

PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
ATLANTIC MENHADEN MANAGEMENT BOARD

**Crowne Plaza Hotel Old Town
Alexandria, Virginia
May 5, 2010**

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1. **Approval of agenda by consent** (Page 1).
2. **Approval of proceedings of November 3, 2009 by consent** (Page 1).
3. **Move to nominate Louis Daniel as Vice Chair of the Atlantic Menhaden Board** (Page 1). Motion by John Duren; second by Patten White.
4. **Move to accept the Atlantic Menhaden Stock Assessment and Peer Review Report for use in management** (Page 13). Motion by Doug Grout; second by Jaime Geiger. Motion carried (Page 13).
5. **Move the Menhaden Technical Committee develop alternative biological reference points if possible for the August 2010 meeting. These reference points should include projections of the spawning stock biomass or population fecundity relative to the unfished level and a reference point associated with abundance. The technical committee should present to the board a range of potential reference points that preserve the varying levels of spawning stock biomass. These levels of spawning stock biomass should be placed in the context of those that are currently employed for other stocks of clupeids and pelagic forage species. The technical committee should develop a range of management strategies to achieve the reference points with, if possible, expected outcomes for yield and stock health. Request the Policy Board to task the Multispecies Committee to work with the Menhaden Technical Committee to account for predation in the alternative reference points** (Page 13). Motion by Patten White; second by Steve Meyers. Motion carried (Page 20).
6. **Motion to adjourn by consent** (Page 22).

ATTENDANCE

Board Members

George Lapointe, ME (AA)	Jeff Tinsman, DE, Proxy for P. Emory (AA)
Terry Stockwell, ME, Administrative Proxy	Roy Miller, DE (GA)
Pat White, ME (GA)	Tom O'Connell, MD (AA)
Sen. Dennis Damon, ME (LA)	Lynn Fegley, MD, Administrative Proxy
Doug Grout, NH (AA)	Bill Goldsborough, MD (GA)
G. Ritchie White, NH (GA)	Russell Dize, MD, proxy for Sen. Colburn (LA)
Rep. Dennis Abbott, NH, (LA)	Jack Travelstead, VA, proxy for S. Bowman (AA)
David Pierce, MA, proxy for P. Diodati (AA)	Catherine Davenport, VA (GA)
Bill Adler, MA (GA)	Louis Daniel, NC (AA)
Rep. Sarah Peake, MA (LA)	Bill Cole, NC (GA)
Robert Ballou, RI (AA)	Mike Johnson, NC, proxy for Sen. Wainwright (LA)
Seth Macinko, RI, proxy for Sen. Sosnowski (LA)	John Frampton, SC (AA)
David Simpson, CT (AA)	Malcolm Rhodes , SC (GA)
Dr. Lance Stewart, CT (GA)	Robert Boyles, Jr., SC (LA)
Rep. Craig Miner, CT (LA)	Spud Woodward, GA (AA)
James Gilmore, NY (AA)	John Duren, GA (GA)
Pat Augustine, NY (GA)	Rep. Bob Lane, GA (LA)
Brian Culhane, NY, proxy for Sen. Johnson, (LA)	Jessica McCawley, FL (AA)
Peter Himchak, NJ, proxy for D. Chanda (AA)	Steve Meyers, NMFS
Tom Fote, NJ, (GA)	Jaime Geiger, USFWS
Gil Ewing, NJ, proxy for Asm. Albano, (LA)	A.C. Carpenter, PRFC

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

Ex-Officio Members

Rob Latour, Technical Committee Chair

Staff

Vince O'Shea
Robert Beal

Braddock Spear
Chris Vonderweidt

Guests

Bob Ballou, RI	Pete Jensen, Stevensville, MD	Michael Luisi, MD DNR
Loren Lustig, PA	Karl Blankenship, Bay Journal	Robin Wells, CCA-VA
Clay Harford, MSSA-CCA	Mark Alexander, CT DEP	Kevin Smith, CCA-VA
Clint Waters, MSSA	A.J. Erskine, Kinsale, VA	Jerry Benson, CCA-VA
Hugh Miller, CCA	Ron Lukens, Omega Protein Ben	Peter Wingate, CCA-VA
Tom Welch, CCA-VA	Landry, Omega Protein	Phil Kline, Greenpeace
Cathy Geisler, MSSA	Drew Minkiewicz, KD &W	Derek Orner, NOAA
Roberto Geisler, MMA	Shaun Gehan, KD &W	Tom McCloy, NJ DFW
Randy Stephens, Topping, VA	Peter Burns, NMFS	Dave Ellenton, Cape Seafoods
Charles Hutchinson, MSSA	Wilson Laney, USFWS	Jeff Kaelin, Lund Fisheries
Charlie Coates, CCA-VA	Bob Ross, NMFS	Murphy Sprinkler, CCA-VA
J.W. Smith, NMFS, NC	Ben Martens, CCCHPA	Rich Ackerman, Alexandria, VA
Chuck Prani, MSSA	Beau Beasley, Warrenton, VA	
Larry Jennings, CCA-MD	Charles Lynch, NOAA	

The Atlantic Menhaden Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, May 5, 2010, and was called to order at 2:30 o'clock p.m. by Chairman George Lapointe.

CALL TO ORDER

CHAIRMAN GEORGE LAPOINTE: Good afternoon. My name is George Lapointe; I'm chair of the Menhaden Board. I'm going to get the board started a little bit early because the South Atlantic Board was efficient and finished early so we'll see if we can follow along as best we can. For members of the audience who wish to speak, Agenda Topic 3 is public comment. There is a sign-up sheet for people to sign up.

We had a meeting on parliamentary procedure this morning, and one of the things that we as commissioners do, including myself, is sometime speak too long, and so I'm going to try, with the consent of the board, to limit people's discussions to two minutes – that's both commissioners and audience members – and see if we can move along smartly. Unless there is objection, I will try to adhere to that rule through the course of the meeting for both commissioners and members of the public.

APPROVAL OF AGENDA

We have an agenda before us. There are copies on the table. Are there any additions to the agenda? I see no additions; is there any objection to its acceptance? Seeing none, the agenda is accepted.

APPROVAL OF PROCEEDINGS

We have proceedings from the November 2009 Menhaden Board Meeting. Board members, are there any changes to the proceedings? Seeing none, is there any objection to their being accepted? If there is no objection, those are accepted.

PUBLIC COMMENT

Now is the period on our agenda for public comment. We have a spot on each one of our agendas for members of the public to comment on issues not on the agenda. The three big agenda topics are our stock assessment, what our next steps in management are going to be, and Brad is going to review the aerial survey workshop. Are there members of the public who want to comment on things that aren't those three agenda topics?

NOMINATION AND ELECTION OF BOARD VICE-CHAIR

Seeing no comments at this point, our agenda topic is nominating and electing a vice-chair. Do we have nominations for vice-chair? The chair recognizes John Duren.

MR. JOHN DUREN: Mr. Chairman, I wish to nominate Dr. Louis Daniel as vice-chairman.

MR. PATTEN D. WHITE: Second.

CHAIRMAN LAPOINTE: A motion and a second for Lou as vice-chair. Are there other nominations? Mr. Augustine.

MR. PATRICK AUGUSTINE: Mr. Chairman, I move to close the nominations and on behalf of the chairman cast one vote for Dr. Daniel.

CHAIRMAN LAPOINTE: Is there any objection to that? Seeing none, thank you, and congratulations, Lou, and thanks for your help. Our next agenda topic, Agenda Topic 5, is the 2010 Menhaden Stock Assessment. We will have a presentation on the stock assessment report by Rob Latour; a presentation on the peer review panel report by Kim McKown, and then we will consider acceptance of the assessment and the peer review for management uses.

While Rob is doing that, I may have tried to be too efficient. Six people signed up for public comment. For those people who signed up, did you want to comment just on menhaden generally or comment under the specific items? I didn't see any hands who asked for public comment when I asked for it. I just want to make sure I don't gloss over your comments. I'll make sure we cycle in with you later; thank you.

2010 MENHADEN STOCK ASSESSMENT

STOCK ASSESSMENT REPORT

DR. ROBERT LATOUR: The last time I was before you I was asked questions about certain plots that I didn't have with me so my thought was to bring my computer so I would have all the plots with me in case anybody asked. My computer is not working so bear with me. We will have to deal with what I have prepared here.

Thanks to everyone for the opportunity to be here. I'm here to report on the results of the

2009 assessment. Just some acknowledgements up front; in my career at least I have worked on assessments in various ways, but I haven't had many opportunities where I've started and gone through the process from the beginning to the end.

I can assure you it is a year of my life that was not what I intended it to be – countless hours put in by these individuals here on this assessment, a great deal of effort, and I just want to acknowledge everyone's contributions. I'm really just the messenger this afternoon rather than much more than that.

An update on the process as to how we got to where we are today, as you may recall we went through the SEDAR Process, Southeast Data and Assessment Review Process. About a year ago or even prior to we began assembling the data, having the data workshop in May of '09 in Richmond where we spent time evaluating all available data for menhaden, fishery dependent, fishery independent, biological, ecological, et cetera.

We spent last summer more or less constructing the assessment and conducted the assessment workshop October 2009 in Beaufort, North Carolina. We actually spent some time re-reviewing data, looking at sort of data requests that we put forth that were fulfilled over the summer, evaluated various assessment models. In fact, we considered five different models before identifying the one that would support our base run.

We identified the base model and the base run configuration. We held a technical committee meeting last January in Florida where we re-reviewed the assessment results and prepared for the review, which occurred in March, this past spring, in Charleston. You will hear more from Kim on the results of the peer review. I tried to kind of break this into sections. Part 1 is simply the logic behind the model selection or what we went forth with. From a continuity point of view, the Beaufort Assessment Model has supported the assessment for menhaden in 2003 as well as 2006.

This being a benchmark, we felt necessary to make this a model within our candidate suite, if you will, but we also tried to consider alternatives. Those alternatives were the ever-growing stock synthesis 3 largely led by Rick Methot's development.

ASMFC's relationship with Lance Garrison putting forth the Multispecies VPA was a candidate model. We had a version of an assessment conducted by Steve Martell at UBC. We certainly wanted to

consider that as a potential approach as well as the reduction analysis, which was largely designed to sort of evaluate uncertainty, if you will. In the world of Magnuson and National Standard 1 we felt uncertainty was something that we needed to pay more attention to.

This table here is not intended for you to naturally read everything. It is just describing the criteria or the fact that we came up with what we thought was our objective criteria and categorized each model in those criteria. Some were model complexity, data requirements, is the complexity high or low, how do they handle uncertainty, applicability to management, and have they been used in other assessments, various diagnostics, et cetera.

Our ultimate result was we arrived at selecting the Beaufort Assessment Model for a variety of reasons. I'll give you the reasons for not selecting the others here. Doug Vaughan led the effort to consider Stock Synthesis 3; but when we parroted it really all the way down, it essentially became the same as the Beaufort Model so we felt why go away from something that was comfortable to something that is almost the same where we're less comfortable.

The Multispecies VPA, as you probably are aware, many menhaden predators are missing from that analysis, birds, mammals, other fishes, and VPA characteristics in general are undesirable for a variety of reasons so we weren't as comfortable with that approach. The UBC Model, Genny Nesslage took a stab at, if you will. We had difficulty obtaining the code.

We could not reproduce the results that were in the report offered by UBC, and our collective understanding or our collective best effort to reproduce the results required dangerously narrow prior probability distributions on Fmsy just to get the model to converge. We felt like that was a dangerous assumption apriori let alone something that we wanted to bring into practice, so that was discarded as an option as well.

The Stock Reduction Analysis we primarily used to characterize uncertainty, but those uncertainty characterizations were based on an equilibrium framework or an equilibrium theory approach which may philosophically not be consistent with a short-lived species that is subject to high recruitment and high variability in abundance.

The model configuration input data, I have shown you this slide before so I'll try to be brief, but the basic nuts and bolts of the Beaufort Assessment Model involved the standard Baranov Catch Equation where we really catch to abundance fishing mortality and total mortality. It requires data on fixed size, maturity, fecundity and those are by age.

Recruitment we elected to handle as simply a mean recruitment over time with some sort of annual deviate and one lag or an AR one or a regressive first order on a correlation. Selectivity of the fisheries, both the reduction and the bait fisheries, was handled with a logistic or a flat-topped asymptotic function. Our fisheries-independent data consisted of age zero index, which was a composite of state seine surveys ranging from North Carolina through the Mid-Atlantic and as far north as Rhode Island and a single index for adults, primarily ages one to three fish derived from many pound nets in the Potomac River under the guise of the Potomac River Fisheries Commission.

It is an age-structured model. Ages zero through eight-plus were modeled in the assessment and the years ranged from 1955-2008. Some evidence of aging error in a small auxiliary study conducted by Beaufort scientists indicated there may have been some aging error although the same individual has been aging menhaden scales for the better part of 50 years. If there is error we hope it has been systematic at least and not random.

But, nevertheless, we have allowed for aging error in the model. Based on 3,000 fish that were aged twice, there was about an 80 percent agreement of those aged fish that were selected. The last probably most significant advancement relative to the previous iterations of this model has been age and time-varying M.

We have traditionally used age-varying M, but we have now made it time specific as well at least from 1982-2008, which corresponds to the years available for the MS-VPA. That is the assessment data for striped bass, weakfish, bluefish, et cetera. Means of those time periods at age were applied backward from 1955-1981.

Here are the fishery-dependent data on the left panel. We have 1940-2008. The reduction landings indicate that the model began in 1955, but these data were plotted to try and get as far back in time as possible to understand what the removals might have been. It is the usual pattern of increasing to the mid fifties/sixties, followed by a precipitous decrease and

kind of some slow variability and decrease up to the present.

On the right are the bait landings, which are roughly 10 percent of the reduction landings. There has been a general trend of increase but nothing extremely aggressive. I note here that in 2008, the year we're probably most concerned with as it is the last year in the model, it is the lowest reduction in landings, not the lowest total landings but the lowest reduction landings on record, largely probably due to the fact that it is the lowest effort on record.

The fishery-independent data, as I mentioned here, two indices, an age zero composite index coming from seine survey data targeting striped bass and other fishes conducted in North Carolina, Virginia, Maryland, New Jersey, New York, Rhode Island and Connecticut. That would be the blue plot which corresponds to the left Y-axis, and those data or that index ranges from 1959-2008.

The adult index, which is the red plot corresponding to the right-hand vertical axis would be the adult index, primarily ages one to three and it is derived from pounds net in the Potomac River. It is simply a catch-per-catch-unit effort index, total weights divided by total days fished. In general, the young-of-the-year data tend to suggest a pattern of high recruits in the middle of the time series followed by a precipitous decline in recruitment or productivity. As we all know, it has been depressed in recent years although there have been a couple of strong year classes. In the late nineties and mid-2000's we have seen a couple of strong year classes.

The adult data not too far of a different pattern, although there is more optimism for relative abundance of adults in recent years. The natural mortality rates that went into the model are derived largely from the MS-VPA adjusted for some base ancillary residual mortality that are given here. Basically, the top plot shows age zero M from 1982-2008, and each subsequent plot below the top one is simply an increment in age, so we go from age zero to age six as we move down, and a similar pattern for ages zero and one and two.

You might correlate this with the rebound or possibly a trend in abundance of some of the principal predators or menhaden. The values are

quite high; age zero natural mortality of 1.4, 1.5; probably an average of 1.0 throughout the time series, and those systematically decrease with ontogeny.

Model results and output, here is a plot of model-based predicted numbers of menhaden across the time series 1955-2008 in billions of fish partitioned into age zero and then age one-plus; age zero here in the red, age one-plus in the white or blue; high abundances of age zeroes early in the time series, a decline; high abundance is predicted for the middle eighties in the time series; followed by a decline to the present.

A similar pattern for age one-plus, just less drastic, but we note that in the last decade or so there has been a slight decline in predicted abundance. Reference points, if we want to start making inferences about stock status, those that were selected include from the fishing mortality point of view an F_{med} , which is essentially the fishing mortality rate where recruitment balances removals or you could think of it as replacement.

For abundance we used actually a proxy, total numbers of mature over egg productivity, which is indicative of reproductive potential. The logic behind these reference points is kind of captured here in this figure on the right, which is a plot of the stock-recruitment relationship; that is, modeled-predicted stock-recruitment relationship.

We have model-predicted spawning stock or mature over on the X-axis and model-predicted recruitment and the pattern is not very good. In fact, you can see at a given low level of spawning stock, say one times ten to the fifth you can get two, three, fourfold increase in recruitment, so there seems to be a very weak relationship between spawning stock and recruitment at least as predicted through the eyes of the model.

Thus, we felt MSY-related reference points would not necessarily be the way to go and thus elected to move forward with the F_{med} and the mature ova. Base model stock status, I showed you this plot once before and nothing really has changed. This is a control plot here where along the X-axis we have our abundance target and threshold so think of the horizontal line indicating the target for abundance and a threshold for abundance – do I have that right or am I going wrong – sorry, the vertical lines, target and threshold.

Horizontal lines would be those corresponding to fishing mortality. This control plot characterizes time from 1999-2008. You can see we're always above the threshold biomass or threshold egg productivity. Since all the points plot out to the right of this abundance threshold, we oscillate between the target being below or above the target. From an overfished standpoint, the last ten years or so suggest that has not occurred. The stock status would not be considered overfished.

From an overfishing standpoint we are almost always at or above the target, and in a couple of instances we have been above the threshold, three in the last ten years or so. The most recent point lives right here; that is, the 2008 which is just below or right at the threshold, suggesting generally not overfishing, some cases where we are overfishing.

To sort of spell this out in a little bit more detail, I'll make the point here that the F_{2008} estimate was greater than the F_{target} but less than the F_{limit} , which would still lead to a conclusion of not overfishing. Although it is very close to the F_{limit} , some of the points I want to make here have to do with the high variability in the F estimates.

If we plot this over time – again 1955-2008 – we have the fishing mortality rate on the Y-axis. The blue line would be the target. Very rarely has the F value been at or near the target. The red line would be the threshold. More often it has been below the threshold but still an appreciable proportion of time above the threshold.

In addition, it is not uncommon to see 100 percent, 50 percent, 150 percent changes in F from year to year is somewhat – it bothers me; I'll put it that way. It bothers us as the technical committee how highly variable the F 's are. I'll elaborate on that in a minute. Abundance, the fecundity 2008 value is greater than the target and the threshold, which would suggest the stock is not overfished.

In fact, for most of the time here the target indicated in blue and then the threshold in red, we have been above the target and above the threshold, suggesting the overfishing status has never really been an issue for the last many decades. Some uncertainty analysis here considering the National Standard 1 migration

into our thinking, we've have conducted 2,000 model runs under a bootstrap framework, which basically means we iterated the base model configuration 2,000 times where at each step of the way we allow for variability to enter into the input data.

The variability that we allow to enter in is derived from either a directed study, published or otherwise, such that in this case the reduction landings here we associate at a CV of 0.03. This was based on an actual study that we were able to obtain. Things included in red here indicated places where we had no understanding of uncertainty so we basically had to assume certain error levels associated with those input data.

For some proportion of the input data we had to make assumptions; others we had reasonable guidance on what the error levels would be. If we try to display the results of the 2,000 model runs, this is perhaps somewhat of a confusing figure and I will try to walk you through it. On the X-axis here we have the F value for 2008 divided by the reference point; so when those two are equal, the ratio is one, so we're along this vertical blue line.

If we're to the right of the blue line, that means the F in the most recent year is greater than the reference point and we're overfishing. If we're to the left of the blue line, the F value in the most recent year is less than the target or threshold and we're not overfishing. The same logic here; this ratio applies for the fecundity or the abundance proxy.

Along the blue line at one would be when they're equal. Below the blue line is actually a good thing, because that suggests that the fecundity is less than the threshold so the abundance level is high and thus we're not overfishing and then overfished status. The plot here is a plot of where we live in this two-dimensional space from all 2,000 runs. The red dot would be the base run configuration, not overfished, not overfishing, but you can see that 63 percent of the time that configuration has been maintained or those results would be preserved.

However, 36 or 37 percent of the time you would conclude an overfishing or not overfished stock status; the appreciable uncertainty having to do with the overfishing definition and the overfishing status; not very much concern about the overfished status. A couple of final thoughts; as we contemplate what overfishing and what F might mean to this resource, we have plotted here again time on the X-axis; and the first vertical line, numbers of zeroes or predicted age zeroes; predicted recruits in red.

We have fishing mortality rate experienced by the age two-pluses in the stock in the blue on the other vertical axis. We were hopefully just looking for some correspondence or some relationship, and it seems to suggest as F is going up, in blue we have decrease in the recruits. That is what we might expect, but we have periods within the time series where we don't get what we expect; that is to say, F is going up and bouncing around drastically; arguably twofold or more increases; and very little response in recruitment.

This would be the subsequent year's recruitment so you can interpret these F's as the F experienced by the stock this year, the recruitment being what would be realized next year as a result of what is remaining after the fishing season. The high variable F's are troubling. The lack of response in the stock dynamics or age structure of the stock suggests that there may not be a strong relationship between F and other measures of abundance; in this case recruitment.

If we look at these data in a slightly different manner, I have plotted the same F's on the X-axis, the same recruits on the Y-axis. We get relationships that are intuitive and we get relationships that are not intuitive. You might imagine a high F over here would lead to a low recruitment next year, and we have some observations supporting that idea.

You might imagine a low F leading to a high recruitment; again, we have observations, a few perhaps that support that idea. We also have high F's and then high future-realized recruitment. We have low F's, and perhaps the most, low F's, low recruitment. Again, this points to the idea that is F really translating into the stock dynamics leading to a predictable what we would expect kind of response in abundance in future age classes and years. It doesn't seem so.

The last one is total landings; is there a relationship between total landings and F? We have situations where landings in red here are going down, which you would expect would lead to lower F's or a decline in F, and in fact F goes up. We have in more recent years, if you want to focus your eye, relatively speaking – I mean, there is some variability in landings, but relatively speaking low variability in landings and yet high variability in the F's, which further

suggests that landings in F are not well tied within the stock dynamics.

I guess I bring these points to your attention as we contemplate overfishing. We have discussed this as a technical committee to some extent, but I think it warrants further discussion. I guess you could argue we're in some hypothesis forming stage in some of this; what is the relative role of harvest to that of the environment in shaping the abundance in the stock dynamics of menhaden? This is an open question, I think. It certainly seems as though the environment is a player.

I guess I will add members of the technical committee have also indicated whether it is even reasonable to consider an F-based reference point for the stock, period, given its potential to be highly influenced by environment – recruitment being driven perhaps more by environment than spawning stock biomass.

Others have articulated that National Standard 1 actually allows for – which I know we're not under, but if it is at all entering into your minds allows for relief of requiring an F-related reference point for stocks that fall under this category. I think it is food for thought. I think there are some interesting dynamics playing out here. I think it is a little more complex than we might have originally thought going in. I'll end there and I'll take questions if there are some. Thanks.

CHAIRMAN LAPOINTE: Thanks for that report. Bill Adler.

MR. WILLIAM A. ADLER: Right near the end there, you were talking about landings and the F thing not responding like you thought they would. Are you also saying that the environment issues or factors could be driving abundance rather than fishing?

DR. LATOUR: I'm saying at this point as the technical committee we have discussed the relative roles, and I don't think we have come to a consensus on that issue. I would categorize it more as a point of discussion and a hypothesis. We haven't had a lot of time to contemplate these results following the review, but it is certainly emerging component of our thinking is to try to ascertain what those two might be and how they might be interacting.

MR. ADLER: Several years ago when we had big reports from the technical committee and the scientists on this issue, I remember a statement that

basically said that environmental ecology issues have more to do with the ups and downs of the stock rather than fishing pressure. Is that still pretty much true?

DR. LATOUR: I would be a world-famous fishery scientist if I could address that formally, but I'll give you a few nuggets that come into my mind. The notion of regime shift or the notion of we're in a different period of productivity such that the carrying capacity of species along the Atlantic coast, not just menhaden, have been reduced is becoming more prevalent in the discussion of analysts and scientists.

I served as the SARC Chair this past December where we reviewed the butterfish assessment. A very similar pattern emerged whereas butterfish abundance or predicted abundance was in decline despite the absence of a directed fishery. Recruitment seemed to be at an all-time low and maintaining low levels, indicating that there – in that case there are no landings but the stock is still in decline.

There are other species for which this paradigm may be emerging. I will leave you with that as sort of where the state of the science is. It is not a definitive answer but I think as we begin to learn more as environmental degradation takes its effect, the environmental situation could be more of a driving factor than we thought originally.

MR. DAVID SIMPSON: It was a very good presentation, and it does seem that with menhaden largely recruitment is independent of stock size. I know formerly we used to use 3 percent MSP; and if you had that, you had enough to get at least average recruitment. That would seem to make this species an ideal one for a simple yield-per-recruit F_{max} type of management, meaning that you'd get the maximum yield per individual recruit that entered into the population, realizing that those numbers each year you will get a random assortment of strong and weak year classes; yet you seem to indicate that the species isn't a good candidate for an F-based management. I wonder if you could explain a little bit more why.

DR. LATOUR: I think the idea lived more in the equilibrium assumptions required there. We have protracted low recruitment from the early nineties to the present. We have a period of high recruitment if you just kind of do it in a very

gross scale. Predicted abundance has kind of gone up and down in a similar fashion.

The idea of equilibrium there seemed a bit unpalatable. If you're basing your reference points on a stock-recruitment function where there is very little to no relationship, which is where these yield per recruit and other things would come from, I think the committee in general had some reservations about doing that.

REPRESENTATIVE SARAH PEAKE: Thank you for the presentation. Help me out a little bit because I'm not a statistician. Just in thinking about this as you went through your presentation, in looking at the environmental factors; statistically if there is a total reduction in the biomass, would factors like environmental factors or maybe the increase in certain forage fish, the way we have successfully rebuilt the striped bass stock, would we see that causing greater fluctuations in the recruitment lines since we don't seem to see a direct correlation between landings and recruitment?

DR. LATOUR: We also don't see a good correlation between predicted abundance of menhaden and recruitment. If I understood where you're going – well, maybe I don't. Could I ask for clarification?

REPRESENTATIVE PEAKE: Sure, and maybe I'm not asking this the right way. I guess my question is if we've seen a decline in the total abundance, is it then more subject to swings in other factors other than mortality due to landings and fishing?

DR. LATOUR: Yes, ultimately if you reduce abundance to a dangerously low level, then you risk stock collapse independent of harvest, absolutely. That would certainly be a strategy to avoid, but I guess the point is that there is an apparently weak or at least our ability to detect the relationship between abundance and recruitment is weak makes us react in a way that suggests is recruitment really tied to abundance or is fishing mortality really tied to landings when you don't see these patterns more tightly coupled. I guess that is where our thinking is at the moment.

MS. LYNN FEGLEY: Thanks for your presentation, Rob. I had a little bit of a two-part question. The first one is in terms of the linkage of fishing mortality it looks like the lowest level in your time series was about 0.5, and I just want to ask the question if you feel like the fishing mortality level has ever been low enough within this time series to really examine the

hypothesis that fishing mortality doesn't matter? How low does fishing mortality have to go before you can really make that assertion?

Then the followup to that would be that if we really are in a situation where fishing isn't the primary driver of the system but we have a regime shift where productivity has decreased, then at what point – I wonder if you can clarify for the board how you should consider adjusting your reference points for this new paradigm of low productivity if we're not skirting on a danger zone by just letting the fishing ride. Thank you.

DR. LATOUR: The grand experiment hasn't been conducted because we haven't shut the fishery down for any extended period of time, right? I can't answer that. I don't know how low it would need to be. I guess probably from what I understand about the economics of industry is that we have seen the highs or at least we have seen the landings at their highest because the infrastructure is not likely to expand, but whether we've seen the low I don't know. I can't tell you what the low would be. The second part of the question had to do with – remind me again; sorry.

MS. FEGLEY: The shift in productivity.

DR. LATOUR: Right, shift in productivity, so, again, that is a carrying capacity question, right; has the carrying capacity in certain nursery habitats been reduced to a lower level now than it has been in a previous time? That is an ecosystem question, certainly. Of course, I can't answer that; I don't know for sure, but it is emerging as a viable hypothesis from the standpoint of these persistent low recruitments across other stocks beyond menhaden.

How we would have to adjust harvest there again requires a more full understanding of what that carrying capacity is there, and I don't know as though we have those data in front of us. I will offer a comment on that, too, that just came to my mind. The reference point issue is how would we adjust the reference points under this paradigm, and I think that is a – the reference point issue is emerging as an element of the technical committee discussions that I don't know has been fully verified all the way through.

We as a group agreed on the current reference points within the assessment and moved forward, but we have continued those discussions, in

fairness, and I think part of the review process in March also pointed out further ideas that we might need to consider in the reference point discussion. These weren't hastily arrived at; they weren't haphazardly decided upon, but I do believe there is more discussion to be had at the technical level.

DR. LATOUR: Other questions? Seeing none, I want to thank you for your report. I find your presentation is really clear and I certainly appreciate it, and I'm sure we're going to have a lot more talks about these kinds of issues. Kim.

REVIEW PANEL REPORT

MS. KIM McKOWN: I would like to present the findings from the peer review at the SEDAR Review Workshop. The review team was made of five panel members. They included Dr. Miller from the National Marine Fisheries Service, Northeast Fisheries Science Center. We had three review members who were from the Center for Independent Experts; Patrick Cordue, Dr. Chris Darby, Dr. Geoff Tingley; and myself.

The principal findings that the review panel felt was that the 2010 Menhaden Stock Assessment includes all the relevant data, model results and status determination we felt were robust and it provides a sound, scientific foundation for coast-wide management of menhaden. As Rob pointed out, they used the Beaufort Assessment Model for their primary assessment tool. It is well-tested software, population dynamics and likelihoods.

It is based on a good understanding of the stock structure and migration; reasonable certainty in the catch history over a very extended period of time, which is rather unique for a lot the species that we have; also an extensive catch-at-age data from the main fishery over really an extended period of time, which again is very unique for our assessment; very defensible recruitment indices and adult abundance time series; and defensible estimates of age and year-specific natural mortality developed from the MSA-VPA.

The panel concluded that the use of Fmed and the fecundity associated with it, that there was really no information in the relationship between target and threshold fecundity and virgin fecundity levels. The panel asked the assessment team to do some projections with zero fishing mortality to get an idea of what the virgin stock biomass might be; and the

estimated annual fecundity since 1998, was that 10 percent of the virgin fecundity levels.

As far as the status of the stock, we agreed with the status that Rob just told us from the assessment team, that the 2008 point estimate of fishing mortality was below the estimated Fthreshold; therefore, the status determination would be that overfishing was not occurring; and that the 2008 point estimate of fecundity was above the fecundity threshold and target and that the status determination is that the stock is not overfished.

Though the panel was concerned that the 2008 F estimate was very close to the threshold; and if uncertainty estimates were included, there is a significant probability that overfishing could have been occurring in 2008. You saw that in the graph that Rob just showed you that 36/37 percent of those uncertainty estimates were above the threshold.

I guess we felt the central challenge from this assessment is the fact that we were concerned with the use of Fmed and the fecundity associated with it for reference points; and in particular the fact that it is not related at all to the virgin fecundity levels. The panel made a number of recommendations to the assessment team for just changes that we thought would be worthwhile to explore in the model. All those were run during the time.

We asked basically to redefine the fishery, so in the base model they modeled the reduction fishery and the bait fishery separately. When we examined them, there is a portion of each of those fisheries in the Chesapeake Bay and a portion on the coast, mostly in the northeast, New Jersey and north.

When we looked at it, the age structure of those fisheries were really based more on where the fishery occurred rather than the type of fishery, and so the recommendation was to break out the fisheries by latitude rather than by gear, so to model the southern fishery which is fishing on mainly two year olds and then model a northern fishery which is fishing mainly on three and older fish.

Some of the other things we asked the assessment team to do was some of the data, there were data gaps, and they had basically filled in the data. Because of the type of model

they're using, they don't need to fill the data in so we asked them to take that out and just leave the data gaps. By filling it in, you actually are decreasing the uncertainty of your estimates.

Another thing, we just had some recommendations on effective sample sizes, which again relates to the uncertainty that you have in the model, and the numbers they were using made the answers a little less uncertain than we thought were realistic. We also asked them to – since we had told them to re-examine how they modeled the fisheries and have a southern and a northern fishery, that they allow that southern fishery to have dome selectivities since it is only really fishing on those younger ages, and just to have the flexibility for the model to do that.

When we looked at the – we also wanted sensitivities to allow changes in selectivity over time because the fishery really has changed over time. When we looked at this reference run, it actually seemed to fit a lot of the data better than the base run, so our suggestion is to explore using this in a future run.

The bottom line is the stock status was exactly the same from the reference run as the base run, and so we were very comfortable then with the base run. Another thing that came out of the review was the fact that the model was using N-weighted fishing mortalities relative to N-weighted reference points for stock status – sorry, abundance, thank you.

I guess recent research has indicated the fact that you should really be calculating this on the full F rather than abundance weighted; and that when you use the abundance-weighted F, in some circumstances you may not be getting the true status determination. We also recommend in the future to examine just the timing of the fisheries in the indices. Many of the fisheries are seasonal and they should be timed appropriately in the model with the indices.

We also recommended in the future – the assessment team had developed their juvenile indices in two different manners. One was basically a combination of all the surveys together into one juvenile index that would reflect everything going on in the coast. The other was a regional approach. The assessment team used the combined index and the panel thought it would be good to investigate the use of the regional approach in the future because it just may pick up differences recruitment in different areas.

They also recommended the development in the long term of a coast-wide adult menhaden survey. Currently for the adult index they're using the Potomac River Fisheries Commission's pound net

index, which is very spatially limited, and they're assuming that is reflective of what is going on with the abundance of menhaden on the coast.

The thought was in the future to try to develop a coast-wide index, possibly an aerial survey maybe working in conjunction with industry. As I mentioned before, we recommend the examination of alternative reference points which would provide more protection to spawning stock biomass than the Fmed reference points. There is really no relationship between the current reference points and virgin fecundity levels, and the fact that the projection levels indicated that the current fecundity could be as low as 10 percent of the virgin fecundity. Thank you.

CHAIRMAN LAPOINTE: Thank you; questions for Kim? Lynn.

MS. FEGLEY: Thanks for your presentation, Kim. I'm just curious; if you can give the board at all a little bit of a – you know, we use the word "concern" and the concern relative to the reference points, and I'm just wondering – given the menhaden as it is managed and if there is some capacity in this fishery to grow somewhat, I'm wondering if you can give the board any assessment of the risk we're facing under the current management framework in terms of the fisheries and the stock health.

MS. MCKOWN: Basically all I can tell you is from those projections, that from the base run it looks like the abundance out there could be very low compared to population that was unfished. Now one of the things we did look at were projections that encompassed the fact that we may be at a low productivity level now, and so we used recruitments only from recent years.

If you looked at that, then we were maybe at a 15 percent of virgin biomass so depending on your productivity level we're at a different level. When we used that reference run, that was a little more optimistic, so we might be at 12 to 15 percent of the virgin biomass, but it is still relatively low. How that relates to long-term sustainability of menhaden, I can't answer that.

MR. JACK TRAVELSTEAD: Kim, you mentioned the need for a coast-wide index of abundance, and you mentioned somehow involving industry in that. Can you explain that

a little bit further? For instance, why couldn't we use the fishery itself to produce some type of index of abundance?

MS. MCKOWN: You could but you would probably want to put observers out on the boat to be collecting some of the biological information while you're out there. You might want to work jointly with industry on collecting information from the spotter planes that they use. Two of the members of the panel were from a government lab in England, and I guess they have worked with industry doing aerial surveys, and they said that they're – I think NAFTA may have done some coordinated work and it is something we could explore with them for recommendations how to do that.

DR. LATOUR: Another point, Jack, would be the fishery as it currently operates is not randomly selecting locations to fish; and so are we getting a representative sample of abundance from the fishery or are we getting what the fishery wants for its economic interest or otherwise? Now you could put a purse seine survey out on the water that would follow a statistically defensible design, but the price tag would be shocking, I think.

MR. P. WHITE: I guess picking up a little bit on where Lynn was, a couple of times I think this week we have talked about, well, what would it be if we were fishing on an unfished – or if we were estimating on an unfished population? I think one of the points I tried to make earlier is that the whole scenario, our whole ecosystem is different than it was whatever you're basing this time period on of an unfished situation,

A couple of points that Rob made was that our natural mortality is down and our landings are down, and so I think the scenario starts to indicate, and I know neither of you want to go there, but that we are having a natural phenomenon here with a changing climate, and I think we've got to be careful; and as you indicated, Kim, get a lot more information as to how this is working because we aren't going to be able to replicate how it was 20 years ago. We have got to much more forecast what it is going to be ten years from now.

MS. MCKOWN: Just in response, one thing I had mentioned to Lynn was the fact that we did recognize that we seemed to be at a low productivity level in relation to recruitments, and so that was – some of the runs that we asked the assessment team to do used just the recent recruitment period since it has been low; and even when we did that – like I said, in

the base run I think we were at that 15 percent virgin biomass levels and when we used the reference run we were at 25 percent of the virgin levels. That's about the range where we are with the recent productivity levels.

MR. ADLER: If you could, on the gathering of all this information that goes into the models and everything, are the biologists and the technical committee using information other than what is provided by the reduction fishery or are they only using the reduction fishery information?

MS. MCKOWN: No, they are using information from the reduction fishery, from the bait – you know, it is basically all of the landings which encompasses a number of fisheries. They also include recreational harvest in there. We also have fishery-independent data in there.

MR. ADLER: What is the fishery-independent data? Forget the catches and the fishery by whoever; what other information – is that what you just said?

MS. MCKOWN: They use juvenile abundance indices from a number of surveys ranging from New York, I believe, down to North Carolina. They are also using an adult index – what else?

DR. LATOUR: The fishery-independent stuff is jargon for the fact that we have state biologists, Departments of Natural Resources, out in the field sampling abundance of fish populations, so we have data coming in that is unrelated to harvest in those manners. Some of it is related to harvest, as you know, the landings and other things, so it is kind of a hybrid of those two.

MR. TRAVELSTEAD: Rob, I'm assuming that the technical committee has not yet had a chance to fully consider the results of the peer review, but I'm wondering having seen it – and I assume you've had it for a little while, anyway – do you have any initial thoughts on what you've seen there? What amount of time do you think it would take the technical committee to fully evaluate the peer review results and incorporate them into your latest thinking?

DR. LATOUR: I have had just over a few weeks. When the documentation was made public to you all is actually when I started to see some of it myself, so your intuition is correct. As the technical committee, we've had very little

time to contemplate the results of the review or discuss them collectively.

My personal impressions were that the suggestions were all constructive. None of them were in the fatal flaw category or even close. Quibbling over effective sample size and things and uncertainty is important, but those are more at a technical level than an operational level, which is where you operate.

The major one that strikes me, which is something that we as a technical committee discussed and as I alluded to in my presentation and are continuing to discuss, is the appropriateness of the reference points. I think that is probably where we need to start our evaluation of the review. I briefly spoke with Joe Smith to gauge where the Beaufort workload is in the coming months, and the red snapper assessment is on their plate at the moment for the Gulf, independent of the oil spill, and I assume it is going to take most of the summer, so I would think optimistically we wouldn't be able to provide much until the fall.

MR. WILLIAM GOLDSBOROUGH: Thanks, Kim and Rob. I'm just trying to summarize in my mind where we are based on the assessment and the peer review. Going back to last summer when this board was considering a motion to begin the development of new reference points, we decided not to do that in view of the upcoming assessment with the advice given that we thought some of the changes that were being undertaken might actually provide more insights later – at this point in the game, actually, when the assessment was reported.

As I understand, the primary ones were using time-varying M's and the MS-VPA estimates as inputs and that, in fact, if I understand right, we're seeing some pretty significant insights now, including, and maybe most prominently for me, anyway, that incorporating that information and hindcasting, I guess is the word, it shows a pattern of F varying around the threshold pretty much throughout the time series, and many of those years being above it and sometimes well above it when what we really seek is to have F varying around the target.

So, we've got a circumstance where we're maintaining a fishery at a higher level than we want relative to our current reference points. Another major piece, as I see it, if I understand right, is that the fecundity of the population in the last ten years is 5 to 10 percent, I think I heard you say, of an unfished stock and that the peer review panel felt like that was not enough protection of spawning potential,

and, therefore, that the population reference point was perhaps too low.

So, it sounds to me like – and that in connection with that, we're seeing a continuation of the trend of recent years of reduction in abundance in the population now to a low point in the time series. So, the picture that I'm seeing coming out of this is that we need to take steps to bring F on average closer to the target and that we need to actually look at the reference points; in particular the population reference point and perhaps make it more conservative. Is that a fair summation?

MS. McKOWN: Well, certainly the panel felt that abundance-wise was a lot of concern.

DR. LATOUR: The efforts to incorporate natural mortality, which as we saw were huge, the model was very insensitive to it. I mean, all the sensitivities would vary the M pattern and got almost exactly the same results; so while that was a valuable step in terms of trying to build in realism, it had very little impact on the model. That was your first point.

The second point, yes, it is true – I mean, you saw the plot – we've been bouncing around the thresholds, above the target for F for quite some time. I guess I would ask you to superimpose on your thinking the notion that it may not be that landings and F are tightly coupled – I guess that is the take-home message – such that your control mechanism, if you want to look at it that way, through modifying landings or otherwise may not necessarily lead to the result you're hoping for, and that is pushing the F down to the target.

That presupposes that the F reference point is valid, which is where a lot of the review discussion itself centered. That is my sort of take on that. As far as the abundance point of view goes, there is a different philosophy if you think about tying things to a virgin biomass. It is a different way of approaching an abundance reference point.

I had this debate with my colleagues. A conservation biologist hears the statement that you're at 60 percent or 50 percent virgin biomass and they freak out. A fishery scientist says, well, you're almost there, keep going, you've almost achieved maximum compensation and optimal yield. For the scale that we're operating under,

the traditional dogma of 50 percent is not bad, so we are below that. If you take the little bit of work we have given to it and operate at 10 to 15 percent, yes, so there is concern there that there is need for improvement there, no question.

That still falls under the general discussion of reference points and, again, whether spawning stock biomass preserved at some level translates into realized recruitment in a predictable way. It could be that the environment is such a dynamic player in this situation that it doesn't translate into a predictable way.

It could be that there is a very tight relationship and we don't have the ability within our data sets to detect it. That is an open question at this stage, but, again, I would categorize it into the reference point discussion. These are sort of some of the issues that we as the technical committee have had in the same types of discussions at our meetings. Hopefully, that was helpful.

MR. SIMPSON: I guess along those lines and sort of following up on my previous question, I guess just generally would you anticipate that ultimately yield and stock size would increase if we fished closer to the target than if we fished closer to the limit?

DR. LATOUR: Intuitively it makes sense, I would tend to agree with you, but, again, if the relationship is not there; that is to say if – I mean, fundamentally that's how we operate in terms of thinking about population dynamics, so that is exactly the way I would argue you should proceed, but if the environment is a mediator in that relationship such that compensation or other mechanisms are in place to break apart the coupling of that relationship, then I don't know if you'll get there. I guess that is my point.

MR. SIMPSON: Okay, assuming that there is value in any of the 50-some years of data that you have in recruitment, it seems pretty clear that recruitment is largely independent of stock size until you get below – and I can't pull the table up, but until you get to a very low stock size; so if you keep any reasonable amount of stock, you're as likely to get a strong year class as a weak one. Therefore, if you fish at something that would be akin to F_{max} you will get the most yield from the resource per recruit that comes in?

DR. LATOUR: If you believe in the multiple productivity regime concept, which period do you place your mean recruitment? Maybe I'm not

following your question, and I apologize if that is the case. I will offer another comment for Mr. Simpson and that is when we removed the recruitment index from the model altogether, we got very little deviation in the results, which suggests that the catch matrix contains as much if not more information about recruitment than the actual index value does; lending further uncertainty about whether the patterns in the index over time are even realistic.

MR. SIMPSON: I guess I'm wondering if there is any value to this entire assessment, then. I look at it and I think it is pretty good. It is troubling, as you mentioned, that fishing mortality seems to run from low to extremely high and back down again and back up again. Otherwise, I look at it and in the context of how fisheries are assessed in the northeast and viewed, I'm really having a difficult time following I guess the logic that is being presented here that we can't fish with an F-based approach.

I don't understand the concern about the level of spawning biomass when it seems pretty clear that recruitment is largely independent of stock size. It is a very resilient fish. It seems to take very few eggs to produce a strong year class unlike some other stocks that – you know, gadids tend to require a higher percent MSP that you were referring to earlier. I'm puzzled.

DR. LATOUR: I will offer a caveat here. This discussion largely occurred before my role as a member of the technical committee so I'm trying to go on my recollection. I would ask if colleagues of the technical committee who are in the audience, if they have any ability to offer direction on this, the logic of the non-traditional MSY-related reference points.

CHAIRMAN LAPOINTE: Just a comment from the chair, it strikes me that as we move ahead in the coming months that we can work on some of those questions because I think it is as puzzling for you guys as it is for us; and so how we can add some logic or some new ways of looking at this so that in fact we can move forward in a logical way I think is a challenge for everybody at this table and everybody in the audience. Pat Augustine.

MR. AUGUSTINE: Thank you, Kim and Rob, for your thorough reports. Even I understood them so it couldn't be all bad. You did clear up

some issues for me. Do I understand that the peer review panel recommends – the primary recommendation is that alternative reference points be considered and chosen on the basis of providing better protection for the SSB and so on? Is that the major recommendation from the peer review? It appears you accepted and commented positively on most of the other elements of what the technical committee reported; is that correct?

MS. McKOWN: That is correct.

ACCEPTANCE FOR MANAGEMENT USE

CHAIRMAN LAPOINTE: Other questions? If not, the action we are going to consider is whether we accept the benchmark assessment and the peer review report for management use.

MR. DOUGLAS GROUT: Mr. Chairman, I would make that motion to accept the Atlantic Menhaden Stock Assessment and Peer Review Report for use in management.

CHAIRMAN LAPOINTE: I have a motion by Doug Grout; second by Dr. Geiger. Board members, debate on the motion. Remember, I'm going to ask for those who want to speak. I have learned from this morning and I will take first the maker of the motion and then somebody against, if there is anybody. If there is nobody against, we will keep this short and get on with it.

MR. GROUT: Yes, excellent stock assessment and peer review. I think it was a thorough job. The way you explained it was very clear as to what you felt were the places we needed to work on here. I appreciate the tremendous effort that has gone into this. It will help us with our management.

MR. AUGUSTINE: Mr. Chairman, I would reiterate what Mr. Grout said. There is no question that the thoroughness that the technical committee went through and developed their assessments and their recommendations were extremely thorough, clear and open and very honest. There was no hidden agenda here. It is very heartwarming to see this with the technical committee putting it out there on the table. I think a lot of credit goes to Joe Brown and his group down there in North Carolina for all the background work that they did of which you relied heavily upon to do that. In addition, the peer review, again, could not have been more open and honest about it. They did point out the highlights of what the issues were to be looked at.

They commented and recommended or – I shouldn't say "recommended" but identified the key elements of what the technical committee did. They spelled it out clear enough so the average person who read this could read it and understand it. I would truly support this. Thank you, and that is my two minutes.

CHAIRMAN LAPOINTE: You were close to two minutes. Any other board members wish to speak about the motion. The motion is to accept the assessment and the peer review. Seeing none, I will briefly go to the audience; any audience members want to comment on the motion? Again, the motion is to accept the assessment and the peer review. Seeing no audience members, we'll come back to the board. Is there any objection to the motion? **Seeing none, the motion is accepted.**

NEXT STEPS IN MENHADEN MANAGEMENT

I want to again thank the folks who did the stock assessment, folks who did the peer review, Rob and Kim for coming and explaining it to us. I want to echo Pat's comments just a little bit; not only in the clearness of the presentation but the clearness of the job in front of us in terms of the uncertainty is important for us to understand. Our next agenda topic, Agenda Topic 6, is next steps in menhaden management; what do we do? There has been a fair amount of discussion. I will open this up to the board at this point. Pat White.

MR. P. WHITE: I have a motion when it is appropriate, Mr. Chairman.

CHAIRMAN LAPOINTE: I think it is appropriate to get things started.

MR. P. WHITE: Move the Menhaden Technical Committee develop alternative biological reference points if possible for the August 2010 meeting. The reference points should include projections of the spawning stock biomass or population fecundity relative to the unfished level and a reference point associated with abundance.

The technical committee should present to the board a range of potential reference points that preserve the varying levels of spawning stock biomass. These levels of spawning stock biomass should be placed in the context of

those that are currently employed for other stocks of clupeids and pelagic forage species.

The technical committee should develop a range of management strategies to achieve the reference points with, if possible, expected outcomes for yield and stock health. Request the Policy Board task the Multispecies Committee to work with the Menhaden Technical Committee to account for predation in the alternative reference points.

CHAIRMAN LAPOINTE: I have a motion; do I have a second.

MR. STEVE MEYERS: Second.

CHAIRMAN LAPOINTE: Steve Meyers seconded that; thank you very much. Questions on the motion? Bill Adler.

MR. ADLER: I wanted to ask whether this motion includes the development of ecological reference points in that thing that Pat just said. Are ecological reference points also part of that or would be part of that development?

MR. P. WHITE: It was not in my motion at this time.

CHAIRMAN LAPOINTE: My sense, in looking at it, is that, I might, the Policy Board tasking the Multispecies Committee to work with the Menhaden Technical Committee to account for predation in the alternative reference points is starting to get at that question in what I see as a manageable increment, Bill.

MR. ADLER: Okay, and I don't want to upset the wording there and confuse it, so the idea would be if this passes could that be a sub-note to the technical committee that is working on that to sort of look at that. As you said, it is already started. Would that be appropriate if it passes?

CHAIRMAN LAPOINTE: I talked to Rob a little bit before the meeting; and if this passes, I think that there will be a lot of discussion with the technical committee about – you know, these are some pretty broad topics and, again, to try to give us information to move menhaden management forward without asking questions that we could ask forever and not move management forward, so I think there is going to be inherent in this motion a fair amount of give and take.

We're going to learn as they go along; they're going to learn as they go along, and we will have to refine our focus depending on what the data can yield as they address the question; again if the motion passes. Other questions on the motion? Louis.

DR. LOUIS DANIEL: Mr. Chairman, would it be appropriate or would you accept an addition to this motion to look at a coast-wide cap? Would that be an appropriate addition to this? If we're going to ask the technical committee with doing certain things, I think we've got a bait cap but we don't have a coast-wide cap.

CHAIRMAN LAPOINTE: I think from what I understand about this, the technical committee should develop a range of management strategies to achieve reference points, and I suspect that in that discussion – again, if the motion passes – that a coast-wide cap will be one of those things that is discussed. Other questions on the motion? Pat Augustine.

MR. AUGUSTINE: Mr. Chairman, clarification. Is that motion clear enough that will allow us to develop a clear set of terms of reference for the technical committee?

CHAIRMAN LAPOINTE: Rob, do you want to comment on the clarity?

DR. LATOUR: It seems to me that it is in three basic parts. One is re-evaluate reference points as a general strategy or a general objective, sure. Provide a range of management strategies to achieve reference points, that is projection analysis type stuff, and I think that may be doable. The third is where my sort of clarification, if I were to ask for any, is the general topic of ecological reference points has come forth. In many regards reference points strike me as sort of the end or near the end of an analysis or an assessment.

Assuming that you have in place a modeling exercise that gives you insight into where your stock is relative to a reference point, an ecological reference point elicits to me – and I don't claim to be an expert at this point on these, but we would need a model or a tool to allow us to provide inferences about what the ecosystem demands are in addition to the harvest demands or impacts of ecosystem demands and impacts of harvest are on this resource, which would require sort of a multispecies type approach.

My word of caution there is that with the single-species model we have in front of us, it is a well-oiled machine, if you will. It is a mature assessment. Long hours have been placed into that model and its application to menhaden. Switching to a multispecies approach, which may ultimately be something we do, I think first has to come from a directed feeling that there is a plan in place to transition to multispecies management. I would recommend you recognize that would be switching from a mature assessment situation to a very immature one where we would have a steep learning curve and a lot of data gaps, a lot of uncertainties. That is my two cents on the latter part there.

MR. AUGUSTINE: Just a follow-on, Mr. Chairman, with that breakout, then, it appears that you can address each of those sections separately. You referred to a model in the third part. Do we have an assessment model run available that you could use as the basis for addressing the third part?

DR. LATOUR: We have the MS-VPA which did pass peer review, although if I remember correctly, the recommendations of the peer review were not to be used – it was not to be used to directly support management. It was to be used to augment additional analyses or auxiliary analyses as we have here today; use it in the form of estimating M-2's.

We have a tool; it is of value. There is some information that can be gleaned, some inferences that can be made. I think there is some research coming on line out of the Northeast Center and out of the Pacific that would modify the approach there, build on that approach. The point I'm trying to make is there is some research and development that would be required to really get to a maturity level with a multispecies approach that we're now at with the single-species approach for menhaden.

MS. FEGLEY: I just wanted to comment a little bit that perhaps a different way to interpret that final statement, there is the MS-VPA which does provide an estimate of the amount of menhaden consumed by predators. One way that you could interpret accounting for that predation is to include in this range of reference points a broad enough range so that you have reference points that – I mean, essentially what you're coming down to, it seems, is an allocation decision.

You know, you're allocating resource; it is an allocation decision. It is the allocation of resource to predators, to fisheries, to whatever else, and I think that at a certain point maybe what would be helpful

for the board is to kind of understand that range of allocation.

CHAIRMAN LAPOINTE: And if I can jump in, I think this is a fairly large task for the technical committee and others, and we won't have all those questions answered today. I know that in Pat's motion it says "if possible" by August 2010. Rob mentioned the fact that a number of the technical committee members are working on things or on other issues in the southeast; that in fact it may take more time than August 2010, but the chair can work with the technical committee to in fact advance some of these discussions, so we're not doing nothing but we're moving ahead the discussion and better understanding what those three components of the motion would mean. Bill Goldsborough.

MR. GOLDSBOROUGH: Lynn covered much of what I was going to say, but I guess I would just add that we have seen already at this board in the last year or a year and a half some work that has been done both by staff and by others that laid out some of the other less intensive, less quantitative approaches to doing what I see the motion would do in that last part, and that is account for predation.

I think there is work there, there are literature values that would not require a fully developed model and a new multispecies assessment approach that we can apply fairly readily in the short term if I'm not mistaken, so we're not starting from square one on that. It doesn't have to be all-encompassing ecosystem-based management. It appears to me to be a first increment, as you said, Mr. Chairman, in that direction. Thank you.

DR. JAIME GEIGER: Mr. Chairman, to follow up on that, I'm struck that we're looking at basically three subregions, North Atlantic, Mid-Atlantic and southern regions stocks, or areas of this particular stock. Is there any particular subregion such as, say, the Mid-Atlantic and the Chesapeake Bay may offer the most data to sort of take the first step towards developing these environmental reference points and doing somewhat what Bill Goldsborough was talking about as well.

DR. LATOUR: Most all of the available data currently have been inputted into the MS-VPA, so that has been done. We can gain inference into the M-2's based on the predators that we

have included in that model. It is a very minimum number of menhaden predators. Birds are not there, mammals are not there, so it can be thought of as a minimum.

Those data have been synthesized; they're there; they give us some inferences. If I may respond to Bill's comment, it is still not clear to me if you're asking us to incorporate the predation issue, in a sense we have through the M-2 matrix that we supplied the single-species assessment model. If you're asking for an allocation question, I can't see how you would do that without having a fairly formal understanding of the ecosystem demands for the resource independent of the harvest so that you know what the demands would be in order to understand the allocation.

That is where my comments earlier were pointing to, and we don't have that tool necessarily in our toolbox at the moment. I feel as though we've gone pretty far with incorporating predation. I mean the M-2's that are principally predation add in the residual M-1 for other things not there. The single-species assessment model before you is largely insensitive to the pattern and variation in that pattern, so predation is being incorporated.

I admit it is a minimum look at it because we don't have all predation events incorporated, but the allocation thing is where my mind is a little bit more gray, if you will. We don't have the demands on menhaden from the ecosystem point of view well understood.

MR. SIMPSON: First a comment or an observation; Table 7.9 has a range of potential reference points to preserve varying levels of SSB; namely, F 20, F 25, F 30. There is the F_{med} that we have been talking about for quite a while here. I don't know what else you were looking for there, but the sentence "the TC should develop a range of management strategies to achieve the reference points", presumably one of those would be some kind of quota.

Given the variability in recruitment, that would require basically some kind of minimal update in this assessment probably annually, so I wonder if that is anticipated to occur so that we could include that in the list of alternatives, that we would have enough of an update in the assessment to establish a quota from one year to the next.

CHAIRMAN LAPOINTE: My sense in reading the motion is that we're not going to get one report from the technical committee on this and make a decision and go home. I quite agree that when people talk

about different management strategies, whatever they might be, I think they're going to come with an abundance of other issues that come along with them. The one you mentioned is one those, and so we need to have a very deliberative and eyes-wide-open discussion on what those are so that we don't overdrive our system and have some potential strategies that we can't deliver on.

MR. SIMPSON: I just don't know if it is routinely done now. Maybe they could just answer how frequently do you typically do an update to the menhaden assessment. I think a lot of the things that are being asked are really dancing around a value judgment and they're asking you to produce a number that would say we need a set-aside for predation and other ecological functions. I think the reference to other clupeid stocks is a good one.

I think Atlantic herring is a good analogous type of fishery, and there I think they just – and there has been all kinds of research on predator demands that Bill Overholtz and others have done, but in simplistic terms it was just a set-aside of so many tons. You know, you assume an M, set aside so many more tons and harvest a slightly lower amount of fish. So, really, we frequently ask the technical committee to give us a technical basis for doing things that are really value judgments.

DR. LATOUR: Every three years is the current – with a benchmark every six, so we do one update in between benchmarks is the current plan or current strategy. I quite agree with your latter comments, and you articulated my thoughts better than I did; thank you.

DR. DAVID PIERCE: It is a bit of a complicated motion. I just boil it down to the fact that we are requesting – that we desire more conservative reference points; and those reference points, we want them to be more conservative to account for predation. To me that is the charge we giving to the technical committee; more conservative reference points with predation concerns being the reason why we would like to go in that direction. I agree that is an appropriate course of action for us to take and it is quite consistent with what we heard earlier on from the two presentations that were provided.

MR. GOLDSBOROUGH. Mr. Chairman, I'll be brief. I think Dave Simpson made a good point about value judgments ought to take place here at this board and that we shouldn't ask the technical committee to do that. I think that phenomenon, if you will, has been a fundamental reason why we have been grappling with these issues for a number of years.

The current amendment we adopted in 2001 included an objective to protect menhaden's ecological role and we still have really done nothing on the ground that would do that, and I think that is a large reason why. As I read this motion, it asks for a suggestion on a range of potential reference points. It doesn't ask for a choice of which one, and thus the board would then be confronted with that range, and the board would have to make that judgment, as well it should. Thank you.

CHAIRMAN LAPOINTE: Seeing no other questions, do board members want to speak for or against the motion? Pat White, the maker of the motion, and then Jack Travelstead.

MR. P. WHITE: Given the importance of menhaden both to the ecosystem and to the various fisheries, it is our responsibility to make sure that we have the most appropriate management framework for this stock. A primary concern of the peer review panel is that the current reference points fail to protect adequate spawning stock potential.

This is extremely troublesome for a stock of this importance and we need to task our scientists to develop new alternative reference points that protect sufficient spawning stock potential and are in line with the reference points employed for other clupeids and forage stocks. We also want to make sure that the new reference points include options associated with the abundance of spawning stock biomass to make sure the stock is protected under a range of circumstances.

MR. TRAVELSTEAD: We have all agreed we have a very detailed and thorough stock assessment and peer review presented to us today. I congratulate all that worked on that. My fear coming into the meeting was that because it is so thorough and presents so many different concerns and levels of risk that people might cherry-pick various points from it in an effort to sort of speed things up faster than they need to be accelerated.

That is not what this motion does; at least that is the way I read it. I think it puts the issues right back where they need to be and that is at the technical

committee. Rob had indicated earlier that he thought there were a number of areas that additional discussion was needed, and I think this motion forces that discussion to occur. Ultimately the decisions will be the board's decisions to make, but there is clearly a lot of work that needs to be done. I think this motion does exactly that and I would urge its passage.

MR. A.C. CARPENTER: I would take notes from this morning and just simply say that I support the motion and urge other members to also support it.

CHAIRMAN LAPOINTE: Other comments? Seeing none, I'm going to go to the audience. In spite of Collette said, we do have public comment on our agendas for a reason. We have a motion that you see before you. Clearly, it involves a lot of technical work and a lot of work on menhaden that I know you're all interested in. I had a list of six people. The first one was Kevin Smith.

MR. KEVIN SMITH: Thank you, members of the board and chairman. My name is Kevin Smith. I live in Richmond, Virginia. I am the president of Coastal Conservation Association of Virginia. I'm also a representative of an organization called The Menhaden Coalition, which consists of greater than two dozen organizations from Massachusetts to Virginia, from tackle shops to charter captains to fishing associations, fishing clubs. I'm here to express the concern about the condition of the menhaden stock.

My hope is that you will do a good job in the future as we see the direct impact of it in Virginia and the states around us see the impact of what is going on in Virginia. I also want to make a statement that the members of this Coalition and the CCA of Virginia is that the General Assembly's management of menhaden is not representative of the best interests of the general public of Virginia; and as a result, we would like to see that be changed possibly to the VMRC. Thank you very much.

CHAIRMAN LAPOINTE: Thank you, sir. The next person on my list is Phil Kline.

MR. PHIL KLINE: Thank you, Mr. Chairman. My name is Phil Kline. I'm an oceans campaigner for Greenpeace. The motion on the floor here now is a step in the right direction. It

will reveal some of the technical results you're going to need to make management decisions. When I look at this, and you've all seen this, this is not a graph of good management.

There obviously are actions that you can take that can be much more conservative and precautionary. There is a body of science on the dietary needs of zero age striped bass that is alarming. It appears that we have starving striped bass in the Chesapeake. There is going to be a bunch of fishermen that are going to give you their on-the-water experience that this low abundance of menhaden is stressing the fisheries.

It is really time to move forward with things like this, but in the short term take some precautionary steps and stop the decrease of the biomass. Zero menhaden is where a chart like this ends up, and it is where a lot of fisheries have gone. It is not your job here overseeing a public resource to see its demise.

It is actually let's build it and maintain it in an abundance that works for all sectors, especially for the ecology of the region, and I don't need to even say anything about that because you all are very aware of it. It is time to make a fundamental paradigm shift in the way you view and the way you manage these fish and give the ocean a chance to give back to us the goods and services that we've had in the past. Thank you.

MR. BENSON: I'm Jerry Benson; I live in Lenexa, Virginia. This is my first ASMFC meeting and I'm overwhelmed by the technical expertise I see on display here. It has been exciting to meet many of the luminaries in the fisheries management business. That includes a particular excitement at meeting UTube Celebrity Vince O'Shea.

I'm here today representing 32 organizations that Kevin mentioned that have great concern over the alarming decline the menhaden population. The menhaden population, as I understand it from your data, is 12 percent of what it was 25 years ago. 1984-2009 it is down 88 percent. We're obviously concerned that when you lose 88 percent of a population, regardless of where it started, that can't be good. We're asking today that you do your duty and start rebuilding the Atlantic menhaden stock. I thank you very much for your time.

MR. CHARLES HUTCHINSON: As you have gathered, I am Charlie Hutchinson and I represent the Maryland Saltwater Sport Fishermen's Association. Most of what I would like to say has already been said, but I want to bring up one thing. There has

been a lot of technical stuff talked about. Most of us that don't deal with that is over our heads, but some things are pretty obvious.

One is the stock is in the cellar. Your group is the one that is responsible for management so you have got to look yourself in the eye and say can we afford to keep that up. Another factor I want mention that I have noticed in past hearings is that for some unholy reason, with a single stock, this has been considered a Chesapeake Bay problem. It doesn't pertain to other states and it was a Maryland versus Virginia problem. I would like to state emphatically that Maryland and Virginia are both very well aware of the problem as it affects us; and if you don't correct it, it is soon going to affect you. Thank you.

MR. BEAU BEASLEY: Mr. Chairman, I don't represent an organization. I just represent myself as an individual angler and as a member of the media, as a freelance writer who asks themselves what should I be writing about. First, I want to say thank you publicly to Brad. I called him with a couple of questions last week. I also sent an e-mail to Mr. Bowman who is represented in Virginia. I got very prompt responses.

As a citizen of the Old Dominion, I appreciate the fact when my state representative – I believe Mr. Bowman is the head of VIMS – answered my e-mail within an hour, which shocked me. I even commented to him – unfortunately, I started out by calling him the wrong last name, so he had to start out by correcting me. I appreciate the fact that he was so prompt.

I want to say to the committee that Mr. Spear also promptly followed back with me. I think it took about two days, which in today's time considering the workload that he and his colleagues are doing is pretty fast. One thing that troubled me greatly was – and I'm not a scientist. I'm just an angler. I'm kind of a barebones guy and I don't understand all the factors other than I understand junk in/junk out.

I'm not trying to insinuate that the model is bad. I'm saying it will only give you the information that you put into it; and if you don't change the reference points, you're not going to change the outcome. My question to Mr. Spear pointblank was if I'm going to explain to my readers what the state of the menhaden is so they can make an informed decision with regards to contacting their legislatures or not; what grade – because

the average angler doesn't understand fecundity and F and all the different factors, but they understand A through F – what grade would you give the menhaden status?

Mr. Spear was very honest. He said, "I really can't give you one. My question then to you as a board – and I'm paraphrasing now; he said we don't have enough information. I can't give you one. He was not evasive at all; he was very polite, very fast to answer. I did not get the sense he was choosing his words at all. He said, "We don't know. I can't tell you, I don't have enough information to give you a grade."

I respectfully submit to the board if you don't know what the grade of the menhaden is, how can you possibly say it is not being overfished? If you don't know what you have, how do you know how to manage it? Now I understand that – and he and I discussed the fact that menhaden have a nasty habit of moving. They don't stay in one place.

It is a lot like counting birds flying from one state to the next. As anglers we understand fish move, but I would ask you if this board is looking at information that is constantly saying that there are fewer and fewer menhaden, at what point does it have to get before you decide you have to do something?

As an angler I'm saying I appreciate the fact that you're having a public meeting. I appreciate the fact that you allow me and others to have the opportunity to speak. I am glad to see that there is a motion and the board seemed to be interested in perhaps visiting the reference points, but I would just say the trend is easy to track. It looks like to me this is down, and that is not the trend that we would all like to see.

I would also like to say as an individual recreational angler I have no interest, no interest in demonizing the commercial industry. They have a right to earn a living, so the commercial industry is not the bugaboo bad guy here, but they don't have a right to harvest more fish than the rest of the anglers and citizens in the coastal states can enjoy. Thank you.

MR. RANDY STEPHENS: Good afternoon. I'm Randy Stephens. I'm the president of the Tidewater Marine Trades Association. We're not a fishing association, particularly if you've ever been fishing with me because I never catch anything. I'm also a native of the Northern Neck, born and raised, still live there, have raised my kids there.

I do believe that this motion is a step in the right direction and I thank you for that. I also want it to be

known that time is of the essence. What I've personally experienced over the past 30 years living on and being around the Rappahannock River is there are substantially fewer sportfish and substantially fewer pods of menhaden.

We used to nearly walk across the Rappahannock River on them and now they are few and far between. I know that is not a scientific, technical thing, but my reality is what we see day to day. I used to manage one of the largest marinas in Deltaville, which is the third largest population of boats in the state of Virginia.

We got calls every day from anglers who were coming down to Deltaville to fish. They had three questions; is the wind blowing, what is the price of gas, and has the menhaden fleet been in recently, because everybody knew that when the menhaden fleet came through there was two weeks of terrible fishing to the point of no fishing.

That is a financial burden on the marine trades and that is why I'm here. The economics of this thing is something that probably gets overlooked from time to time, but right now the marine trades like many industries are having a very, very difficult time. The lack of sportfishing which is one of the largest revenue generators for the state of Virginia is going away and it is going away quickly.

The statistics back ten years ago were that the menhaden fisheries brought about \$15 million to the state of Virginia and at the same time sportfishing brought close to a billion dollars. It is an economic thing. Right now, speaking from the marine trades and someone who is personally going through it, everything that gets taken away that makes it more difficult, more challenging for people to use their boats affects our bottom line.

There have been seven marine dealerships in the state of Virginia in 2009-2010 that have closed, gone out of business completely; no chance of them firing back up. This is a very broad range, which you folks know, but I would reiterate that time is of the essence and I would like to see something move forward on it. Thank you.

CHAIRMAN LAPOINTE: That is the list of people who signed up, and I want personally thank all the folks who have spoken so far for observing my request for brevity. Are there

other members of the audience who want to speak before we bring it back to the board? Seeing none, board members, we have a motion before us. Are we ready for the vote?

The motion is move the Menhaden Technical Committee develop alternative biological reference points if possible for the August 2010 meeting. These reference points should include projections of the spawning stock biomass or population fecundity relative to the unfished level and a reference point associated with abundance.

The technical committee should present to the board a range of potential reference points that preserve the varying levels of spawning stock biomass. These levels of spawning stock biomass should be placed in the context of those that are currently employed for other stocks of clupeids and pelagic forage species.

The technical committee should develop a range of management strategies to achieve the reference points with, if possible, expected outcomes for yield and stock health. Request the Policy Board to task the Multispecies Committee to work with the Menhaden Technical Committee to account for predation in the alternative points.

That is the motion. All those in favor of the motion please raise your hand; those opposed, raise your hand. **The motion carries;** thank you very much. I want to thank everybody for the good discussion and I want to thank the audience members for their participation. We have a lot of work before us and we will revisit that or we will visit it again. The last agenda topic before us today is Brad Spear is going to give us an update on the aerial survey workshop.

UPDATE ON THE AERIAL SURVEY WORKSHOP

MR. BRADDOCK SPEAR: The aerial survey workgroup met in January for the third meeting that they have come together for. At this meeting it was a group of state and federal scientists along with a number of industry representatives from both the bait and reduction fisheries. There were two main topics discussed at the meeting.

One was spotter plane log surveys that had been developed in the Chesapeake Bay and the Narragansett Bay regions; and also to talk about a coast-wide adult index through an aerial survey. First, in the Chesapeake Bay the reduction industry there has collaborated with the NOAA Beaufort Lab

in collecting information from their spotter pilots that go out every week to survey schools of menhaden.

The Beaufort Lab has worked with the industry in putting together a survey that has potential as an index of abundance for the Chesapeake Bay. That survey has only been conducted in 2006, 2008 and 2009, so it is a short timeframe, but the workgroup does see some potential in that survey.

Some of their concerns about insuring that it is a scientifically defensible survey are the need for more quantitative data, including actual search time that the planes are out there looking for the schools and also the actual area covered by those planes. Both NOAA Beaufort and the industry have committed to working collaboratively in this upcoming season in 2010 and for the foreseeable future.

A very similar survey has been initiated in Narragansett Bay with the industry up there and working with Rhode Island DEM staff the survey began in 2008. In 2009 it was the case where the menhaden didn't actually move into Narragansett Bay, so the survey only went out once and collected no data that was useful. Again, there was commitment from the industry and Rhode Island DEM to continue that survey in 2010.

There was also discussion about another industry survey coming out of New Jersey. There is a company there that also uses spotter pilots, so that may be another potential source of information.

The second topic that was discussed was mentioned in the peer reviewers' recommendation, and that was possibly developing a coast-wide adult index by using an aerial survey. This is a topic that has been brought up by the technical committee consistently over the past few years as their biggest informational need for the assessment.

The group modeled their discussion after a survey that is recently initiated on the west coast for the Pacific Sardine Fishery. They use an aerial survey coupled with an in-the-water boat survey. We had invited the gentleman who designed that survey to come to the meeting, but he couldn't make it. Instead we sort of walked through the survey report that he has put together

and came up with a number of details that would constitute a survey for menhaden along the Atlantic coast.

We also costed out that survey. In the first year the cost would be about \$420,000 and that includes all the equipment, including the cameras and the computers to collect the data. In subsequent years the annual cost was estimated at about \$250,000.

The next step that the workgroup saw was sort of turning this framework design into a detailed design that would be statistically defensible and defensible through peer review. I just learned last week that there is a group that has taken an interest in this survey and has sent out an RFP looking for someone to do just that, turn this sort of framework that this workgroup has put together into a scientifically defensible survey. It is my understanding that they do have funding to pay a contractor to actually do that. This workgroup will continue to work with that group, and I will continue to keep you updated.

CHAIRMAN LAPOINTE: Thank you, Brad; questions for Brad? A.C.

MR. CARPENTER: Thank you, Brad. What is the potential and the difference between this and the LIDAR studies that we went through just a few years ago to estimate the population in the Bay; and as I recall was deemed as not a viable tool at that time. Can you help me get through that?

MR. SPEAR: This group did involve the LIDAR Survey in their discussions in the first couple of meetings. The technical committee has also talked about this as well and sort of I guess lowered it in their list of priorities for a couple of reasons; one of which is its cost. It would be more expensive to outfit planes with the laser. I guess there were limitations that were weighed and that also sort of lower the priority of a LIDAR Survey compared to human observers and video.

CHAIRMAN LAPOINTE: Other questions? When will we get another update from you?

MR. SPEAR: At this point there is no other meeting scheduled for the workgroup. Whenever there is new information to present to the board, I will bring that forward.

CHAIRMAN LAPOINTE: And the person or the group that has money you said to move ahead; is that moving ahead with the \$420,000 or the design of the survey?

MR. SPEAR: It is with the design of the survey. The group's name is Sustainable Fisheries Partnership. They also look for sustainable solutions and funding is part of that equation, so they are looking at this as a long-term project, I believe.

CHAIRMAN LAPOINTE: Great, thanks, Brad. Other questions for Brad? Bill.

MR. ADLER: Maybe under other business; I have to go back to the scientists again so it is not under aerial.

CHAIRMAN LAPOINTE: All right, any other questions on the aerial survey? We are under other business. I will go to Bill.

OTHER BUSINESS

MR. ADLER: Through all of this, I wanted to go back to the technical committee. When there was mention made of the southern section sees – I don't know if it is sees or catches or has or whatever, less than two-year-old fish and the northern second usually has more than two-year-old fish, I wanted to hear that again. That was one thing. The second thing I wanted to hear – actually it is the aerial surveys – the surveyors on the planes; are they like the fishing people, plane, pilot or are they a surveyor from a Division of Marine Fisheries people that actually do the surveying from the plane?

MR. SPEAR: The survey question, was that in relation to the spotter planes that currently go up or in this coast-wide design that has yet to be implemented?

MR. ADLER: Well, I think since we're looking at information that we have received, I would say the spotter planes that are up now. You also mentioned that there are in New Jersey, even. Do we have a Division of Marine Fisheries type surveyor looking out the window or is it an employee of the fishing company?

MR. SPEAR: With the Chesapeake Bay Survey, it is the industry pilots that are filling out their log sheets and submitting them to a federal scientist. In Rhode Island it is largely that same process, but the Rhode Island DEM staff has gone up into the plane a couple of times.

DR. LATOUR: Rivers and bays and estuaries along the coast all generally rear age zero menhaden. Every fall they sort of collect as one group over winter sort of along the coast of North Carolina. And as spring and summer and fall come, the distances that these fish migrate northward is dependent on how old they are, such that the younger fish generally don't migrate as far north as older fish.

If you imagine the states along the east coast north to south, you can expect to see a greater proportion of age one and two fish in sort of the Mid-Atlantic/Chesapeake Bay Region; a greater proportion of age three and four fish and maybe even beyond that in New Jersey, New York, that region. New England presumably, although we don't have a lot of collections there, would be sort of the extent of the migration, so that would be where your oldest fish would be.

This natural migration pattern within the stock is such that when you put the fishery activity on top of that, the fishery acting in New Jersey in the summer is likely to get more threes in their catch than they would if they were operating in the Chesapeake Bay, for example. It lends itself to the possibility of making geographical distinctions between the regions of harvest versus the types of harvest.

CHAIRMAN LAPOINTE: We're going to have plenty of technical questions as we meet in the future and so keep those in mind as well. Pete.

MR. HIMCHAK: Mr. Chairman, on the topic of the board having to make value-based decisions, I think – and if anybody took the time to go through 150 pages of supplemental materials, there is a common thread of concern – and this relates to ecological reference points, appropriately – to filter feeding value for menhaden in the ecosystem.

I'm just wondering exactly what does the board understand as far as the importance of menhaden in improving water quality. I draw particular attention to a timely publication – a 2010 publication. Dr. Latour is one of the authors. It talks about net removal of nitrogen by menhaden in Chesapeake Bay.

I was wondering if perhaps this could be circulated to board members and we could get some kind of a presentation at a future board meeting so that we're a little more educated, a little better educated into what their value is on the filter feeding end of things. This publication is most timely, and that's my request for the next board meeting.

ADJOURNMENT

CHAIRMAN LAPOINTE: Sure, Pete, thank you. Other questions or other issues before the board? I believe we are adjourned.

(Whereupon, the meeting was adjourned at 4:45 o'clock p.m., May 5, 2010.)