DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC STURGEON MANAGEMENT BOARD

The Marriott Norfolk Waterside
Norfolk, Virginia
October 18, 2017

Approved August 8, 2018

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ATTENDANCE

Board Members

Patrick Keliher, ME (AA)
Douglas Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Ritchie White, NH (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
David Pierce, MA (AA)
Mike Armstrong, MA, Administrative proxy
Raymond Kane, MA (GA)
Bob Ballou, RI, proxy for J. Coit (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
David Borden, RI (GA)
Sen. Craig Miner, CT (LA)
Mark Alexander, CT (AA)
Colleen Giannini, CT, Administrative proxy
Sen. Phil Boyle, NY (LA)
John McMurray, NY, Legislative proxy
Jim Gilmore, NY (AA)
John Maniscalco, NY, Administrative proxy
Heather Corbett, NJ, proxy for L. Herrighty (AA)
Emerson Hasbrouck, NY (GA)
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)
Tom Fote, NJ (GA)
Andrew Shiels, PA, proxy for J. Arway (AA)
Loren Lustig, PA (GA)
Roy Miller, DE (GA)
John Clark, DE, proxy for D. Saveikis (AA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Lynn Fegley, MD, proxy for D. Blazer (AA)
Ed O'Brien, MD, proxy for Del. Stein (LA)
Rachel Dean, MD (GA)
Rob O'Reilly, VA, proxy for J. Bull (AA)
David Bush, NC, proxy for Rep. Steinburg (LA)
Chris Batsavage, NC, proxy for B. Davis (AA)
Robert Boyles, SC (AA)
Malcolm Rhodes, SC (GA)
Patrick Geer, GA, proxy for Rep. Nimmer (LA)
Spud Woodward, GA (AA)
Nancy Addison, GA (GA)
Jim Estes, FL, proxy for J. McCawley (AA)
Sherry White, USFWS
Derek Orner, NMFS

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

Ex-Officio Members

Staff

Robert Beal
Toni Kerns
Katie Drew
Max Appelman
Kristen Anstead

Guests

Russ Allen, NJ DFW
Joey Ballenger, SC DNR
Mike Bednarski, Richmond, VA
Joe Cimino, VMRC
Allison Colden, CBF
Christopher Davis, VMRC
Michelle Duval, NC DNR
Lewis Gillingham, VMRC
Aaron Kornbluth, PEW Trusts
Lynn Lankshear, NOAA
Arnold Leo, E. Hampton, NY
Mike Luisi, MD DNR
Chip Lynch, NOAA
Dan McKiernan, MA DMF
Nichola Meserve, MA DMF
Chris Moore, CBF
Kathy Moser, NYS DEC
Brandon Muffley, MAFMC
Cheri Patterson, NH F & G
Kelly Place, Williamsburg, VA
Tim Sartwell, NOAA
Chris Wright, NMFS

The Atlantic Sturgeon Management Board of the Atlantic States Marine Fisheries Commission convened in the Hampton Roads Ballroom V of the Marriott Waterside Hotel, Norfolk, Virginia, October 18, 2017, and was called to order at 10:15 o'clock a.m. by Chairman Adam Nowalsky

CALL TO ORDER

CHAIRMAN ADAM NOWALSKY: Good morning. My name is Adam Nowalsky; this is my first Board as Atlantic Sturgeon Chair, first meeting. Before we begin the sturgeon portion of the meeting, I just want to extend a word of gratitude for the dinner last night to our host; and I'll just simply say everyone involved with the dinner last night, very well done and much appreciated.

APPROVAL OF AGENDA

CHAIRMAN NOWALSKY: We've got our Atlantic Sturgeon Board meeting here today. We'll first go ahead and begin with the approval of the agenda. I'll extend a word of gratitude again for those individuals who heeded our request at the last Board meeting for any items to put on the agenda. We were able to get a couple following our stock assessment report.

Are there any modifications to the agenda as presented here today? Seeing none; the agenda stands approved as provided.

APPROVAL OF PROCEEDINGS

CHAIRMAN NOWALSKY: The next order of business is to approve our proceedings from our August, 2016 Board meeting. Are there any modifications to those proceedings as provided? Seeing none; those proceedings stand approved.

PUBLIC COMMENT

CHAIRMAN NOWALSKY: The next order of business is Public Comment for any items that are not on the agenda. Max, did we have anyone signed up? No one signed up. I'll look to the audience. If anyone would like to make public comment for an item not on the agenda, please raise your hand. Seeing no hands raised; we'll continue.

2017 BENCHMARK STOCK ASSESSMENT REPORT

CHAIRMAN NOWALSKY: Our first order of business then to come before us will be the 2017 Benchmark Stock Assessment Report. That will then be followed by a Peer Review Panel report, and then we'll have to first decide whether to accept that for management use, and make a determination if there are any actions we want here today. We will have a presentation from Katie Drew on the Benchmark Assessment Report. We'll stop briefly for any questions about that before we move on to the Peer Review Panel Report that will follow. With that we'll turn to Katie.

PRESENTATION OF BENCHMARK ASSESSMENT REPORT

DR. KATIE DREW: Before I jump into the actual content, I just wanted to take a minute to acknowledge all of the people who worked on this assessment. This is a list of the Stock Assessment Subcommittee members and the Technical Committee members. If you want to look, their names are in much larger print on the actual assessment report. But I just wanted to point out this took a lot of time and effort on a number of different people's parts from federal and state agencies, and from academic institutions. We really appreciate all of the work and all of the data that went into this assessment.

I'm just going to go over some background information on sturgeon; and on the history of the fishery, the data and the models used, the results, stock status, and then some conclusions and research

recommendations. There is a lot to get through, so I'm just going to jump right in.

Obviously as we all know, sturgeon are anadromous; meaning they return to their natal rivers to spawn, preferring hardbottom and tidal fresh water. They spend the first few years of their life in their natal rivers and then in the estuaries; and then eventually moving off to nearshore coastal marine waters.

Fish tagged in the Mid-Atlantic have been detected from Cape Canaveral in Florida, all the way up to the Gulf of St. Lawrence; so they move extensively along the Atlantic Coast. They are long lived, and they are slow to mature. The maximum recorded age is 60 years. They are believed to be mature around Age 10, but it can be all the way up to Age 32 for females in the north.

Maximum length was 14 to 18 feet historically, but nowadays you mostly see them at 10 to 12 feet. They once supported one of the largest fisheries by weight on the Atlantic Coast; in the late 1800s and early 1900s. But landings have declined steadily since the beginning of the time series. This graph goes back to the 1880s, so you can see a peak there of about 3,000 metric tons.

There was a bit of an increase again in the 1950s through the 1990s; but you can see that the peak here on this inset graph only goes up to about 120 metric tons, so nowhere close to the 3,000 metric tons we were seeing back in the 1800s. Declines in this peak, this little tiny peak, are eventually what led to the 1998 moratorium on the Atlantic Coast, implemented by ASMFC.

In 2012, NOAA listed Atlantic sturgeon under the Endangered Species Act. On the basis of genetics they identified five distinct population segments. They identified the Gulf of Maine as threatened, and the New York Bight, Chesapeake Bay, Carolina and South Atlantic DPSs as endangered. You can see the range of rivers included in each DPS in this figure.

The last benchmark assessment for sturgeon was conducted by ASMFC in 1998. NOAA undertook two status reviews after that. The 1998 one was linked to the 1998 benchmark assessment, and found no listing was warranted. The one in 2007 was the basis of the 2012 listing determination; which brings us to today, and the 2017 ASMFC benchmark stock assessment.

This was done at both the coastwide and the DPS-level. We're still a data poor species here; so a lot of the issues that hindered the assessment in 1998, and in 2007, are still here for this species. But we were able to conduct some more quantitative analyses than the previous assessments. This assessment was peer reviewed through the ASMFC external process in August; and following my report we'll be receiving a report from the Review Panel Chair, on how they felt about all this.

In terms of data used, we tried to pull data from a number of different sources, including biological and life history data, landings data, bycatch observer data, fishery independent surveys, and acoustic tagging data. We also explored a number of different analyses and models; trend analysis, data poor models, genetic methods, a tagging model, egg-per-recruit analyses, and so forth. Stock status determination was eventually based primarily on the ARIMA trend analysis, the tagging model, and the egg-per-recruit model. This is what I'm going to focus on in my talk today. The rest of this information is available in the stock assessment report; if you really want to get into it.

One of our TORs was to develop estimates of bycatch. I'm going to talk about the bycatch data that we have now; and what we were able to come up with, with that.

Obviously, the moratorium stopped the directed harvest; but you still have bycatch in other fisheries. The information unfortunately is limited. We looked at two observer programs to develop these estimates; the NOAA Observer Program on federally permitted boats, which occurs from Maine to North Carolina in ocean waters, and North Carolina Estuarine Gillnet Observer coverage.

They were ranged from 2000 to 2004 all the way up to the present. This is kind of a modification of the methods that were used during the status review in the listing process; which is basically using a GLM to predict the number of sturgeon, based on things like species composition, year, and other factors. We did separate models for the otter trawls and for gillnets, and for the North Carolina and for the NOAA data.

This is kind of where the samples were occurring. The North Carolina is the colored figure up on the left; and that is the North Carolina estuaries, where the gillnet observers were in state waters. Then we used the coastal statistical areas for the federal program; which is shown in the grey with the red boxes. I think the important thing here is they are not really overlapping at all. We have the coastal water estimates and we have inshore estuarine waters from a state.

If we look at the gillnet data, the observers actually record whether that fish comes up alive or whether it comes up dead. We calculated the total number of sturgeon that would have been caught by these fisheries over the course of a year; and then we applied the observed proportion dead to estimate how many of those were dead when they were caught. This obviously doesn't include any post release mortality; but it's kind of a way to estimate the differences between what was actually caught and what was killed.

For the federal gillnet bycatch estimates, we're looking at about 1,100 fish per year on average were caught; with an average of about 295 fish or 25 percent being brought up dead in the observer program. This is the otter trawl bycatch data. You can see there is actually a much lower proportion of fish that were observed dead in this program; partly due to the lower sample size or the lower encounter rate in the otter trawl.

But in some years they did not observe any dead sturgeon, only live sturgeon. As a result, you get about the same number caught, 1,100 fish per year on average, but only about 41 were dead. In the North Carolina estuarine sturgeon bycatch, in their gillnet observer program, they are averaging about 4,000 fish per year were caught. Although that has dropped off to about 2,000 in recent years. But they only observed about 5 percent dead, so the average was about 200 fish per year; which means that estimates of total bycatch were higher from the North Carolina program, but the estimates of the dead bycatch were similar in magnitude because of the differences in the way the fisheries were prosecuted; you had a much lower mortality rate in the North Carolina program than you did in the federal program.

The other difference was that North Carolina and NMFS, the fisheries that they're observing are operating on two different components of the population. North Carolina is primarily capturing smaller fish in the 50 to 75 centimeter range, which is juveniles, and the federal program is observing mostly larger individuals from 100 to 200 centimeters, the adults; which makes sense because again they're operating in different locations and they're operating on different components of the population, where the juveniles are inshore and the adults are the ones that are in the near coastal waters.

We did want to note that observer coverage on the Atlantic Coast is not really sufficient to fully characterize sturgeon bycatch. There is no coverage south of North Carolina. There is no estuarine coverage outside of North Carolina; and overall a low percentage of trips are covered across the coast, even in the programs that do exist. This is a source of uncertainty, and a source that we need more data on for this species.

Obviously this is important, because the bycatch in these ocean intercept fisheries are intercepting fish from all different DPSs. This is a figure of the DPS proportion in each different fishery. We actually were for this assessment able to reanalyze some samples that had been collected from the directed fishery in the 1990s with current genetic markers; so that we could have a comparison to the modern DPS concept, which is that first bar.

What you can see is that pretty much even in the '90s, it was dominated by the New York Bight; but you are getting fish from the Gulf of Maine, Canada, the Carolina, and the South Atlantic DPS. This proportion has changed over time; so that the middle bar is the data from samples collected during modern times from the observer program.

Again, you can see that the New York Bight dominates, but we have fish from all DPSs, including now the Carolina DPS as well as more of a proportion from the Chesapeake Bay and the South Atlantic. The last bar is fishery independent samples from that same region. This has made it very difficult for us to separate total coastwide harvest down to the DPS level; because we know we have these intercept fisheries in the New York Bight area, and then we also knew they happened off of Carolina as well.

Because these proportions change over time, and because they're harvesting different components of the population, we can't really separate that total harvest back down into DPS level; which hindered some of our ability to apply data poor models. I'm going to switch gears from the fishery dependent stuff to the fishery independent stuff now; where we are still data poor.

Atlantic sturgeon is rarely encountered in the usual multispecies surveys that we use to assess our species. We looked at 50 surveys from state, federal, and academic research partners; and ended up eliminating 41 of them, mostly because they did not encounter sturgeon frequently enough. There would be one or two sturgeon in the entire time series. In addition, other surveys had inconsistent methods or gear changes, or incomplete time series that made them inappropriate for developing indices of relative abundance. This is the final set of indices that we ended up looking at for this assessment that we felt were acceptable and reliable enough.

I think what I wanted to really point out with this figure is that there is very few survey points below North Carolina. We don't have a lot of information on the South Atlantic DPS from fishery independent sources. The surveys caught primarily juveniles and small adults. Most of the fish that we were looking at were 500 to 1,500 millimeters total length.

Even the ones we accepted had low rates of encounters with Atlantic sturgeon. Only about 1 to 3 percent of the tows had Atlantic sturgeon in them. As a result the Panel recommended that indices with low numbers of Atlantic sturgeon should use sort of presence/absence instead of CPUE as the index; so looking at how the proportion of tows with sturgeon in them changes over time. That is what I'm going to show you for the rest of this presentation.

Again, we looked at a number of different trend analyses for these indices; but what we decided on eventually as the most reliable was the ARIMA, which is the Auto Regressive Integrated Moving Average approach, which you guys saw yesterday for eel, and it has also been used for river herring in our assessment framework.

It's basically a statistical technique that smoothes out the effects of auto correlation, and observation error and noise in a time series. That also lets us calculate the probability that an index is above or below a reference value in the time series; given the amount of noise that we see in the time series.

We looked at two reference values; the 25th percentile of the index, and the index value in 1998, the start of the moratorium, and asked the question "is the index in 2015, or the last year of the time series, higher than the 25th percentile of the entire time series, and is it higher than it was in 1998?"

What I am going to be showing you now are the smooth ARIMA indices for the different surveys that we looked at. For example, this is the Maine/New Hampshire trawl survey, which takes place in the Gulf of Maine DPS, and you can see that decline and some bouncing around over time. In the last year of the dataset, this index had a 51 percent chance of being above the 1998 value, and a 61 percent chance of being above the 25th percentile.

Similarly, this is the Connecticut spring and fall. The spring had a low chance of being above the first year, and the fall had a higher chance of being above the first year, and both were above the 25th percentile. This is the New York Juvenile Atlantic Sturgeon Monitoring Program, which is one of our few dedicated sturgeon surveys.

You can see the strong, significant, increasing trend in that; and it was basically above both the first year of the index and above the 25th percentile. Similarly, the New Jersey ocean trawl on the bottom had a very high chance of being above both the 1998 value, and above the 25th percentile. The Chesapeake Bay DPS was represented by the VIMS Seine Survey in the James River; which had sort of an up and down pattern here, and as a result it had a low chance of being above the '98 value of the index, but a high chance of being above the 25th percentile at least. In the Carolina DPS we looked at the Program 135, and split that down into a spring and a fall index, and a young of year and a juvenile index. The young-of-year index had high chances of being above both '98 and above the 25th percentile. The juvenile index again, was one of the few with a significant increasing trend, and had a 100 percent chance of being above both '98 and the 25th percentile.

The Program 135 had a lower chance of being above the '98 value; but was slightly likely to be above the 25th percentile, and the fall juvenile is another one that had a statistically significant increasing trend, and had a high chance of being above both the '98 value and the 25th percentile.

The U.S. Fish and Wildlife Cooperative Tagging Cruise actually ended in 2010; due to gear and method changes. It had a lower chance of being above the '98 value, but a slightly higher chance of being above the 25th percentile. The South Atlantic DPS was represented by the Edisto River Survey, and it had a low chance of being above the first year in the index.

It only goes back to 2004. It doesn't go back to '98, and a 51 percent chance of being above the 25th percentile. However, the TC members from South Carolina had some concerns about this index; and we felt it needs more work. It's not enough to throw it out, but it needs more work before we consider this a reliable index of what's happening in the South Atlantic.

For the coastwide index, we used a method called the Conn Method to combine all of the indices that we had into a single index. It basically tries to look and find a single underlying trend for all of these indices; and produces this index for the entire sort of coastwide metapopulation of sturgeon, which had a 95 percent chance of being above the '98 value, and a 95 percent chance of being above the 25th percentile.

What you can see is kind of actually something we've seen in a lot of our indices; which is decline through the '80s into the early '90s, and then beginning a slow uptick after the moratorium. In general what we were seeing with these indices is that the majority of the indices were above the 25th percentile that we looked at. All of them except NEAMAP were above the 25th percentile, which is good that it means we're better than we have been at some point in the past.

When we're asking the question of are we better than we were in 1998, that is have we improved since we started that moratorium? The results were a little more mixed, and some of them were above and some of them were not likely to be above that index value.

To switch from talking about abundance to talking about total mortality, I'm going to talk about the acoustic tagging data now. We were able to get data from 12 different researchers from academic and state agencies that tagged a total of 1,300 Atlantic sturgeons with acoustic tags. Acoustic tags of course are the ones that are implanted inside the fish; and send out a little signal that is picked up by receivers in arrays throughout the coastal waters of the Atlantic, which means that we don't have to wait for this fish to be caught to know where it went and whether it's still alive.

We were able to assign the fish that were tagged back to the DPS of origin; based on genetics for the most part, and we had fish from all five DPSs. Although the New York Bight was represented much better than some of the DPSs like the Carolina DPS, which only had 99 fish. That did influence some of the results that we saw. We used a Bayesian model to estimate the survival rate of tagged fish at both the coastwide level, where we pooled all the fish together, and at the DPS specific level, where we only looked at fish from a single DPS.

The larger sample size from the coast did result in less uncertainty at the coastwide level than at the DPS specific level, and DPSs with higher sample size had more precise estimates of survival coming out of the model. These estimates of survival were translated into estimates of total mortality; compared to Z benchmarks from the egg-per-recruit analysis to determine if total mortality rates were too high.

The tagging model can't separate natural mortality and fishing mortality or anthropogenic mortality; and it's just a measure of how many fish are surviving from year to year, and therefore how many fish are dying from year to year, without trying to attribute that to natural or manmade causes. That egg-per-recruit analysis was used to estimate essentially the level of total mortality, natural and anthropogenic that produces 50 percent of the egg production of a virgin population. This gives us a total mortality benchmark or threshold of the Z 50 percent EPR. This is similar to the river herring benchmarks and the shad benchmarks that were based on SPR or spawning stock biomass per recruit; but again using that concept of a total mortality rather than a fishing mortality benchmark. It's also similar to the menhaden fecundity reference points; which are in terms of F, but are in terms of egg production rather than SSB.

Because the inputs to the egg-per-recruit model are so uncertain, that is we don't have great estimates of size at age, or

maturity at age, or natural mortality, the Review Panel recommended that we draw these values from a distribution. What you can see on the left there is that distribution of size at age, of length at age, with the median value and then some uncertainty around it. That goes into then creating a distribution of the Z EPR value instead of a single point estimate, and so that histogram on the right is the 50 percent egg-per-recruit distribution, rather than a single estimate. The median estimate was about 0.12, with confidence intervals of 0.1 to 0.15. Basically the takeaway from this is that Atlantic sturgeon cannot sustain high levels of additional mortality. Even the uncertainty we have about the selectivity curves, about the life-history parameters involved, you're still not looking at a very large range of sustainable mortality for this species.

What I'm going to show you now are the comparison of the estimates of total mortality from the tagging model in gray. That's basically the distribution of the estimates of total mortality that came out of the tagging model; compared to the Z threshold, this red line here on the graph. What you can see for the coast is that the majority of that gray is below the Z threshold. That is good. It means there is only about a 6.5 percent chance that Z is greater than the Z threshold.

In this case it's essentially saying that total mortality is sustainable at the coastwide level. Whereas, if you start looking down at the DPSs, what you can see for the Gulf of Maine is that we have a lot more uncertainty in that distribution. It's a much wider distribution, and that probably has to do with in part the sample size that we have fewer tagged fish in the Gulf of Maine than we do across the entire coast. In addition, the median Z in the Gulf of Maine was higher, so it had an estimate of 0.3, and that resulted in a 74 percent chance that Z is above the Z threshold. You can see a lot more of that distribution is above the Z threshold.

The New York Bight had a median Z of 0.09, and only a 31 percent chance that Z is greater than the Z threshold. You can see the majority of that estimate, the peak of that estimate is below the threshold. The Chesapeake Bay had a median Z of 0.13, and a 30 percent chance that Z is greater than the Z threshold. The Carolina DPS had a median Z of 0.25, and a 75 percent chance that Z is greater than the Z threshold. The South Atlantic DPS had a median Z of 0.15, and a 40 percent chance that Z is greater than the Z threshold.

To combine sort of all of this into a stock status, we were looking at essentially two reference points here. For abundance we weren't able to develop estimates of abundance at the DPS level or at the coastwide level; because of the lack of data. We used sort of the index value in 1998 as a reference point; in order to be able to say, are we doing better or worse than we have been doing since the moratorium?

For mortality we used the 80th percentile of that Z egg-per-recruit distribution. The Review Panel recommended for both of these that status be presented as the probability of being greater than the reference point. Instead of just saying okay we're above or below a reference point, as we have in the past; we're going to say, what is the probability that we're above or below that reference point in order to better capture the uncertainty in the data here, which gives you this table.

I did apply some color coding to kind of help you read this a little bit; at the coastwide level, what you're looking at here is the coastwide level, the probability of being above your Z threshold is low, and the probability that your index is greater than the 98 value is high. That is good. That's what you want to see.

The flip side being something like the Gulf of Maine, where the probability that you're above your Z threshold is high; and you have a 50/50 chance, essentially of being above where you were in '98, or in this case 2000, because the Gulf of Maine survey didn't start until 2000. You can see that there is not a consistent picture across our DPSs; that some have low probabilities of being above the Z threshold, which is good, and high probabilities of being above the '98 value, which is good. But others have lower probabilities or higher probabilities for different scenarios.

But what we also wanted to point out is that we still do believe the stock is depleted relative to historical levels. We're doing better than we were in '98, for the most part, but we are still depleted relative to historical levels, and we don't want to let the shorter time series of the indices hide some of that.

Of course the South Atlantic we felt there were no suitable indices, so the biomass or abundance status is unknown in that region. But there is only a 40 percent chance of being above your Z threshold.

Overall, at the coastwide level, the population appears to be recovering slowly; at least relative to where it was in 1998. Overall at the coastwide level, mortality is below that Z benchmark. There is more uncertainty at the DPS level, and not all DPSs show the same trends for biomass or for mortality. One good sign is that the juvenile indices were actually where we saw the strongest positive trends; so that the species is as we discussed, long lived, slow to mature, it's probably in the juvenile indices is where you're going to see that recovery first.

This is still a data poor species. We have few dedicated Atlantic sturgeon surveys, and none of them for spawning stock biomass at the DPS level. They are rarely encountered in existing multispecies surveys, which may be a problem with the design of the survey. But it may also be a problem with that they're just at low levels, and we may see them more and more as the stock recovers.

In addition, we have very limited biological data at the DPS level, and not a lot of that is being collected on an annual basis. We don't have a lot of good information on growth and maturity, and mortality at the DPS level, or even at the coast level. The tagging data provide important information for this assessment on survival and on mortality.

That time series should be maintained and sample size should be increased, to better understand the DPS level dynamics, in terms of mortality. Because of that the TC recommends an update to this assessment in five years, and a benchmark assessment again in ten years, if improvements in the data have been made. With that I will take questions.

CHAIRMAN NOWALSKY: Thank you very much for that report, Katie. We'll turn to the Board for questions; before we go on to the Peer Review Panel report. The first hand I see is Loren Lustig. Let me go through, and while Loren's speaking if you would keep your hands up, I'll jot you down and nod to you that I've got you here. Go ahead, Loren.

MR. LOREN W. LUSTIG: I actually have two questions, so I would request a follow up. My first question is the more important one. I thank you for that excellent report. I was concerned about the bycatch mortality, 5 percent. Now I understand that it's complicated, because many trips there are not observed. That is a problem likewise. Did the Technical Committee offer any suggestions about how this small, but still important, mortality could be alleviated or lessened in any way?

DR. DREW: I think probably the most important thing would be to increase observer coverage; and to get a better handle on what's going on. I think there has been some work in terms of looking at factors that led to the mortality. We reported it sort of essentially as it is 5 percent across the board in the North Carolina gillnet fishery.

But there have been studies that looked at things like is it tied down or is it a free-floating gillnet? Is it the depth that you're fishing at? Is it temperature or things like that? More work can definitely be done on that to help you avoid setting your nets and gear in a way that's going to interact negatively with sturgeon. I think more work can also be done with the tagging data; to identify sort of hot spots or hot times of year when these sturgeons are vulnerable to the gears, to help provide information on how not to catch sturgeon.

MR. LUSTIG: My follow up question is can you give us any indication of what the disposition of these fish is; that being the fish that have died in the bycatch and mortality consideration?

DR. DREW: My understanding is that when the observers are on board that all goes back, and everything has to go back into the water now. There is no retention of sturgeon for any purposes. Whether or not that's happening when somebody is not onboard is of course hard to say. But right now it all goes back into the water, whether it came up alive or whether it came up dead.

CHAIRMAN NOWALSKY: Right, so let me run through the list of people that I have down so far. I've got Dave Borden, Mike Armstrong, John Maniscalco, Dave Bush, and Rob O'Reilly. Is there anyone else that I missed from there? We do have a hard stop later this morning for a luncheon; so we'll try to keep ourselves on schedule here. Dave Borden.

MR. DAVID V. BORDEN: Excellent report, Katie. In terms of the Gulf of Maine as I understand it, it's pretty much bycatch. What are the fisheries? What are the target fisheries that have the bycatch in the Gulf of Maine?

DR. DREW: In the Gulf of Maine I don't know specifically by the DPS. I think the other issue for the Gulf of Maine of course is the connectivity with Canada, where there is still an open fishery. Some of that mortality may not be fishing actually in the Gulf of Maine. It may be in Canada, where it is still open.

But in general I think we were seeing, with the gillnets in particular, it was a lot of monkfish and spiny dogfish. I would have to go back and look. We did it based on sort of species composition, so we do have the relationships between what was most likely to be caught in that fishery with sturgeon, so we could go back and look at that as well.

CHAIRMAN NOWALSKY: Mike Armstrong.

MR. MICHAEL ARMSTRONG: Katie, I'm trying to be clear. An EPR of 50 percent is a Z of 0.12. Then you apply 80 percent of that so really the reference point is 0.096?

DR. DREW: It's a little higher. It's the 80th percentile of that distribution; the slightly higher end of that distribution yes.

MR. ARMSTRONG: Okay so we're getting Z out of the acoustic tagging. Most of the acoustic tagging is on juvenile fish, so you expect Z to be higher? My question is, are we biasing Z a little high, unless there is a selectivity curve you use in the EPR calculation and all that?

DR. DREW: If we go back and look at the distribution of the tagged fish. It is actually a pretty good split between juveniles and adults. We basically sort of eyeballed this and said the 1,300 millimeters, so 130 centimeters is an adult. Below that it's a

juvenile. We had a basically almost 50/50 split between fish above and below a certain size. The other thing we did, I didn't mention this in the presentation, but that Z estimate is, so the egg-per-recruit estimate is an age-structured model.

Because we're using age-specific natural mortality in that model, we actually reported a N weighted average of that mortality over the sort of the range of ages that we thought we were seeing in the tagged fish, so that we know that mortality on the juveniles probably is higher than it is on the adults, because of that combination of natural mortality and then vulnerability to those estuarine inshore fisheries. We tried to balance that out when we were to present a Z that is directly comparable to what we think the Z that the tagging model is actually measuring in there is.

MR. ARMSTRONG: Okay, well I'm glad I asked. That's good. I wanted to be clear on that. We're being pretty conservative. I see a lot of good news in this report. When I see the big red boxes, I don't think it's quite as bad as all that. I mean we're heading in the right direction here for sure.

DR. DREW: Right, and the red boxes were dangerous, and that's probably why the Review Panel recommended just the percentages. The important part of that I think is that in some systems we are seeing higher estimates of mortality; and that may be a function of the sample size that we have. The Carolina and the Gulf of Maine were our two lowest sample sizes, and that's where we see more uncertainty, and therefore a higher probability of being above that. But there may also be DPS level sort of specific factors that could be affecting mortality as well.

CHAIRMAN NOWALSKY: Next I have John Maniscalco.

MR. JOHN MANISCALCO: Katie thanks for the presentation. I was just wondering if the Assessment Committee looked at how sensitive the coastwide Z was to different DPSs, because of the, we'll say overrepresentation of the New York Bight tagging data?

DR. DREW: We did discuss whether we would want to consider coming up with DPS specific estimates of the reference point; versus doing this kind of coastwide approach. I think initially when we were just reporting the point value, we were sort of looking at, and we did provide estimates for a southern region and a northern region. Part of the issue is of course we don't have really good biological data at the DPS level; so we know there are differences in the life history in the south versus the life history in the north. But there is not a lot of good data to help hammer that down. There was a little bit of a difference. I think when we were looking at the point estimates it was like 0.09 compared to 0.13 for the south. There were some differences, but we ended up just sort of folding that into this larger uncertainty about the overall coastwide Z estimate, because we don't have a good handle on DPS specific life history parameters. The data just aren't good enough.

CHAIRMAN NOWALSKY: David Bush.

MR. DAVID E. BUSH, JR.: Some of my questions were sort of answered. But I guess that leads me to a new question. It relates back to the mortality. I understand that during this you really didn't try to attribute it to any one particular source of mortality; just lack of information. But that still brings me back to the original point in here, and some of the stuff that I was reading.

Bycatch and ship strikes are usually the primary or assumed to be the primary sources of mortality. But then in another area it is suggesting that there is a

substantial unaccounted for source of mortality somewhere. Are there any thoughts or suggestions what that could be or might be? What tree do we start barking up?

DR. DREW: I think the bycatch and the ship strikes are certainly probably the two primary, easy-to-identify sources of mortality. I think there is also, you know there is the concern about maybe how much of the Gulf of Maine is moving into Canada, where this is a directed fishery. There is also the concern I think about some of the power plant impingement type stuff. Dredging, construction, all of these types of projects that interfere with slow moving coastal fish, as well as the potential for if not direct mortality then a loss of productivity due to the loss of spawning habitat, and the degradation of environmental quality. I think it's a lot of things that we've seen with eel, with shad and river herring, as well as for sturgeon. They're all vulnerable to some of the same issues.

CHAIRMAN NOWALSKY: David, do you have a follow up?

MR. BUSH: Yes just very briefly. The proportion changes that you've seen over time that is associated to this mortality. Is it possible that some of these proportion changes are just simply based on the fact that we have more or better data; versus what we originally had? Do you think there are other substantial changes that are in fact changes as well?

DR. DREW: I think that is one of the things that hindered the assessment; is that it is hard to tell the difference between are we seeing more sturgeon now, either more deaths, or are we seeing more sturgeon in the rivers or more in our surveys because we're looking for them, because we're paying attention, because the data are better, or is this a genuine sign of either increased ship strikes or increased mortality or increased sturgeon abundance? I think that is hard to say, and it's probably a combination of both.

CHAIRMAN NOWALSKY: Right, so I've got additional speakers, Rob O'Reilly, Pat Keliher, John Clark, and Roy Miller. Once those four speakers have had a chance, we're going to move on to the Peer Review Panel report and we'll have an opportunity for additional questions after that. Rob O'Reilly.

MR. ROB O'REILLY: Thank you, Dr. Drew. Mortality seems to be talked about quite a bit. My question relates to using total mortality. At this point I can see that that is a valuable way to look at this. But the questions about the bycatch mortality or non-harvest mortality, once there are more incidental-take plans put in place through the National Marine Fisheries Service; it's bound to generate more monitoring efforts. I know in Virginia we're on the threshold of having our ITP approved, and we're looking at our gillnet fishery, and so we've got about a year of monitoring so far.

I guess when you talk about the five year and the ten-year approach, with the ten year being another benchmark, and the need for additional data, I would guess that more states having the incidental-take plans approved will propel us towards that more data. Then I wonder once we do achieve more ITP in essence, does that mean that total mortality will be important to split a little bit, and look more closely at the bycatch mortality, or do you think that as we go forward in time, whether it's five years or ten years that just looking at total mortality will suffice?

DR. DREW: I think looking at the total mortality is important from fishery independent surveys like the tagging program; because that's an actual measure of how is that bycatch impacting the population? I think it is going to be important to monitor the levels of bycatch that we're seeing, and then seeing how that translates into total mortality, to get a

better handle on how important is bycatch to the total mortality compared to things like ship strikes, or things that we're not adequately monitoring?

How much of it is sort of an unseen source? I think definitely having the better data through the ITP permits is going to be critical. But I think we also need this metric of sort of this fishery independent source of measuring how that's actually impacting the population.

CHAIRMAN NOWALSKY: We will have more ITP discussion shortly. Pat Keliher.

MR. PATRICK C. KELIHER: Katie that's a great presentation with a lot of positives. I want to get back to a direction you went with David Borden. The Endangered Species Act, if I'm not mistaken, has within its laws political boundaries, in this case the boundary between Canada and the U.S. Your answer to David included information related to Canada, and bycatch in Canada. Why are we taking that into account, when we're looking at a DPS that should not include the country of Canada?

DR. DREW: We're really not taking it into account. But I think we're talking about it in terms of, it's a question that the Gulf of Maine is genetically distinct from Canada, so it is its own population. But we know those fish are moving back and forth with Canada; and in fact in the report there is a figure showing the breakdown of harvest in the Bay of Fundy directed fishery on a genetic basis, and it was about half Canada but still had a significant component of Gulf of Maine fish.

We know those Gulf of Maine fish are moving up into Canada, where they are vulnerable to other sources of mortality. It's something to consider and keep in mind that when we're trying to recover this population, it may not be solely a Gulf of Maine problem. It may also have implications for interactions with Canada.

CHAIRMAN NOWALSKY: John Clark. Thank you, Roy Miller.

MR. ROY W. MILLER: I just wanted to clarify something I thought I heard and that regards the disposition of animals killed as a result of bycatch. I think I heard that they're thrown back overboard. Did I hear that correctly? Katie is shaking her head yes.

DR. DREW: That is my understanding, yes.

MR. MILLER: Isn't there some better way to handle these animals? It seems to me if we have observer coverage, couldn't that observer be given a permit to retain a sturgeon killed as bycatch, so that we could get biological data? The reason I suggest that is that when sturgeon wash ashore in our state, either from ship strikes or fisheries interactions. That becomes a big deal.

The public gets involved, a biologist gets dispatched to collect the animal and gather data from it, if it's not too decomposed. Here we have access to animals that are dead; but not decomposed. They otherwise should be in reasonable condition for a post examination. Can't we make better use of that data?

DR. DREW: That's definitely one of the research recommendations from the Stock Assessment Subcommittee and the Review Panel; is to try and make that happen. It's a combination I think, of permitting issues that you need now that it is an endangered species, you need specific permission to be able to do anything with it, even if it's dead.

But there is also, you know the observer program is on a working vessel and that the sturgeon is not the target of the observer program. I think it has been in the past easier for them; they take a length and a weight, and then just throw that thing back

overboard, and move on to the commercially important species they're trying to observe. I think we certainly recommend that that is what happens and that the observer program consider giving more priority to sturgeon, and taking that kind of samples from sturgeon that they encounter in the process.

PRESENTATION OF THE PEER REVIEW PANEL REPORT

CHAIRMAN NOWALSKY: Okay, we'll now turn to Dr. Ballenger for a presentation of the Peer Review Panel report.

DR. JOSEPH BALLENGER: All right thanks for having me today. Thanks, Mr. Chairman. For those of you guys who don't know me, I'm Dr. Joseph Ballenger. I'm from the South Carolina Department of Natural Resources. I was the Chair of the recent Review Panel; Independent Review Panel for the Atlantic Sturgeon benchmark stock assessment.

As Katie just said, we all are intimately aware there was a benchmark stock assessment conducted on Atlantic sturgeon. Where we came in, a Review Panel was convened, including myself and three additional technical reviewers, with expertise in sturgeon biology, statistics and population dynamics in stock assessment modeling, with the express goal of doing a scientific review focusing on the data inputs to the assessment, the model results and sensitivity regards to major model assumptions, and the just general overall assessment quality; with the ultimate products being both the stock assessment report and an accompanying Review Panel report that will be shortly I believe, posted to the ASMFC website.

In addition to myself, I was also joined on the Review Panel by Dr. Rod Bradford from the Population Ecology Division out of Canada Department of Fisheries and Ocean, Dr. Selina Heppell from Oregon State University's Department of Fisheries and Wildlife, and Dr. Rob Ahrens from the University of Florida Fisheries and Aquatic Sciences Program.

We convened, as Katie mentioned, in August, 2017, to review the assessment. I'm just going to go over very briefly our major findings. We did find that the suite of assessment analysis provided by the Stock Assessment Subcommittee and the Technical Committee provides the best available science at this point in time for Atlantic sturgeon. However, as Katie mentioned several times, the paucity or lack of data precluded the application of more traditional stock assessment techniques; except at perhaps the coastwide level.

There really is a genuine lack of data. We need some more information here. But the bottom line if for a stock-status determination, the Review Panel felt comfortable saying that the stock was depleted relative to historical levels, based off of results from the effective population size and stock reduction analyses. I'm not going to talk about those in depth here.

We also felt though on a good note is that total mortality in recent years seems to be generally below the threshold levels, as being proposed, and it seems from the relative abundance indices trend that it would have a stable to increasing relative abundance overall, generally speaking.

The Review Panel was actually tasked with going through the terms of reference and making specific comments regarding each TOR, the first of which was to evaluate the appropriateness of population structures defined in the assessment.

The Review Panel made some conclusions regarding this saying that there seems to be a body of evidence that suggests that complex metapopulation structure along the Atlantic Coast for this population was

sort of this network of small, semi-discreet, subpopulations, being connected through some type of migrational movements.

Generally speaking it seems like the genetic designations of the distinct population segments are sound; although it is likely there is going to need to be some refinements to the genetic baseline in the coming years, to better understand spawning tributary membership within the DPS units, particularly between the Carolina and South Atlantic DPS units.

That said there are a lot of challenges to actually conducting or running an assessment on Atlantic sturgeon actually at the DPS or river level. This is because we have, as I mentioned earlier, insufficient life history information, particularly within individual DPSs. Most of the life history information we do have derives mainly from the New York Bight area.

We've also seen an identification of new or more widespread spawning behaviors than we might have thought previously existed; including potentially higher incidents of straying between natal rivers, and also this identification of false spawning runs in some systems. We also feel that the lack of coordination between the U.S. and Canadian Atlantic sturgeon assessment research could be possibly hampering our understanding; particularly of what's going on in that Gulf of Maine DPS.

Finally, we have difficulties partitioning current sources of anthropogenic mortality, whether that's coming from bycatch, ship strikes, or other means to individual DPSs. Given that we recommended for the assessment that the Assessment Team focus on assessing trends and mortality, total mortality at the coastwide level for the assessment.

Then to support research that would advance our ability to assess the population of finer spatial resolutions into the future. Further, we would need to refine the DPS construct to better define spawning tributary membership; particularly as I mentioned earlier in the Carolinas and South Atlantic units.

For Term of Reference 2, we were asked to evaluate the adequacy, appropriateness, and application of data used, and the justification for inclusion or elimination of data sources. Overall, the Assessment Team and the Stock Assessment Subcommittee should be commended for a thorough collection and evaluation of the available data. That said, coming out of Katie's presentation, the data that ultimately was deemed suitable for use in the assessment emphasizes the data poor situation of Atlantic sturgeon; relative to many other U.S. managed marine and riverine resources. Particularly evident was a lack of data available from the South Atlantic DPS. There was also not enough adult fish were not adequately represented in most of the datasets. Very few adults were showing up in the datasets. We have no information on the age structure, or the age structure is not sufficiently documented for any DPS to really do an age-based analysis.

In regards to specific data streams, [the review panel] made some comments regarding specific data streams, and I'll start first with fishery removals. The Review Panel had some concerns there are several potential sources of bias in the historic landings dataset. As chief amongst those being that we have really an incomplete catch history, as we know that Atlantic sturgeon harvest began prior to the 1880s, but we just don't have any information about how much was landed prior to this point in time. We also understand that particularly in the earliest part of that historical landings stream that annual landings estimates are probably being influenced by under or over reporting, depending on what portion of the coast they decided to sample in a given year.

Then there is also just a general lack of information on sizes harvested; and if the sizes of harvested fish changed dramatically over time. We concurred with the Assessment Committee with regards to the removals time series that it is hampered by the inability to separate those removals to individual DPS units, with some acknowledgement that seems the center of the fishery is shifting over time, so the relative impact on the harvest on different DPSs is likely changing through time.

In regards to the indices of relative abundance, I hope it is abundantly clear by now that there is very few surveys that are specifically designed to catch Atlantic sturgeon. Given the surveys that we did end up using an assessment model, some surveys appear to be DPS specific, giving survey location and age which encountered.

But for those ocean or estuarine surveys, it's unclear what proportions of the DPSs are actually encountered in those surveys. We need to address this with concurrent genetic sampling of any Atlantic sturgeon sampled in those surveys in the future. Here is just once again that same map that Katie showed earlier, showing that we have basically three riverine surveys, and then the rest of the nine surveys are mainly coastal or estuarine in nature. They are probably mixed stocks [surveys].

The Panel also expressed some concern regarding the suitability of the Conn method to develop a coastwide index. Although this method has been used and advocated as a means to combine geographically separated indices in other studies, and on average it appears to provide unbiased results. It's not very clear in what situations it does produce biased results. That said, the Review Panel didn't have any other viable option, or couldn't come up with another viable option to come up with a coastwide index, so at this point in time we did feel that it represented the best available abundance trend for the coastwide [population].

The Review Panel also made some specific recommendations. We recommend, although the Assessment Team originally recommended excluding these indices, we recommended including the New York Juvenile Atlantic Sturgeon Survey, the NEAMAP Survey, and the South Carolina Edisto Surveys and Trend Analyses.

They were originally for the most part, my understanding, eliminated because of the relatively short time series for these surveys. But because these are primarily small juvenile relative abundance trends, we thought there was some value in including these in the assessment. We also made some specific recommendations about how to actually standardize the different relative abundance indices, recommending use of a binomial error structure for surveys that have low encounter rates and small catches of sturgeon, when they actually were positive.

We did this for six of the nine surveys; and we recommend using these in subsequent trend analyses in development of the coastwide index. I believe that is the results that Katie presented on earlier were those recommended changes.

Term of Reference 3, we were asked to evaluate the methods used to develop Atlantic sturgeon bycatch estimates. Panel conclusions; the bycatch series posited should not be used as a time series of relative abundance, and the Assessment Team also recommended this as well. This is because it's plagued by a lot of the same issues; we have a lot of other fishery dependent data sources including inconsistencies in sampling, not to a full understanding of the responses of industry to regulatory changes and how that could affect catchability or selectivity, and some uncertainty about DPS compositions or catches.

Further, DPS composition of the bycatch is needed if assessment/management at the DPS level is to be pursued into the future. The Panel also felt that bycatch mortality was likely underestimated overall. The bycatch estimates that we do have were derived from a subset of fisheries that are interacting with Atlantic sturgeon; and those fisheries had generally limited observer coverage in oceanic fisheries, with no information from many inshore, estuarine, and riverine fisheries.

There was also difficulty in defining effective effort on unobserved trips. The current bycatch estimates do not account for the possibility of delayed mortality of Atlantic sturgeon, once they are replaced back in the environment. They are affected by underreporting or inappropriate survey methods, and we know that the time series of bycatch estimates are incomplete, because the earliest bycatch estimates we have are from 2000. Recommendation from the Panel is to take measures to try to include additional fisheries, in order to increase a geographic scope of our understanding of bycatch, particularly in the Gulf of Maine and in estuarine/riverine areas.

For Term of Reference 4, we were asked to evaluate the methods and models used to estimate population parameters and biological reference points. Overall, as I said earlier, the suite of models available to the Assessment Team was somewhat limited, due to the inability to conduct age-based analyses. Simply put, the age data were just insufficient to do age-based analyses. Given these limitations, the Review Panel did agree with the decision to evaluate total mortality estimates from the acoustic tagging model relative to egg-per-recruit reference points as a means to sort of assess sustainability of recent mortality rates.

We also agreed with the use of the ARIMA models to evaluate recent trends in abundance, or endorse those approaches. One of the main things that are hampering this assessment is that the representativeness of life history parameter estimates at a coastwide, or individual DPS level is a significant source of uncertainty in the current assessment. We must get some better information regarding life histories from other areas, and more recently. A primary recommendation coming out of the Review Panel was to collect contemporary life history information from all segments of the population.

In regards to the acoustic tagging model specifically, the Review Panel felt fairly strongly that the uncertainty in those total mortality estimates are likely to improve in the short term from these models. As the length of the time series increases and as more Atlantic sturgeon are tagged. Those uncertainty estimates improve both at the coastwide and at the individual DPS level, and it will improve for estimates for juveniles and adults. We did recommend using the median Z estimates from the tagging model as point estimate for current Z instead of the more normal measure of central tendency of mean, simply because we saw those skewed distributions that Katie was showing earlier.

Here are just a couple of examples, the same thing from her plots showing the skewed nature of those distributions. These are actually from the two DPSs with the highest number of tagged fish. It gets a little bit more skewed for some of the other DPSs.

For the ARIMA model or the trends analysis, the use of the ARIMA model is the most suitable for the trends analysis, because from the Review Panel's perspective it did allow you to account for a potential autocorrelation in the indices values from year to year, as well as it provides a built-in mechanism for a probabilistic determination of likelihood of population increase relative to some predefined reference point.

Katie and I talked on this, but the Assessment Team also did a power analysis. The Review Panel felt this was very useful to actually investigate the potential utility of the surveys we are including in the model for the general result, suggesting that due to levels of uncertainty the ability to detect trends from those surveys may be relatively limited in the short term. Then finally the Mann-Kendall Test just allows us to once again address some probabilistic assessments of increase.

The Review Panel did have some concern regarding the robustness of the egg-per-recruit analyses, and reliance of management on the single point estimate of Z 50 percent as Katie alluded to in her presentation, due to two primary sources of uncertainty, namely the uncertainty of life history inputs and uncertainty in the bycatch and ship strike selectivity at size and age.

During the Review, we asked the Assessment Team to evaluate some different assumptions about age at maturity and/or bycatch selectivity; which ultimately suggested some substantial or moderate uncertainty in the Z 50 percent level. This is the same graph that Katie showed earlier, suggesting there is some uncertainty in that estimate, and hence we recommend taking that probabilistic approach.

The Review Panel also felt there needed to be some justification for the choice of the Z 50 percent as a threshold or target egg-per-recruit level. We should both explore how sensitive the reference point level is to different assumed threshold and target egg-per-recruit levels, and the choice of the most appropriate threshold or target will likely require additional research.

We also recommend using that probabilistic approach to define egg-per-recruit percent levels; whatever percentage you want to manage to.

For Term of Reference 5, we were asked to evaluate the methods used to characterize uncertainty in the stock assessment in regards to the mortality status. We felt that with the tagging model, as presented, appropriately incorporates uncertainty into recent total mortality estimates given that it's a framework. We did recommend including those visual or summaries of the posterior distribution of Z to give a better representation of the uncertainty. Then I've said this several times, but basically those total mortality estimates, coming from the posterior and recommend uncertainty incorporation of egg per recruit, allows the analysis for total mortality determination to be assessed probabilistically, as far as the biomass and abundance status.

The ARIMA analysis has a built-in framework that allows, once a risk tolerance is specified, to monitor population trends relative to an accepted reference point, so we felt this was good. The Review Panel thought that monitoring total mortality using acoustic tagging models in the short term will provide a better measure of anthropogenic mortality impacts on recovery than trying to directly monitor sources or individual sources of anthropogenic mortality, meaning directly monitoring losses due to bycatch, ship strikes, et cetera.

This is because it's going to take a lot of resources and a lot of extra expended effort to get those datasets into a situation to where they can be really used in a more traditional stock assessment approach. As I mentioned earlier, we also think in the short term the utility of those tagging model estimates are expected to increase as uncertainty in those total mortality estimates are reduced.

We also think that by addressing the previous concerns regarding the egg-per-recruit analysis, basically building on some of those life history and selectivity

uncertainties, it could be useful for actually informing potential recovery targets into the future.

There is still some uncertainty as to what the most appropriate index-based reference point to use as a measure of current stock status. As Katie alluded to, they used either the start of the moratorium, or the closest year they had to the start a moratorium, or whether it was above the 25th percentile of the overall index. The Panel didn't have any specific recommendations on other reference points to use. That is something that could be considered in the future though.

We also agreed that we should not use the results of the stock reduction analyses, which you can find in the report as a measure of biomass or abundance status. These results were suggesting a more rapid increase in abundance of the Atlantic sturgeon population coastwide in recent years than what we were seeing in any of our indices or any of our other analyses, which most likely suggests that there are unaccounted for sources of mortality that we're not accounting for in those models.

We also said that for the acoustic tagging models, although in the short term they are our favorite approach to assess total mortality, for them to be viable in the long term, there must be maintained and sustained effort to tag additional fish coastwide. We also should expand resources to do as much as we can, to maintain or expand current acoustic receiver arrays coastwide.

The Review Panel also felt the specification of a risk tolerance by managers would inform choice of the ultimate reference point from the egg-per-recruit analysis, and mortality status determination. Finally, the ultimate choice of the biological reference points should be informed by management goals and target recoveries.

Overall, regarding status determination, the Review Panel concurred with the assessment that the abundance of evidence suggests the abundances are likely increasing slowly coastwide. However, Atlantic sturgeon remains depleted relative to historical levels. The Review Panel was cognizant and recognized the difficulties posed by just the limited information the Assessment Team had, and lack of DPS specific recovery targets. We did recommend that additional research be conducted to identify appropriate reference points for future status determinations and recovery targets, and to develop metrics used in status determination to be presented as probabilities, as Katie showed you earlier.

I've mentioned several times and Katie has mentioned several times, but as far as research, data collection, assessment methodology recommendations, the primary thing is that there is still a severe data limitation that currently are restricting the type, scope, and usefulness of assessment methodologies that can be applied to Atlantic sturgeon.

There is an incomplete accounting of temporal and spatial variability and life history parameters. There is an imperfect understanding of temporal or spatial organization of the metapopulation structure. There seems to be major uncertainties in the scope for direct harm arising from interaction with ongoing human activities; whether that be through bycatch, ship strikes, et cetera.

Just to highlight that the Review Panel went through a little bit of a data gaps analysis, they put a table together in the Review Panel report to quickly try to highlight some of the primary data gaps we have for Atlantic sturgeon. With regards to life history, we basically don't have very much life history data at all. The vast majority of it

is coming from the New York Bight area, and even that data is fairly dated at this point in time. We need more contemporary studies of life history. In regards to surveys or monitoring work, we are lacking surveys on juveniles and adults in some specific DPSs; and we are lacking any survey of spawning adults throughout the entire coastwide range of Atlantic sturgeon. This should be a high priority moving into the future to improve our understanding of Atlantic sturgeon.

We also, as we talked about earlier, only have limited bycatch information. We have no local bycatch monitoring in the Gulf of Maine, New York Bight, or Chesapeake DPSs. Further, the number of acoustic tags used in our mortality estimation varies, depending on DPS and the number of genetic samples used in the definition of that genetic baseline varies from DPS, and likely sample size needs to be increased. Overall, once again just reiterating the suite of assessment analyses provides the best available science.

The overall conclusion is the stock is depleted relative to historic levels. The current total mortality is below threshold levels and coastwide Atlantic sturgeon populations seem to be exhibiting stable to increasing relative abundance since the moratoria. We concurred that the general timeframe should be to conduct an assessment update in five years, and a benchmark assessment in ten years; assuming that some of these data improvements are made over this time period. With that I would be happy to answer any questions.

CHAIRMAN NOWALSKY: Okay, so thank you very much, Dr. Ballenger, before we get to questions I will just highlight that there was a Atlantic sturgeon Stock Assessment Subcommittee and Technical Committee did meet and provided a supplemental report that is in the meeting materials for some of the items that the Peer Review had highlighted. A number of those were touched on in Katie's report, I believe as she went through that. But just did want to highlight that for everyone. Again, I want to highlight that we do have a hard stop this morning. I do have a couple of additional agenda items. I'll allow a couple minutes at this point for any questions for Dr. Ballenger about the Peer Review Report. I would ask that they be geared specifically towards informing the Board about the decision point we'll have, about whether or not to accept this for management use and request that. With that do I have any hands for questions for Dr. Ballenger at this point?

CONSIDER ACCEPTANCE OF THE BENCHMARK ASSESSMENT REPORT FOR MANAGEMENT USE

CHAIRMAN NOWALSKY: Okay, seeing none; we'll next turn to the Board for consideration of acceptance of the Benchmark Assessment Report for management use. Chris Batsavage.

MR. CHRIS BATSAVAGE: Yes I would like to make that motion that should be coming up on the board here shortly. I guess before it does, I would like to just express my appreciation to the Technical Committee and the Stock Assessment Subcommittee and everyone else who worked pretty hard on this assessment over the last few years.

As you saw one of the earlier slides, it was literally a cast of dozens, at least a couple dozen. Without me adlibbing, hopefully there is, here we go**. I move to approve the 2017 Benchmark Assessment for Atlantic sturgeon and Peer Review for management use.**

CHAIRMAN NOWALSKY: Thank you, Chris; do I have a second to that motion? Seconded by Doug Grout, discussion on the motion, okay before we take action on that I'll simply turn to the public momentarily. Are there any comments from the public on

this matter? Seeing none; back to the Board. **Is there any objection to the motion? Okay seeing no objections; the motion stands approved.**

CONSIDER MANAGEMENT RESPONSE TO THE STOCK ASSESSMENT REPORT AND PEER REVIEW REPORT

CHAIRMAN NOWALSKY: At this point we would entertain Board discussion about Management Responses to the Stock Assessment Report and Peer Review Report. Bob Ballou.

MR. ROBERT BALLOU: I'm not so sure if this is so much of a management response, but it's a curiosity that occurs to me as both Dr. Ballenger and Dr. Drew spoke about the lack of data from the South Atlantic. Associated with that the rejection of SEAMAP as a survey, based on the rare occurrence of sturgeon, yet NEAMAP was accepted; obviously because there must have been more of an occurrence of sturgeon in the survey results.

What are we to make of that? Are SEAMAP and NEAMAP surveying in the same way, and SEAMAP is just simply not encountering any sturgeon, or is there something about the SEAMAP methodology that differs from NEAMAP that might help explain the lack of data resulting from that survey, and therefore it's non-availability for use in the assessment?

DR. DREW: Sure, good question. We did look at SEAMAP, and they had very rare occurrences of sturgeon; so I think they caught maybe one or two over that entire 30 year time series of SEAMAP, whereas NEAMAP actually was getting semi-reasonable numbers for that. I think it does have to do with they are using different vessels, and they're surveying in different areas.

I think it may be a combination of the differences in the techniques that the SEAMAP is using that kind of shrimp trawl vessel, and it's just not able to interact with those larger fish the way that NEAMAP, which is using a larger vessel, is able to, and a different set of strata. I think it's just the SEAMAP is not good enough to capture sturgeon in ocean waters, whereas NEAMAP is a little more successful at it.

CHAIRMAN NOWALSKY: Okay so I've got three hands right now. I've got Mike Armstrong, Lynn Fegley and John Maniscalco. I would request again comments geared towards management response by this Board. Mike.

MR. ARMSTRONG: It's clear somewhere direction needs to come to improve the data. I've seen time and time again with species, where we get reports like this and there is no correlated effort to move things forward. I would suggest, I don't know how we move forward with it, but the TC can give us guidance of where is the biggest bang for the buck? Is it more acoustic tagging? I would suspect that's the easiest to pull off.

Is it going to improve the estimate? Life history looks like it is desperately needed; that will be a tough nut to crack. But anyway, I just wanted to throw that out there. If we want better data, if we don't want all this uncertainty, we need to move forward. Of course it will cost money, and I don't know where that comes from.

CHAIRMAN NOWALSKY: With that comment, let me turn to staff with the question of would there be any benefit to specific TC tasking on any items here today; or discussion at a future Board meeting? Is there any TC tasks in the hopper that will help inform a lot of these research questions moving forward?

MR. MAX APPELMAN: I think the task that Mike is bringing up is certainly valid; and just having that general agreement as part of this discussion on the record, to have the TC look into where to focus data collection

efforts is certainly something that can be done before the next meeting of this Board.

CHAIRMAN NOWALSKY: Is there any objection from the Board to having Max work with the TC on that moving forward; an objection?

MR. BATSAVAGE: No, Mr. Chairman, not an objection. But I think to that point, with sturgeon being listed as endangered and threatened, I think we need to keep in mind that in addition to money needed to conduct this research, we also need permits through the Endangered Species Act.

As we'll hear in just a few minutes that is not easy task. I think that is something the TC should probably highlight as well, as far as research needs. I guess maybe just kind of manage our expectations, as far as how we can get some of this stuff done, just due to the constraints under the ESA.

CHAIRMAN NOWALSKY: Next up I have Lynn Fegley.

MS. LYNN FEGLEY: Just to follow up on Mike's point about tasking the TC. There was a note in Dr. Ballenger's presentation about the necessity to maintain and potentially expand the acoustic array. I just wonder if there is a way for the Board to understand the status of that array; how it's faring. Are there budgetary constraints, and if there are some levers that can be pulled somewhere to help make sure that array stays in place?

CHAIRMAN NOWALSKY: I'll look to anybody up here at the table, or around the rest of the room to comment on the acoustic array. Katie.

DR. DREW: Part of the issue is of course that it's not a single, like there is no single entity maintaining this array. It's actually a patchwork of different arrays held together by different researchers. But I think as part of the TC task, we could also look at as part of the sourcing this data, we definitely reached out and tried to get in touch with as many people as possible.

We could definitely follow up with some of that and see how are things going, where are arrays now, where do people expect to lose funding or gain funding in the future? That could help sort of give a status report on the array as it exists.

CHAIRMAN NOWALSKY: John Maniscalco.

MR. MANISCALCO: I was just wondering what the Board could do to improve information sharing with Canadian fisheries that seem to be an issue for the Gulf of Maine.

CHAIRAMN NOWALSKY: Is that something the TC could look into and respond? Okay well thank you very much for that discussion. I think we've got something we could move forward with. Do we expect that we would hear back and schedule a Sturgeon Board meeting for the winter, or not until the spring?

EXECUTIVE DIRECTOR ROBERT E. BEAL: It seems we're coming up with a pretty extensive list for February already. If the Tech Committee can get their work done and it fits into the February meeting, we'll put it on there. Since it's a long term research project, it may not be as urgent as some of the other things that have to be tackled in February. You may have to push it to the May meeting, but we'll see what we can do.

CHAIRMAN NOWALSKY: Okay, so we're going to move on to the next agenda item then. With the consent of the Board I would like to flip flop Items 5 and 6. We do have the Atlantic sturgeon Coordinator here from GARFOs Protected Resources, unless there is any objection from the Board, I would like to give her the opportunity to do

her presentation on the update of the progress on the ESA five-year-status review and development of recovery targets. We'll turn to Lynn. Thank you.

UPDATE OF THE PROGRESS ON THE ESA FIVE-YEAR STATUS REVIEW AND DEVELOPMENT OF RECOVERY TARGETS

MS. LYNN LANKSHEAR: Thank you very much. I also wanted to recognize our counterparts, my colleagues in the Southeast Regional Office, with whom we share Atlantic sturgeon management under the Endangered Species Act. Once a species, subspecies or a distinct population segment of a species or subspecies is listed under the endangered species act, we, NOAA Fisheries, must undertake a review at least once every five years to consider new information since the listing, and then make a determination as to whether that listed entity should be reclassified under the ESA, or delisted. Since of course we were at that five-year mark for the Atlantic sturgeon DPSs, We are beginning that process of five-year review.

Any five-year review, one of our first steps is to publish notice in the Federal Register that we're undertaking the review, and to ask any members of the public to submit relevant information. The public notice will also give specifics on how and what information should be submitted, just in terms of providing biological information or any other information that needs to be considered. This is not a public comment period; so it's not an opportunity to comment on any past actions or any that the public may anticipate that we would be taking in the future. It is specifically to solicit information for the five-year review. There will be a deadline in that notice for when we would like the information. Again, that's just to help make the review process as expeditious as possible. However, it is important to remember that we will accept new information at any time.

We don't want folks to read that notice and then have something new come out, and withhold it, thinking that we can't consider it for the review. Again, any information that is available can be submitted to us at any time; both during this five-year review process or any time outside of a review process.

For species without recovery plans, this of course is where we're at right now with our Atlantic sturgeon DPSs, we analyze the available information relative to the definitions of endangered and threatened in the Endangered Species Act, and to those same five listing factors that we considered when they were originally listed.

It is very important to remember – we want this message to go out to as many people as possible – that the five-year review does not make any change to the listing. While the language in the ESA specifically says that the five-year review process ends with a determination about whether the species should be reclassified or delisted; we make that determination in the five-year review document, but it has no immediacy of affect. What that would mean, if it does determine that some change is needed, is that we would have to then do a proposed rulemaking with opportunity for public comment, and then considering all such comments and going out with a final determination.

Again, for our Atlantic sturgeon distinct population segments, our plan of course will be to review the information; and then draft the five-year review internally with NOAA staff, to use the stock assessment as one of our primary sources of new information, to request the Sturgeon Technical Committee to peer review the draft five-year review.

Again, five-year reviews do not necessarily need to be peer reviewed; but our

expectation at this point is that we will have it peer reviewed, and request that through the Sturgeon Technical Committee.

Then what may be subject to change, but at this point we're looking at completing one review document for all five DPSs. Again, that may change if we find that there is an abundance of information available for one DPS versus the others, and just as a matter of timeliness we may complete some before another one that needs further consideration. I just put this in so we would have something to reference to, but once the results are available they will be posted on our Office of Protected Resources website, as well as the regional websites.

Just for your information, for five-year reviews there is additional information there about templates that we follow and the guidance that's available. Our other step, which I alluded to at the beginning is recovery planning. We have not yet begun recovery planning for the Atlantic sturgeon DPSs. Recovery planning is also required, and the purpose of that is to put plans into place that guide our consideration of how the species will be recovered, and when we would consider those recovered to warrant delisting from the Endangered Species Act. Again, we're in the beginning stages of that. Part of that is to consider whether to do separate plans, one for each DPS, or some combination of the DPSs together. Part of that consideration in large part is that we are looking to involve a variety of subject experts in these plans. We want to make sure that we use their time in the best way possible. We don't want to call a group of experts in for one plan, and then have to subsequently call them in again for another. Some combination of plans together might be the best use of their time. Again, combinations may work, just in terms of when we put the information out to the public to enable the public to see things altogether, rather than in five or three or four separate places.

Once a Draft Recovery Plan is prepared, we make that available for public comment. Anyone not involved directly in the recovery planning process has the opportunity to comment on that. Again, we take those comments; consider those before making any final recovery plan. Just for your information, more information is there on our website about recovery planning.

I just want to finish up by updating folks on critical habitat; to make you aware that our last piece of information to go up on our websites occurred just this past week. Those are the final documents that include the GIS data for all the areas that we have designated as critical habitat. Again, folks can reference that for information to help determine whether if there is any ongoing activity, whether that activity may occur within the designated critical habitat.

Again, just a reminder of folks you can contact for more information; myself, my counterpart Andy Herndon in the Southeast Regional Office, and my Supervisor, Julie Crocker. We're always available. Please feel free to call us with any questions, or send e-mails at any time. We're happy to help. Thank you.

CHAIRMAN NOWALSKY: Thank you very much, Lynn. Did you have a timeline for when that request would come to our TC for them to review the five-year review?

MS. LANKSHEAR: I don't have a timeline at this point. But I think what we can do is we can provide a timeline of the whole process, and provide that ahead of time so they can also get it on their schedule.

CHAIRMAN NOWALSKY: That would be appreciated, I'm sure; questions for Lynn? Chris Batsavage.

MR. BATSAVAGE: If I understand correctly, because we have two things going on here

at the same time, the five-year review and development of the recovery plan, is it possible that the results of the five-year review could determine that sturgeon could be delisted or downlisted and then rule making can occur after that without the recovery plan, or does the recovery plan need to be put in place in order to see where we need to be, in terms of recovering this stock? I'm trying to figure out the order of things, in terms of moving forward, as far as any chances of delisting or downlisting the species.

MS. LANKSHEAR: The recovery plan would be specific to a listed species. The five-year review would be the document to really look at whether or not any one or all the DPSs may possibly warrant delisting. We would consider that first, and then obviously a recovery plan for something that may possibly warrant delisting; we wouldn't necessarily start that then.

CHAIRMAN NOWALSKY: John Clark.

MR. JOHN CLARK: I was just curious, the recovery targets you have up there. Is that going to be a specific population of sturgeon, since it doesn't seem like we know what the population is? We didn't know what it was when it was listed. How do you set a recovery target for a species like this?

MS. LANKSHEAR: The ESA isn't specific that we have to have a number as a recovery target. In fact, because we have so many data-poor species, recovery planning can involve any target that is a reasonable assessment that the species can warrant delisting. It does not have to be specifically population numbers.

CHAIRMAN NOWALSKY: I did see a hand in the audience as we were about to begin the presentation. Arnold Leo, did you have any comment specific to the five-year review and the recovery targets; if so, you can come up to a microphone and make your comments, please? Thank you.

MR. ARNOLD LEO: Arnold Leo; I represent the fishing industry of the town of East Hampton, New York. The point I wanted to make for your consideration; I think it's clear that the progress made with the sturgeon stock is really because of the moratorium, which has been in place for many years and really has nothing to do with the stock having been listed as endangered.

I think with the review of the benchmark assessment that we got today, it's clear that the moratorium is working satisfactorily, and that it could certainly warrant downlisting the species from endangered to threatened. This is a tremendous significance to the commercial industry; because the recovery plan, which has not yet been revealed to us, can certainly with an endangered species, curtail the activities of many commercial activities for example, gillnetting for monkfish in our region.

I think that rather than impose such curtailments through the recovery plan on the commercial industry, it would be wiser and serve the best information available to simply downlist to threatened. I would request that the Board petition for that downlisting to threatened. Thank you.

CHAIRMAN NOWALSKY: Thank you, Arnold, for highlighting the differences that may have been had on the impact, either between the moratorium and the ESA listing, and again that ESA listing impact on states for other species harvest has certainly been discussed quite a bit, and I'm sure will be continued to be discussed here at the Board.

What I'm going to do, I'm going to move on from this agenda item. I thank Lynn for coming today. She's got her information up here, anyone with additional items can contact here. We'll move on to the next agenda item very briefly. Max has a very

short presentation on ITPs, and he's got an item to go ahead and bring to your attention.

We are going to be limited in the amount of time we'll have to discuss it, but hopefully this information will at least be out there to all the individual states. They can further follow up with Max or follow up with individual states jointly. I'll turn to Max to go through his presentation, and we'll have just a couple moments for some brief discussion here.

REVIEW STATUS OF THE INCIDENTAL TAKE PERMITS FOR ATLANTIC STURGEON

MR. APPELMAN: In the interest of time, I'm not going to put up a presentation for this. I'm just going to list off a couple things I wanted to say about this exercise. There is a memo in your meeting materials about the status of incidental take permits, or ITPs for Atlantic sturgeon. That was the product of a survey.

Some of you guys around the table probably remember an e-mail I sent out earlier this summer, with a couple questions regarding incidental take permits for sturgeon. The responses received varied quite a bit; some were very direct, some were vague. It was clear that some states, it was a little harder to answer these questions than I thought they might be.

In any event, we tried to summarize those responses as best as possible. We tried to fit it all into one table on the back of that memo. I would just ask that if any of those summaries of the responses mischaracterized anything, please let me know. Get in touch with me, and we can correct that language. Again, in the interest of time, if there were any questions about that memo, feel free.

CHAIRMAN NOWALSKY: Okay, questions for Max or any discussion that feels has to be had here at the table today? Again, I appreciate the Board's efforts here this morning for moving through this agenda as well as we did. Is there any other business? Chris Batsavage.

MR. BATSAVAGE: Not other business, but I did want to just go back and clarify something that came up earlier regarding the disposition of dead sturgeon that are encountered as bycatch. I checked with staff, with my agency on what happens when we encounter one through our observer program.

We do bring those back, and they're either given to the Natural Science Museum in Raleigh or to the Sturgeon Salvage staff. We also collect genetic samples off all the live and dead sturgeon that we collect through the ITPs. But it took a little bit of administrative hoops to jump through in order to get authorization for possessing those dead sturgeons. Anyway, I just wanted to clear that up on the record, at least what we're doing in North Carolina.

ADJOURNMENT

CHAIRMAN NOWALSKY: Before we adjourn, I'll turn to Bob for direction on where Commissioners go from here. Having concluded the business on the agenda; we stand adjourned.

(Whereupon the meeting adjourned at 11:54 o'clock a.m. on October 18, 2017)