GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

MEETING OF THE STANDING & SPECIAL REEF FISH, MACKEREL, SOCIOECONOMIC, & ECOSYSTEM SCIENTIFIC AND STATISTICAL COMMITTEES

WEBINAR

JANUARY 5-7, 2021

STANDING SSC VOTING MEMBERS

Joseph Powers.....
Lee Anderson.....
Luiz Barbieri.....
Harry Blanchet.....
David Chagaris.....
Benny Gallaway.....
Bob Gill.....
Douglas Gregory.....
Walter Keithly.....
Kai Lorenzen.....
Camp Matens.....
James Nance.....
Will Patterson.....
Sean Powers.....
Ken Roberts.....
Steven Scyphers.....
Jim Tolan.....

SPECIAL REEF FISH SSC VOTING MEMBERS

Jason Adriance.....
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John Mareska.....

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Katie Siegfried.....SEFSC
Jessica Stephen.....NMFS

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees convened via webinar on Tuesday morning, January 5, 2021, and was called to order by Chairman Joe Powers.

INTRODUCTIONS/ADOPTION OF AGENDA/APPROVAL OF VERBATIM MINUTES AND MEETING SUMMARY: SEPTEMBER 14-15, 2020 WEBINAR MEETING AND OCTOBER 30, 2020 JOINT WEBINAR MEETING WITH THE SOUTH ATLANTIC SSC/SCOPE OF WORK

CHAIRMAN JOE POWERS: Good morning, and happy new year. My name is Joe Powers, and I welcome all of you as the Chair of the Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council. We appreciate your attendance on this webinar and input into this meeting. Representing the Council is Tom Frazer. Council Staff in attendance are Ryan Rindone and Jessica Matos.

Notice of this meeting was provided to the Federal Register, sent via email to subscribers of the council's press release email list, and was posted on the council's website.

Today's meeting will include the following topics. When we adopt the agenda, we'll discuss a little bit more about this as well, but it's basically Adoption of the Agenda; Approval of Minutes; representatives to the SSC; a review of SEDAR 70; discussion of Sea Grant greater amberjack; a review of red grouper recreational landings data; review of the council proposed interim analysis schedule.

The red snapper supply chains and markets will not be done, and this will be removed. Then review of the Great Red Snapper Count; review of testing of assumptions about sex change in gag grouper; habitat research presentation; and then request participants for SEDAR 79 and issues about carryover; and then other business.

The webinar is open to the public and is being streamed live and recorded. A summary of the meeting and verbatim minutes will be produced and made available to the public via the council's website.

For the purpose of voice identification and to ensure you are able to mute and unmute your line, please identify yourself by stating your full name when your name is called for attendance. Once you have identified yourself, please re-mute your line. To signal you wish to speak during the meeting, please use the

raise-your-hand function, and staff will display your name. Please remember to identify yourself before speaking and to also re-mute your line each time you finish speaking. Thank you. We will go on to the voice identification.

MS. JESSICA MATOS: For some of you, you can raise your hand, and for some of you cannot, and so we will fix that tomorrow. If you have the ability to raise your hand, raise your hand when you want to ask questions. If you do not have the ability to raise your hand, please send a chat message, and we will acknowledge you. Lee Anderson.

DR. LEE ANDERSON: Lee is here.

MS. MATOS: Thank you. Luiz.

DR. LUIZ BARBIERI: Luiz Barbieri, here.

MS. MATOS: Thank you. Harry Blanchet.

MR. HARRY BLANCHET: Harry Blanchet, here.

MS. MATOS: Dave Chagaris. Benny Gallaway. Bob Gill.

MR. BOB GILL: Bob Gill.

MS. MATOS: Doug Gregory.

MR. DOUG GREGORY: Doug Gregory.

MS. MATOS: Walter Keithly.

DR. WALTER KEITHLY: Walter Keithly.

MS. MATOS: Robert Leaf. Kai Lorenzen.

DR. KAI LORENZEN: Kai Lorenzen.

MS. MATOS: Camp Matens.

MR. CAMP MATENS: Camp Matens.

MS. MATOS: Jim Nance.

DR. JIM NANCE: Jim Nance.

MS. MATOS: Will Patterson. Joe Powers.

CHAIRMAN POWERS: Joe Powers.

MS. MATOS: Sean Powers.

DR. SEAN POWERS: Sean Powers is here.

MS. MATOS: Ken Roberts.

DR. KEN ROBERTS: Ken Roberts is here.

MS. MATOS: Steven Scyphers.

DR. STEVEN SCYPHERS: Steven Scyphers is here.

MS. MATOS: Jim Tolan.

DR. JIM TOLAN: Jim Tolan is here.

MS. MATOS: Tom Frazer.

DR. TOM FRAZER: Tom Frazer.

MS. MATOS: Jason Adriance.

MR. JASON ADRIANCE: Jason Adriance.

MS. MATOS: Judd Curtis.

DR. JUDSON CURTIS: Judd Curtis.

MS. MATOS: John Mareska.

MR. JOHN MARESKA: John Mareska is here.

MS. MATOS: Kari Buck. Jack Isaacs. Andrew Ropicki.

DR. ANDREW ROPICKI: Andrew Ropicki is here.

MS. MATOS: Cam Ainsworth.

DR. CAM AINSWORTH: Cam Ainsworth is here.

MS. MATOS: Mandy Karnauskas.

DR. MANDY KARNAUSKAS: Mandy Karnauskas.

MS. MATOS: Paul Sammarco. I know he is trying to get on. Okay. Just a reminder that, if you cannot raise your hand, go

ahead and send a chat, and I will put your hand up, and, if you can raise your hand, just raise your hand. Thank you.

CHAIRMAN POWERS: All right. Thank you. The agenda, as I mentioned, there's a couple of things to bring up. First off, the presentation by Dr. Asche about the supply chains, apparently that will not be done, and so we will fix things according.

Also, apparently, the presentation on the gag grouper sex change has to be done first thing on Thursday morning, and so we may want to -- If that's the case, first off, I think we need to make sure that the others that are on Thursday morning know that they don't have to do first thing in the morning. Then, secondly, we may want to reshuffle some of the business items to take care of those a little bit earlier.

The other things were Other Business, and there are a couple of things that have been suggested be brought up, and we'll first start off with Doug Gregory.

MR. GREGORY: Thank you, Joe. I wanted to have a brief discussion under Other Business of the, I guess, the benefit of having a one-day SSC meeting focused solely on discussing the Tier 1 ABC control rule and what possible alternatives we can come up with, and it's because, in the last number of assessments, there's been concern about the ABC control rule not capturing the full uncertainty, and we've been looking for alternatives, and so I think it's time to have a dedicated discussion just for that, and so I just want to explore that further under Other Business. Thank you.

CHAIRMAN POWERS: Thank you. I would also -- Several people have mentioned this to me, and I have put together a publication list and kind of an issues sort of paper, but I can distribute those, but we'll have a short discussion about how we want to proceed under Other Business. Also, Carrie.

EXECUTIVE DIRECTOR CARRIE SIMMONS: Thank you, Mr. Chair. Good morning, everyone. I just wanted to add, under Other Business, a short discussion of the next term application process for both the Standing and the special SSCs.

CHAIRMAN POWERS: All right. Thank you. In both of those cases, for Other Business, if we have some time slots where we can kind of fit them in, and so they don't necessarily have to be the very last part of the meeting, I would like to do that, but let's leave that sort of open at this point in time. All

right. With those modifications and discussion, can we adopt the agenda? Ryan.

MR. RYAN RINDONE: You were talking about moving some things around, and so, when it comes to it, we can move the request for participants for mutton snapper up into Wednesday.

CHAIRMAN POWERS: That's what I was thinking of, yes.

MR. RINDONE: Then we absolutely discuss some of the Other Business stuff outside of it being the dead last thing, just with the understanding that these are discussion only and non-decisional.

CHAIRMAN POWERS: All right. Thank you. With those adaptations, can we adopt the agenda? Is there a motion?

MR. GILL: So moved, Mr. Chairman.

CHAIRMAN POWERS: Okay. We have a second from Jim Nance. If there is no objections, then that is approved. Then the Scope of Work. It's fairly obvious, but, Ryan, do you want to mention anything specific to that?

MR. RINDONE: No, sir, nothing that you haven't already mentioned about that has to do with the modifications to the agenda.

CHAIRMAN POWERS: All right.

MR. RINDONE: If anyone has any questions, please let us know.

SELECTION OF SSC REPRESENTATIVE FOR THE JANUARY 25-28, 2021 GULF COUNCIL VIRTUAL MEETING

CHAIRMAN POWERS: This is sort of our guidance on each one of the agenda items, how we approach the particular agenda item. All right. Next, selection of a representative for the council meeting.

MS. MATOS: Joe, could we just test with Paul Sammarco's sound real quick?

CHAIRMAN POWERS: Sure. Go ahead.

MS. MATOS: Thank you. Go ahead, Paul. You can unmute yourself.

DR. PAUL SAMMARCO: Hello. Paul Sammarco here.

MS. MATOS: Great. Thank you so much.

CHAIRMAN POWERS: All right. Selection of the SSC representative for the 25th to the 28th, do we have any volunteers? The enthusiasm is overwhelming. All right. Again, I will take the lead on this, I assume, and, as I look at the agenda for the council meeting, I may tap on some individuals to kind of help me out in this process, and, again, it's all webinar.

DR. LORENZEN: Joe, I would be happy to help out, or do it, as you please.

CHAIRMAN POWERS: Sure. We will make an arrangement between the two of us, and then, if it gets very difficult, then we can arbitrarily assign it to other people as well, just between the two of us. All right. That's what we'll do. Then we're moving on to Agenda Item V, and this is the Gulf of Mexico greater amberjack stock assessment, and we have a good deal of time allotted for this.

MR. RINDONE: Joe, sorry to interrupt again, but I don't think we approved the minutes from the last meeting.

CHAIRMAN POWERS: Yes. Small detail. So we have the minutes for the September 14 and 15 meeting and the October 30 meeting. One is our own, and the other is the joint with the South Atlantic. I suppose we should do these individually. For the September 14 and 15 minutes, are there any suggested changes? If not, is there a motion to adopt the September 14?

MR. GILL: So moved, Mr. Chairman.

MR. NANCE: Second.

CHAIRMAN POWERS: It's been moved and seconded by Jim Nance. Are there any objections? Hearing none, the minutes are approved for that. October 30, that meeting, any suggested changes? Do we have a motion to adopt?

MR. GILL: So moved, Mr. Chairman.

CHAIRMAN POWERS: Thank you. Do we have a second?

DR. NANCE: Second.

CHAIRMAN POWERS: Thank you. Are there any objections? Hearing none, those are approved. All right. Thank you. Sorry, Ryan, for my mistake there.

MR. RINDONE: Transgression forgiven.

CHAIRMAN POWERS: All right. Agenda Item V, the Gulf of Mexico greater amberjack stock assessment, Dr. Cummings -- Again, we have five-and-a-half hours, and so this could be fairly lengthy. We'll begin with the presentation by Nancie Cummings.

REVIEW OF SEDAR 70: GULF OF MEXICO GREATER AMBERJACK STOCK ASSESSMENT PRESENTATION AND PROJECTIONS

MS. NANCIE CUMMINGS: Good morning. My name is Nancie Cummings, and I'm a stock assessment analyst with the Southeast Fisheries Science Center, and I just want to say happy new year, and thanks all for attending. I'm going to be giving you first an overview of the results of the assessment, and then I will go into various components of the assessment.

There will be about five sections, six sections, on the assessment review that I give you, and I will -- There will be breaks in between each section. Also, I just suggest that we might want to take the fifteen-minute established break at around the time of projections, unless we have lots of questions in between and we need a break before that, and we can decide that.

The outline, I will give you an overview, and I'll go into the data, both the older data as well as updating the model with the new data, how the model was developed, and then I'll give you an overview of some of the basic and most relevant fit results, and then the results of the model itself, including diagnostics and sensitivity analyses that were done, and, finally, we'll see a summary of projections, including settings that were used, assumptions that were made in the projections, the pertinent and relevant results, and we'll close with a summary.

Back to the overview, I just want to say that the approved SEDAR 70 Gulf of Mexico amberjack, the base model, it was updated with data through 2018, and the terminal year is 2018. The initial year of the model follows suit from the SEDAR 33, which was 2012, and the 33 update model, and that began in 1950.

There were several important changes to data inputs and to the model parameterization that affected the assessment results, and

these included the MRIP-FES, Fishing Effort Survey, for the recreational landings and discards; the incorporation of a new combined video survey index, or a fishery-independent index that was composed of the Pascagoula SEAMAP survey, video survey, the Panama City survey, and the Florida Fish and Wildlife Survey; the final exclusion of the commercial vertical line index; revising commercial discard estimates, in terms of a change in the methodology that was used to calculate those discards; the use of a spline function to model the commercial vertical line size and age selectivity; incorporating a self-weighting likelihood distribution for fitting the length and age compositions; and, finally, weighting the recreational charter and private and the commercial lengths by the landings.

The base model -- The overall result is that the base model found that the greater amberjack stock in the Gulf of Mexico is undergoing overfishing and is overfished, and you will see two panel plots. On the top-right, I give you a plot, and it provides per-year estimates of fishing mortality ratio to the F at SPR 30. The F at SPR 30 is the MSY proxy that is used in the stock assessment, and, similarly, on the X-axis, you will see B over B SPR 30, and that's the proxy used for the overfished status.

On the bottom-right, then you have a plot of SSB to SSB unfished, and, again, starting in the initial year of the model, 1950, and going to 2018, and what we have here is the horizontal line is the 1.0 value for SSB at SSB over MSY proxy. Then the dashed red line is the minimum stock size threshold, and that is calculated as -- The minimum stock size threshold is calculated as 0.5 times SSB at SPR 30.

I will start now going through the individual sections. First, we'll go through the data, and I would like to point out for you that what I will do, going through this presentation, is I will address each term of reference that was specified by the council and SSC for the stock assessment, but, first, we'll go to the data.

What we have on the right-hand side the right panel, is a figure, a graphic, that you have seen frequently from the Stock Synthesis model, and what it does is it provides you a snapshot of the main and the relevant data components, and that is the catches, which this should read "landings", but the catches, the abundance indices that are used to standardize the model inputs.

The length compositions, the age compositions, and discards, these are the primary data components, and then we have -- On

the sub-levels, we have the independent components of these landings, meaning commercial vertical line catch landings, longline, the charter and private combined, and headboat, and so these follow, for each of these components, as they are available.

I will just note here that we have the joint video survey index, and, likewise, we have joint video length compositions, and so the rest of these are the same for each of these components, and that addresses Term of Reference 1 and 2, in terms of providing updated data, and it's a nice figure.

It starts at the initial year of the model, and it goes to 2018, which is our terminal year, again. Just to note that the commercial fishery, although there may have been some fishing back in the early years, the model, first here for commercial data, are 1963, and it was considered and believed by the panel in 2012, the SEDAR 33 benchmark, that the fishing prior to here was light, if any, and so the recreational catches were deemed to begin around 1945.

What this says is that the fishery was not in a completely unexploited state here, and so we actually calculate that value in the model, in terms of the exploitation. Other data components that are relevant and important in the model, and that are necessary in the Stock Synthesis model, are the life history inputs, and so this is a table basically that shows you the primary data component and then, if there was a decision made, what that decision was, in terms of whether it was unchanged or it was static from the SEDAR 33 update model and/or whether it was updated.

Then I have given you three graphics here of those primary inputs. The mean weight equation, it was unchanged from the SEDAR 33 update. The maturity was updated, and the natural mortality vector was updated.

Likewise, age and growth was updated, and there were additional growth observation pairs of length and age acquired through the various cooperators through 2018, and those data points were updated by the new L infinity, and that was incorporated into the model. Release mortality was static from the model, in the model, in terms of it was not updated from the SEDAR 33 update, and I have given you -- Sort of, where there was a change, we've given you the comparison from the SEDAR 33 update to SEDAR 70.

I just want to say that, in the model, in terms of the growth parameters, K was estimated in the model, as in SEDAR 33 and the

SEDAR 33 update, and L infinity was fixed at the updated value.

Continuing to move into more data, we have the recreational landings, and the decision was made, and has been made as per a few previous SEDARs, to use the new MRIP Fishing Effort Survey data, and there were two working papers for this. Excuse me. There was one working paper, WP-02, describing the Fishing Effort Survey and the new estimates for the recreational landings and the discards, and so we have, on the left-hand side -- This will sort of follow, in terms of the pattern of the display in this presentation, and I will give you, on the left and right, different panels, to show you differences between either a data component or between the SEDAR 70 and the SEDAR 33 update, and so this is the landings, and these are the discards, and this just gives you graphical observations of the difference between SEDAR 70 and 33 update.

Notably, we know, or we recognize, for most of the species where the new estimates have been used, as landings and discards, they have been larger, and we see that here, in terms of landings, with the exception of -- This is for the charter/private, and, for headboat -- The landings are nearly identical between assessments, but, for headboat, there has been a difference, and so there is a working paper on that, and that addresses the differences.

In terms of commercial landings, there was no methodology changes, in terms of estimating those landings and calculating and summarizing them by year. In terms of discards, there were changes, and that is -- There was also a working paper on that. What I will just say is that it's -- The estimator for discards is based on a CPUE, and it's an expansion for total discards, using total effort.

Previously, from SEDAR 33 and the 33 update, the CPUE -- The value was estimated through a generalized linear model, and that has been changed in recent SEDAR assessments, and it has been used for several assessments, several reef fish assessments I should say, and the CPUE values now are estimated using -- It's a statistical estimator, a classical survey design.

As I said, the landings between assessments, the protocols, the methodology, has not changed, and the only difference here is that we have an extension from 2016 through 2018 now, and that's the same for both longline and the vertical line fishery. For discards, through the change in procedure, it resulted in a lower estimate, much lower estimate, for both fleets, the vertical line and the longline, in terms of discards.

I would like to also note here that, for discards, previously, the estimate of discards was provided from 2005 forward. However, now, the methodology has been extended back through time, and so we now have a series of estimates from -- I think it's 1994 forward, for both fleets.

Now we're moving into length. We're moving into the data component of length that's used in the model, and these are retained fish as well as discarded fish. There were two primary differences between SEDAR 70 and the SEDAR 33 update, and SEDAR 33, also, and that is, for the recreational and commercial, the annual compositions were weighted by the landings, with the exception of the longline. The longline was not weighted, and the headboat was not weighted. The longline, the reason was insufficient data, and the headboat was that the landings had not been weighted by area either.

Now, the other main difference is that, in SEDAR 33 and the 33 update, in the model, the way that the distributions were modeled was in terms of the variance -- Incorporating information in the estimate between the observed numbers of fish at size for a partition, and it was using a multinominal, but it was using a standard multinominal, the Frances reweighting procedure. In the new SS 3.30 model, it now has the ability to use a Dirichlet multinominal distribution, and there is a few differences in the way the actual -- The expected is calculated within the distribution, and we'll get into that just a little bit later, and this is basically -- These are the observed fish, the proportion at size, for each sector, fleet and sector, fleet meaning commercial or recreational, and this is also retained and discarded.

Similarly, in terms of the observed age compositions, the primary difference between SEDAR 70 and the SEDAR 33 update is the use of reweighted annual compositions. There was no weighting of the annual compositions in SEDAR 30 or 33, and, also, the Dirichlet multinomial distribution has been used, in terms of incorporating the variance, adjusting the variance, of each individual partition in the fitting process.

Moving on, another data component is the indices, and there has been a change, some change, between SEDAR 33 and SEDAR 70, and that is there has been a decision made not to update the indices from the SEDAR 33, and that is because of the recent regulations have affected the indices, in terms of -- A minimum of two ways.

That is that, because of the closures, it would require a

complete reformatting of the model structure, looking at the model structure and going back outside of the benchmark decisions to use those indices any further, and, also, there was considered to be some confounding, in terms of the behavior of the fishery, with those indices, and so those indices are still being used, but they're not being updated past the year 2015.

The commercial index, we had two for SEDAR 33 and the SEDAR 33 update. We had the vertical line index and the longline index, and I just want to point out that here is a -- We had updated the index for SEDAR 70. However, the panel felt that the behavior of the index could not be explained outside of the SEDAR 33 and the 33 update, and so it was felt that there had been a change in fishing behavior.

There was a lot of consternation regarding, I would say, in SEDAR 33 about using the index, and there had been discussions of splitting the index into two time series, but, in the end, in the SEDAR 33 update, the index was retained, as it was developed, through 2015. In this assessment, in SEDAR 70, the panel felt that there had been a change in fishing behavior and that this particularly could not be explained. Thus, it was decided to drop this index completely from the analyses, although many of the early runs considered the index.

The longline index, on the other hand, was retained fully into the model, into developing the final model structure, and further on for projections, but I have given you -- I have also given you the three indices here. SEDAR 33 is the green, and both SEDAR 33 and the 33 update showed this, and the SEDAR 70 showed this decline in the index, and then followed by an increase, but it was felt that it was still a valid index and appropriate to use in the model.

Finally, in SEDAR 33, we had the SEAMAP survey, the SEAMAP survey fishery-independent index, and we had the Panama City survey. At the time of the SEDAR 33, the Florida index was not considered to be lengthy enough of a time series to use. However, since that time, now it has grown, and so it's now been combined. It was combined and discussed with the panel, through the assessment working group panel, through the series of four -- I think we had four or five working webinars, and then the panel felt that the combined index was more appropriate at this point.

Here we have the combined index, the nominal in blue, followed by the standardized index and the confidence intervals and then the associated size structure.

MR. RINDONE: Excuse me, Nancie. We have a hand up, and I just wanted to give Mr. Gill an opportunity to ask his question before we got too much further away from his point.

MS. CUMMINGS: Sure, or I can finish the slide. Okay. What's the question?

MR. GILL: Thank you, Nancie, and thank you, Ryan. The previous slide, Nancie, could you go back to that? The decision to drop the vertical line CPUE index, did that result in a change in selectivity for that same period of time that it was dropped for?

MS. CUMMINGS: No, it did not result in a change in selectivity, per se, but it was just felt that this large increase in CPUE was not -- That it could not be explained, and it was outside of any kind of logical explanation, and that's an excellent question.

MR. GILL: Okay. I'm a little bit baffled, because, if you attribute a change in fishing behavior, I would assume that that would necessarily include a change in selectivity.

MS. CUMMINGS: I can see that, and I think that's a very valid question, but, at that point in the model structure, it had not. We were still using the double normal at that point as well, in the selectivity, and I can -- Later, and I think it's really good question, we can also, later, look at the plots with the selectivity.

At that point, we went further on, when we dropped the index. We dropped the index, and then we went further on, as you recall, in developing the model, and so we were still using the double normal, and, from there, if you recall, we went on to tweaking the model for -- Basically, we adopted the spline function later on, but there was still no major change in selectivity, but we can look at those plot, because we have those. They're not a in presentation style, but we can take a quick peek at them, if you want.

MR. GILL: Thank you, Nancie.

MS. CUMMINGS: You're welcome. It gave me a chance to get a drink of water.

CHAIRMAN POWERS: I think, when you get to an appropriate time, we may want to just look at the plots, and you can get that

directly from the assessment report, too.

MS. CUMMINGS: Right. Well, at that point -- The South Atlantic report, Joe, will only have the final indices, I mean selectivity, the fleets in there with the final, and so they wouldn't be in the assessment report, but they're in the R for SS files, and we have those.

CHAIRMAN POWERS: All right. Well, anyway, at an appropriate time, maybe let's take a look at that. All right. Go ahead.

MR. RINDONE: Shannon.

DR. SHANNON CALAY: Thanks. I was just going to elaborate on what Nancie has said. Basically, there was a large change in the relative abundance reflected in the survey at about the same time as the imposition of some of our IFQ fishery programs for red snapper and for shallow-water groupers, for example.

The panel thought that the big change in relative abundance from that index was probably not due to an actual change in abundance, but instead to changes in fishing behavior that might have changes to both catchability and selectivity, and, rather than trying to break that index, or freely estimate those sorts of changes with the data available, they chose to simply not use that index of abundance.

CHAIRMAN POWERS: That was in the early 2000s?

MS. CUMMINGS: No. As you see here on the right-hand panel, we see the 2012 -- We see that's the 33 index, and so it stops there, and so, when we move into the SEDAR 33 update, which is the green line, we have the increase, and we have the -- The panel, in the SEDAR 33 update, they elected to keep the index, but with some reservations.

We see that, when we come to SEDAR 70, that we have additional data and observations, and, again, these are observations from the coastal logbook, and so they are reported observations of catch and effort and then standardized, but we see this similar drop, but then, again, after, after the 33 update, which ended in -- The data point was 2015, and then we have some drop, and then we have, again, a big increase, and so, as Shannon noted, there were additional questions, and the questions were raised that, with the -- With all of the IFQs, that this could also have affected this fishery, and the way it affected it was not really identified.

CHAIRMAN POWERS: All right. Thank you.

MS. CUMMINGS: You're welcome, and I will just point out, also, and I think maybe it might have been Mr. Gill that pointed this out all along in the webinars, is that this, again, is not really a targeted fishery, and the primary removals are from the recreational component of the data, and so removing this index or keeping it in, in the end, like in the SEDAR 33 update, did not make a big difference, if you go back and look at the jackknife sensitivities that were done. Thank you.

Then we moved on to fishery-independent indices, and the panel felt that the combined series was stronger and would reflect the growth of abundance of not just what one particular life stanza, but small juveniles as well as some large fish, and so that's what we have here, is the density, and this is the nominal density, the weighted nominal density, of the length composition.

What you've seen thus far, or what I have presented thus far, has been a general overview of the pertinent data components that go into the population model, and I have given you an idea of not just all of the components, meaning the landings, the indices, and the compositions, but also any of the pertinent changes, and what you saw was that one of the largest changes was the incorporation of the FES survey, as well as dropping the vertical line index, and those were two main data issues that changed.

In addition, in Term of Reference 2, with data, there was some additional information presented on greater amberjack, and it was through some oil and gas -- Some exploration of the oil and gas platforms in the central and western Gulf of Mexico, and that study was presented, I believe to the council last year, and we were asked, in the term of reference, to consider that.

There was a significant fraction of amberjack that were residing, or were observed, on these oil and gas platforms, and it was noted by the panel that these results could have some important implications for the assessment and future management advice.

The panel considered those, that paper, and it was noted that, in order to completely and fully incorporate the information on this study, which was a snapshot in time, that there would need to be a complete model restricting, and that would require additional time and effort, staff effort also, but it would require completely restricting the model, in terms of temporal

and spatial, but in particular spatial, stratifications.

That had not been done previously in the SEDAR 33 benchmark, or the update, and so the current model structure that was carried through for the operational assessment -- I don't know if we call it an update, an operational update, but it's an operational assessment, but that would require completely additional -- Not just time and effort, but a lot more thoughts, in order to fully address that, and so it was recommended, and it's still recommended, that this be considered when a benchmark -- During a research track assessment for this resource, to incorporate additional information on spatial stratifications that could fully incorporate this type of information that's being collected.

I am going to start with model development at this point, the base model, and the base model meaning the final model that was elected, or adopted, by the panel, and I will go through the development of the model, how I went through it, how I got there, some of the fit characteristics, the results, the main results, and the diagnostics. It's early, but, if you wanted to ask a few more questions or take a break, then it would be a good time, or we could move into -- This will take a fair amount of time, and this will address -- The base model is addressing Terms of Reference 1 and 3, the development of the model and results of the model. I am not hearing any change. Okay.

What I have here is a slide that shows you how I moved through developing getting to a base model, a final base model, and we have a table here with six steps mentioned, and I will describe each step, and I will show you what model was used, in terms of development, and I will give you three pieces of information on the result of that model on some of the performance results, and that includes the likelihood, the lowest likelihood, a gradient, meaning the overall final gradient for that model across all the data components, reminding you that, in the process of fitting the model, it was fit to individual partitions of the data, as they are available in the model, meaning year, landings, et cetera, indices.

Then I, finally, will be giving you one piece of information that we chose to sort of describe how the model -- How the development of the model was proceeding and what was changing.

In the 33 update, and it was kind of finished in 2015, but it was presented in 2016, and that model was the 3.24 version of Stock Synthesis. The likelihood value, the final likelihood, was this value, 1,191. The gradient was that, and it achieved a

log recruitment of 7.93.

What we wanted to do, in moving this model into the 3.34 version of the SSC, was this. It was to, first -- What would the model results have been if we just converted it, so it's an apples to -- There is no other changes, no new data or anything, but we just converted the model to 3.30, and that is we achieved similar, pretty much similar, likelihood, and we've got the same data, and you would think that, hopefully, it would get the exact same likelihood, but it really never does. The recruitment, unfished recruitment, is about the same.

Then the next thing is we want to do what would that model have looked like, the results, had we just added in the FES catches, and so then we know that we're not adding the new data. Remember the terminal year was 2015 here, and here it's 2015, and here it's 2015. The only thing we've done is we've substituted the FES catches here, and we see that we're achieving -- The model is reaching a larger unfished recruitment value, but, again, the gradient is similar, and the likelihood is similar. Again, we've not added any new years of data, and so we expect a pretty similar likelihood.

Now we get into the additional steps, moving towards the final base model, of adding data and tweaking the model and adjusting the model for basically what we call fit and configuring the model to something that is considered reasonable. I just want to point out that, although you see six steps here, there were nearly 100 models run from here to there, because it just takes a lot of time, and, also, there is a lot of questions and decisions, such as the really good one we had earlier about, well, if you take out an index, how does it affect selectivity, and so then we start looking at let's add the new growth information, and those are pretty straightforward, meaning L infinity, update the maturation, the maturity ogive.

We know that we have -- Since the SEDAR 33 update, we had a new recreational size limit, and so I added a new time block, and so on and so forth, and so now we have all new data here, and so let's go back to Step 3, and so we have more data to try to fit over, and our likelihood goes larger. Again, the ln(R0) value is staying about where it did when we just added the FES catches in, and so it's in the same kind of ballpark.

We have seen -- I would just go back and note that, with other assessments, we've seen that, when we add the FES catches, they have been usually larger, from a species, but that unfished recruitment value also increases.

Now, between Steps 3, 4, and 5, again, this is just adding the relevant inputs that have been updated and tweaking, and then Step 5 is where we really, really start moving the model into what we're hoping is going to be the neighborhood of the final model, and that is, in Step 4, we have the basic compositions, unweighted. In Step 5, now we've weighted our length compositions and our age compositions, and we've changed the -- We have started adjusting the variances of these compositions using the Dirichlet multinomial, and then we've added the index reweighting. Here, we also attempted to estimate steepness, as well as all three stock-recruitment parameters, and then, finally, we removed the vertical line index.

Then we are still achieving a fairly reasonable gradient now, because we're using our reweighting for bringing our likelihood down, and we're fitting the data little more better, and then, finally, just to note that our ln(R0) value is a little higher, and it has changed a little bit, but, also, we're now trying to estimate all three stock-recruitment parameters, and so the final model that was adopted and agreed to by the panel -- The panel selected to not put -- We had tried to put a prior on steepness also, but to not put a prior on steepness, but also agreed to fix sigma R and steepness, and so this is probably -- I shouldn't have put that there, because we're not estimating steepness.

Then to use a spline selectivity function instead of a double normal for the commercial vertical line fleet. Again, the likelihood, this final likelihood value, is pretty similar to Step 5, when we've actually added all the data and all the updated data, and the gradient is a little worse, and we would actually like to see a gradient lower than this, but we've actually got a model that has converged and is doing fairly well, and you will see the result of that convergence performance later. Then, finally, the ln(R0) value is pretty similar.

This is a graphic that was developed back in -- I think in vermilion, and then SEDAR 28, which was cobia, and it was liked by a few people, and so we're deciding to keep it, and, obviously, we could put all those interim steps in here that we tried, but you lose kind of track of where you are too, and it's very difficult to actually keep up with where you are, but this is what we decided to do.

Now what I'm going to do is, for the base model, I am going to take you through the basic model fit to each of those data

components, landings, comps, indices, and then we'll go into diagnostics, and I will give you -- For most of the plots, it will look left is the SEDAR 70 panel and our SEDAR 33. Even though these are not -- I appreciate Ryan pointing this out, but these are not apples-to-apples comparisons, and the reason being we've got new data.

Not just new data, but extra data, 2016, 2017, and 2018, but we've also got a little different model structure, and we also have -- For the most part, the model structure is the same, but we do have some differences, deviations, that I showed you earlier, but we also have the FES data, and so, here, this would be different.

On a fleet-by-fleet basis, for the landings, we see that we have a pretty near identical fit for the longline and the vertical line. We believe, and the panel made the decision, back in SEDAR 33, that the commercial data are much -- The reporting is pretty good, and it's a pretty narrow census, and that there was a lot of amount of error around it.

We have a larger amount of error around the recreational, and this would be the charter and private MRIP and then the headboat data, but you see, in SEDAR 33, that it was almost an exact fit, and it's not as completely an exact fit now, and this is the model fit, and so, within SSC, this is the observed and expected model fit.

That sort of sets up the slides, and I don't have to go into all the details on all of these other slides, because now you have the details. Again, you see, with the discards, you see the commercial has a pretty good fit, and less so for the longline. This is something that would be of research interest, to try to adjust why we have this good fit, but I will also point out that now we have the discards -- The estimate of discards has been considerably, largely, reduced, through the new estimation procedure.

With the charter and private -- With the headboat, it's a very good fit, and, with the MRIP charter and private, it's not so good for a couple of years, but not a horrible fit for the discards.

Now we'll move into the indices and the fits. Again, you're just going to see the longline and then the two recreational and the final joint video survey fits. Again, the SEDAR 70 is on the left, and the SEDAR 33 update is on the right, and, here, we notice that these fits -- We have large CVs associated with the

commercial longline and with the MRIP, and they are much larger for the recent year, and these are the -- This is coming off of the model, again, and so this is the observed and -- Excuse me. This is the observed fit and the standard errors off of the model fit.

I would just note that, again, these indices here, and I would say the headboat and the MRIP, are reflecting juveniles through young adults, and they're not reflecting the largest fish, as are the longline, and then the joint video survey index is considered to reflect the juveniles plus somewhat the young adults and some adults. It had three years of very high standard errors, also.

Before, you saw the basic length compositions, and now these are the fitted compositions off of the model. Again, SEDAR 70, versus the SEDAR 33 update, and these individual panels reflect those individual categories of the various fleets or surveys, and that is the vertical line, and these are the discarded fish and the retained fish. These are the headboat, the charter and private, and the vertical line is retained, and the longline discards, and the survey. These will be the combined weighted observations off of the three surveys.

Here, I just want to, again, point out to you that, in the SEDAR 33, we have the SEAMAP video and the Panama City video, and they were split out. Here, we have all three surveys combined.

The take-home message here is that we're able to fit the vertical line -- We're able to fit some fleets a little better, some categories a little better, in SEDAR 70 than we did in SEDAR 33. However, there was one category that we were not able -- That I was not able to fit very well in SEDAR 70, and that is the discards, and so likely the selectivity retention function needs -- It continues to need some work.

We will point out that an improvement in SEDAR 70 came through the weighting of the charter private, in terms of the retained fish, but I would also point out that, in SEDAR 33, we had some selectivity retention parameters that were autocorrelated, and we had very few parameters in SEDAR 70 that have any autocorrelation of a high level, meaning of 0.7 or higher even, and that is detailed specifically in the SEDAR report.

Rather than dwell on these individual panels, although they're very interesting, what we feel is better, in order the judge the fit, are the Pearson residuals, and this is what we have in the SEDAR 33 update, and it also is quite similar to what you saw in

the SEDAR 33 benchmark, and this is the updated SEDAR 70, and so what you see, at first glance, is that, in SEDAR 33, we had very poor fits with the vertical line, and we had some problems with the retained fish, even for the charter and private, and I'm just going to recall that what we've done is here is that we've -- For the vertical line, we have improved the fit tremendously, and it came through the use of the spline function, primarily, and it was able -- The spline function is not parametric, and it was able to actually -- I think I set seven nodes, and we were able to let it move and estimate a fit that was somewhat better than in the SEDAR 33 double normal model.

In addition, we turned off the tail compression, and that lowered that chi-squared value. Then I would just point out that, as in SEDAR 33, we still have that -- I pointed it out on the previous slide, but that misfit in the discard, the private discard, and, in a few years, for the retained fish for the vertical line, and I should have been pointing this out, in terms of the spline function, but we still had similar problems in a few years for the vertical line, in terms of the retained fish. Then, also, I would point out that we used the Dirichlet in terms of the variance reweighting.

Then, continuing, the headboat retained fish, there are still some problems, but much better fits, in general, and then the, for the trap video, we now -- We have added those early years of data from those earlier surveys. I'm sorry. The later years of data from the three surveys.

Similarly, just to show you the overall fits for the age compositions, and so you see SEDAR 70 on the left and the SEDAR 33 update on the right, and there aren't obvious differences in the fits, in terms of the improvements in fits, although I have to point out that, for the longline, we were able to better fit the tails, and that was through -- I feel it's through the tail compression that we turned off, and it was trying to actually fit these earlier, out to here.

Then, similarly, you have got the Pearson residuals, and so, at first glance, we can see that the bubbles -- The larger the bubble, whether it's minus or positive, the worse the fit is, and you see that that largest residual is a four, a minus-four to a positive-four, whereas, in SEDAR 33, it was almost three-times that.

Again, there have been some changes, in terms of the fitting, and that is whether it was the weight at-age compositions, using the length composition, the landings, and/or whether it was the

Dirichlet weightings, and, also, there were some sample size cutoffs that were applied in SEDAR 70 that were not applied in SEDAR 33 or the 33 update, and you can see those by these samples here, and we lost one set of samples in the early set of years, and so this is a good time to point out that, through looking at the composition data, what your data-rich years are, the data-rich years being primarily, for the age comp, being 2000 forward, and, for the length composition, your data-rich years are really from the mid to -- From 1981 forward, and just keeping in mind that we have a model that has an initial start year of 1950, and so we really only have sample data, length data, and age data from the 1990s forward, or 1980s forward for length and 1990s for age data.

I am going to move on to the model results, and these are after the model had been developed and tweaked, so to speak, and the panel felt that we had a fairly stable model with reasonable results and we could move on to doing what is really critical, and that is looking at some of the diagnostics and so forth, but, before we look at diagnostics, what we have here is two panels of the summary of the fishing mortality, and by fleet as well, and so annual exploitation, showing that the fishery -- As we know, it started at a near-virgin stock back here, in 1950s, and then exploitation increased through the late 1980s and then exploitation followed through until the current year, with some ups and downs of decreasing exploitation and increasing exploitation, and some of this, obviously, was due to regulations, be it lower size limits and/or quotas that were implemented.

We have, on the right-hand panel, a depiction of the fleet-specific instantaneous fishing mortality rates, showing you what you already know, and that is that the charter private fleet had the largest -- The fisheries were exploited mainly by the charter private, and particularly in the vertical line, but less so through the mid-1990s, and then the vertical line fleet has shown a significant decline in fishing mortality, but still has experienced some slight increases in the recent years, whereas the charter and private fleet has -- Although it had a large decrease in the early 1990s, and it was followed by a significant increase in F since 2000, and it is continuing to have Fs, to experience high Fs, through this late 2000s, except in the last couple of years. What I will now move on to --

CHAIRMAN POWERS: Let me interject. Can you go back? What is the scale on the one on the right What do you mean by cumulative F?

MS. CUMMINGS: Cumulative? It's not cumulative. It's continuous.

CHAIRMAN POWERS: I can't even see that. So the yellow line, you're talking about Fs of around one?

MS. CUMMINGS: Yes.

CHAIRMAN POWERS: Okay. Thank you.

MS. CUMMINGS: On the left-hand plot, Joe, can you read "summary fishing mortality"?

CHAIRMAN POWERS: Well, that's just me and my eyes.

MS. CUMMINGS: Okay. Thank you very much.

MR. RINDONE: Luiz.

DR. BARBIERI: Thank you. Nancie, just before you go further into the results, I thought I would go ahead and ask this question now, and can you go back to Slide 17, briefly, the one for landings? You said that you were able to actually give a little more freedom to the fixed landings, right, with this --

MS. CUMMINGS: We have an error associated with the annual landings for --

DR. BARBIERI: Right. We you able to actually input the actual CVs for the different kinds of landings, or you had to assume some other error?

MS. CUMMINGS: We have input -- It's a single value, and it's 0.01 for the commercial and 0.15 for the recreational, and those were estimated empirically, and I don't know if you were there, at the SEDAR 33 benchmark. We could make it -- We could tighten this up, if you believed it, but you actually -- As you know for recreational, you do have estimates of the CVs, and the new model, 3.30, can take annual values of that error. It was not used in this application, because it was not -- It needed to be updated, and so we used the value of 15 percent, or 0.15.

DR. BARBIERI: Right. Thank you, Nancie. I mean, that's exactly what I was asking, is whether you were able to use the actual CV values for the different kinds of landings, the inputs to landings, or if you had to continue using that assumed.

MS. CUMMINGS: We used a single value.

DR. BARBIERI: Right. Okay. Thank you.

MS. CUMMINGS: So a research recommendation could be to re-estimate those by year, but they're going to -- They may be more, and they may be less, but there's going to be a great deal of variability, and so that single value of 0.15 was -- I can go back and look at that, but it was determined to be, I think, an average over a set of years.

DR. BARBIERI: Right, and, just to clarify, that was used across all fleets, right?

MS. CUMMINGS: We have one for commercial and one for recreational.

DR. BARBIERI: I see. Okay. Thank you.

MS. CUMMINGS: You're welcome. It's a good time to get a water break, and so I appreciate that. Okay. So we're continuing to the base model results, and I'm going to move through the length and the age-based selectivities. Just to recall, from SEDAR -- So you have a SEDAR 33 and SEDAR 70, and this is the length-based selectivity, that selectivity value going from zero to one, and, likewise, the age-based selectivity derived from the length-based selectivity for SEDAR 70 and SEDAR 33.

I will point -- You have it by fleet, and so I will just point out the first two are vertical line and longline, and then the private and charter and headboat, and I will note to the Panels 2, 3, and 4 first.

The selectivity function, length selectivity function, was unchanged between SEDAR 70 and SEDAR 33, and so you would expect those to be fairly similar for these fleets, the longline, the private, the double normal, double normal -- Excuse me. Asymptotic for the longline, and then, for the vertical line, it was a double normal, in the SEDAR 33 update, and we worked with that in SEDAR 70, and then, at the very end -- It was actually myself and the developers looked and said, well, let's try a spline function, just to see if we can get a better fit to the data, and it was felt that that was appropriate.

What you have here is -- We won't dwell at the individual values, but you can look at the 50 percent length selectivity and/or age, meaning -- Knowing that, for the longline fleet, they're not quite as selected, at 50 percent, as the other fleets, and so you can see those, and that certainly plays into

the retention function that is used also to model the discards, the biggest difference here being the vertical line and moving from that double normal to the spline function, in that the 50 percent selection has changed from around seventy-five centimeters to more so around 100, and that's sort of what we expect with the larger fish, and then the falloff is a little sooner, the drop-off.

Then what we have here are, for each fleet, I have just broken down and shown you the selectivities and the retention functions individually, and these are also depicted in the report, and, again, this is the ending year selectivity, and so that would be 2018, and the various selectivity retention functions, and so it's showing, again, the 50 percent selectivity, at around sixty centimeters or so.

Then, finally, we have the index selectivities at length, and that's from the MRIP charter survey, and then this is for the SEDAR 33, the SEAMAP survey and the Panama City survey, showing that, yes, there were some smaller fish from the Panama City survey and some from the SEAMAP survey, extending to some of the larger fish.

The joint video survey, representing SEDAR 70, is a composite of all three surveys, and the FWRI survey was not included here separately, and it wasn't -- We didn't think that we had to put it on the plot separate, because this is reflecting all three surveys, and then, finally, moving to just some of the pertinent, the key, metrics that come off the model, the SS model, and that is the total biomass, the spawning biomass, those fishing mortality rates, which you have seen earlier, and you saw the annual fishing mortality rate as well as the fleet-specific mortality rates.

Here, what we have here are SEDAR 70, again in red, and SEDAR 33 is in blue, and you see that what we expect with the addition of the FES catch, and we basically see a higher value of the total biomass in the early year, and you would expect the spawning biomass ogive to sort of follow that total biomass trajectory, and, here, we have not only the estimates by year, but we also have the profile of uncertainty, which indicates that, in the early part of the time series, it's not quite as uncertain.

I will also point out that, between the two panels, as we move through time, in the beginning of the start of the evaluation, that the two curves join, get closer together, and then, finally, just to point out, again, that SEDAR 33 moved only through the 2015 year, and we now have extended the trajectory

through 2018, and just to say that the trajectory indicates that the SEDAR 70 estimate is a little bit more optimistic, in terms of -- Or it produces higher estimates of total biomass and SSB, and that's not surprising, given the addition of the FES estimates.

Finally, in terms of the stock-recruitment relationship, I will just point out that we initially tried to estimate steepness as well as sigma-R. Through the profiling, it was felt that we couldn't quite reach a -- Although we reached -- The model found a value in the area of an MLE, but it was somewhat flat, and so it was felt that the model should be -- Going forward, the model should be fixed at the steepness value and the sigma-R value, and we'll show you those profiles shortly.

In particular, when we went ahead with estimating statements in sigma-R and went through the retrospectives and the jackknives, there was a little bit more instability, and so it was felt that it improved the model, and so what you have here then is the spawning output, the estimated recruitment, and then, on the right-hand panel, you've got the estimates of recruits and the 95 percent confidence intervals.

Again, noting that, although the model year is 1950, and we actually turned on recruit deviations back to these early years, our data-rich period begins in these years, and so we see the uncertainty not only in the recent -- The most large uncertainty in the recent years, but we see some large uncertainty also before the years of really good age data, or better age data.

Then, in terms of status, so that we would know where we were, where we are, in the current situation, and you saw this in the overview, we have two panels here, two plots, again with the plot for each year, an estimate of F over MFMT versus SSB over the proxy, SSB 30 percent, and then, on the right-hand side, you see the SSB over MSY proxy by year, and so you see these individual points have been taken out and plotted, and you see that we are currently below the 1.0 level, and the MSST level is 0.5 times the SSB at MSY proxy.

Then you saw the development of the model, and you saw how we moved forward adding the data and tweaking the model and adding the relevant upgrades to the model, upgrades meaning update the areas of life history inputs and update the -- Or improve on the fitting of the data, meaning adding the Dirichlet multinomial and trying to fit the commercial data in a better way, and so now -- And you saw some of the early results, and so now how did the model do in terms of stability? In other words, if you ran

it a thousand times, what would you get?

What we did was -- It's usually run 100 to 200 times, and we did jitters -- I did 100 jitters, and what happens in the SS model, in the jitter process, is it changes each of the parameter estimates within the model randomly by 10 percent, and so the basic -- What you have on the right-hand side is for each of these data components, which I addressed, and you have a total, plus you have the various categories, the discards, the catch, and that's the landings, and the age comp.

Of those 100 runs, ninety-six of those runs converged to within one likelihood point of the base model, and that's actually pretty good, and no runs demonstrated a lower negative likelihood, and so, although you would like it to be 100 of 100, it's never usually that case, and so I will just move on forward from here, but what you see is what we usually expect. In a lot of cases, it's the length component where you see the changes, the largest changes. Again, these are changes in likelihood and then the age comp.

Finally, we like to see that the model is going to reach a low value, in terms of lowest value, in terms of the estimates in the log-likelihood, also. We see that, for -- On the top, you have -- On the left, you have the log of unfished recruitment. On the right, you have the steepness parameter, and we see that we were able to reach a fairly flat space, and we have a minimum, and the panel felt that was appropriate and logical. However, for steepness, there was not quite -- It wasn't quite the -- It didn't quite reach the lowest flat space that we wanted to. It did reach an MLE, and so the panel adopted, for both steepness and sigma-R, and this is a fairly mess plot, to actually fix the values at the lowest value.

Then I will just go back to this plot here. On the bottom, we have basically a plot of SSB over SSB zero under both of these scenarios, in terms of profiling, whether it's log of unfished recruitment or profiling steepness, and we do not see any strong indication that we have any aberrant result, in terms of what that metric was, and this was calculated for a set of metrics, but I just chose these two to show you, and the panel looked at most of those plots, I believe, and then, similarly, for sigma-R, although the response wasn't as flat as you would like, or as low as you would like, still there was no aberrant indication or an issue, in terms of estimating sigma-R or setting the value at that level that we chose. We chose 0.777 for steepness, and we chose 0.55. 0.524 was selected for sigma-R.

Moving forward, after the panel decided that it was appropriate to fix steepness, fix sigma-R, and estimate the unfished recruitment, as well as adopting all the decisions that were made regarding the fitting, the basic fitting, in terms of dropping the vertical line index and the use of the Dirichlet multinomial and adjusting for variance adjustments, and, also I just pointed out -- I didn't point out that the index variances were also adjusted, using the same procedure as in SEDAR 33.

Then it was important to say, okay, if we hadn't used the input of new data, how would that affect the model, in terms of key metrics, SSB, fishing mortality, and the number of recruits, and what we see in all of these is that we see no large -- We see no tendency of a retrospective pattern, meaning removing data did not have a major impact on any of the estimates of SSB, going backwards in time, in terms of -- This is taking 2018 out, and then taking 2017 and 2018 out, and then taking 2016 through 2018 out, and, finally, 2015 through 2018 out. We do see a cloud, in terms of fishing mortality, with this, and we probably would expect a little bit more difference. If we exploded those, then you probably will see that these are very small values, also. Finally, with recruits.

Then, also, the idea of -- The next question could be how do individual datasets affect the model, in terms of its ability to estimate, on these key metrics of SSB, recruits, and fishing mortality, and, with the exception of the joint video and the private, it really didn't have any effect, in terms of, if you remove the longline, or the headboat, there was really no impact on the model results, on these metrics anyway.

Then we -- As you recall, or some of you recall, and I'm sure that all of you weren't around for SEDAR 33, which ended in 2012, and the SEDAR 33 update, which ended in 2016, but a production model was used in SEDAR 33 and the 33 update. SEDAR 33. It dated back, actually, to SEDAR 9, and so we were -- As you know, the production model was ASPIC, and it was a block biomass model, meaning it does not incorporate information on size or age, and you're not able to separate -- In terms of biomass, you cannot separate out the biomass of recruits, but we were asked to look at a production model for SEDAR 70 as a sensitivity, and so how would the results from SEDAR 70, using the Stock Synthesis, the preferred model adopted by the SEDAR 33 update, or 33 rather, and how would that relate to, compare to, using a production model again.

The model -- I have just pointed out that the production model does not incorporate size or age, and it does not use

selectivities to model time-varying parameters or regulations, and it cannot incorporate natural mortality, and, as you know, it does not fit to the comp data.

What we provided here for you was just a general comparison of the estimates of F over FMSY, which is in the green, and then blue are the B over BMSY, and so you might compare those with the 1.0 level, which you would want to be below that for the fishing mortality and above that for the B over BMSY.

Just noting that this is a simple sensitivity that was provided by a sub-team of the group, and it relates to Term of Reference 4. It did not go into a full suite of sensitivities, such as the B over K values that were explored in SEDAR 9 or SEDAR 33 update, or 33, but we present this here, in terms of fulfilling Term of Reference 4, noting that, if you were to look at this further, you would have to go into an extreme amount of additional work.

To summarize, for the base model results, in terms of Terms of Reference 1 and 3, in terms of the Magnuson-Stevens, the reference points for evaluating where the stock is currently, in terms of these reference points, I have given you a panel with three columns of the variable that is of interest, the metric, the definition, and then the value, and I am not going to go into all of these.

These are -- I would say the first group of items relates to most of the assumptions that you've heard today regarding inputs and how they were adjusted, in terms of the M, whether steepness was fixed or not, and then the second set of metrics addresses mortality rate criteria within the Magnuson-Stevens reference points, and then, finally, the biomass criteria, and then I've given -- What we want to focus on are what's the current value of fishing relative to the proxy, the proxy being F 30 percent SPR for this stock, and it's at 1.729, and so 173 percent higher, and then, likewise, under the biomass criteria -- I will just point out that, for this stock, the overfishing criteria has been redefined, and it was one minus M times SSB at SPR 30, and it is now 0.5 times SSB at SPR 30, and so we have that value, and then we have the equilibrium yield at the SSB MSY proxy.

Now, knowing that we are above -- The current level of SSB in 2018, the overfished rate value, is 0.68. The current value of SSB to the unfished level of SSB is 10 percent, and so knowing, that we are overfished, then that sets into place a couple of things, in terms of projections, meaning that we -- It is

overfished, and that we need to rebuild to the unfished level at the proxy, the equilibrium level, and so it is at 10 percent currently, the current level of stock biomass in 2018 to the unfished level. In terms of the overfished level, it is at 68 percent, and that means we need to rebuild to 70,118 metric tons.

Now, this might be an excellent time for a break. What I will do is I will go into projections. I will give the settings and then the assumptions and then some results, and then I can also offer -- I can offer more questions, if you have any at this point, or we can move on.

CHAIRMAN POWERS: Thank you very much, Nancie. I think this would be a good time for a break, and so let's take a fifteen-minute break, and then we'll come back and entertain questions on what Nancie has done before, and then we'll go on into the projections. All right. Fifteen minutes. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN POWERS: We will return and open the floor for further questions about what Nancie Cummings has presented thus far, in terms of the overall results and the modeling that went in to get there, and so let me open the floor. Luiz.

DR. BARBIERI: Thank you. Nancie, I was just trying to get back to that steepness, the fixed steepness value that was chosen, and so I have a couple of questions. One is you mentioned how that choice was made by the panel.

MS. CUMMINGS: Yes.

DR. BARBIERI: I would like to revisit that, briefly, and then ask if you looked into how that estimate, or the value chosen, and how does that value actually relate to the SPR 30 percent reference points that is being used. Like, similar to those discussions that you may remember that we had back in I guess it was SEDAR 33, and so just to calibrate amongst those thoughts.

MS. CUMMINGS: Okay. First of all, are you seeing my notes, or are you seeing the regular slide show?

DR. BARBIERI: We're seeing the notes.

MS. CUMMINGS: Okay. That's good for me, if that's okay with you guys, because the notes are important. what I wanted to note, Luiz, is how the value for steepness was chosen was that

we ran the profiles from steepness for the base model from 0.4 to 0.99 at various levels. What you're seeing here are at 0.05 values, but they were run from like 0.05 back to 0.01, the one you're seeing here, and so what we saw was that, although the -- It was rather flat in that entire region. The value that was selected by the panel was 0.777.

You would like it to be a little bit more distinct, more distinct low, but it still did reach an MLE, and what I want to point out that's not captured here, but for the SEDAR 33 benchmark, and not the 33 update, we applied the value that was selected, and it was actually by the SSC.

After the review workshop in the SEDAR 33 benchmark, which was in May of 2012, I guess it was, the reviewers suggested that we could not estimate -- That we did not estimate steepness, and the model was estimated, and it's similar here, and it doesn't have the flat, flat, flat, or reach the low, low, low, rather, and so that we looked at -- We tried to do a summary from the literature on steepness for this fish-like species.

I did just a literature review, and the values that were selected were those from -- It was a mean, I believe, and it was 0.85, actually, and it was from -- I think we used the literature review, but it was 0.85, and there was no real comparison, I want to say, or analogy, made to how this level relates to the SPR 30, and so that is for steepness.

The value here that's been chosen, the 0.777, is lower than the value that was chosen by the panel, the SSC actually, in SEDAR 33, which was 0.85, but that value, as I said, was based on more of a literature search, and this value is being based on profiling.

The model did favor values above 0.7, but there was not a deep trough in that area, and so the steepness was not well estimated in the values between 0.7 and 0.8, which supported -- So, rather than supporting it on the literature-based values from the SEDAR 33 benchmark, this was felt to be a better, more logical value for this stock.

DR. BARBIERI: Right, and I was just wondering if looking into what value of steepness would best correspond with that SPR metric that we're using as a reference point might give us another way to evaluate how these two metrics are related and align to each other, and so our choice right now is whether 0.777 is reasonable or not.

MS. CUMMINGS: Well, I think the profiling, given the data, given the model development and given the information that was deemed to be appropriate for the model, in terms of how the data were being modeled, in terms of the errors around the indices and the variance adjustments for the indices and the various adjustments for the Dirichlet and for the compositions, and, in terms of the support for the information that's being used to characterize the profiling, like what is going into the base model, I believe that we have support that the values between 0.7 and 0.8 are more reasonably -- They would be more reasonably adopted than the literature value that was adopted in the SEDAR 33 benchmark of 0.85.

Those species were not -- They were reef, or reef-like, species, and perhaps not reflective of this species, and so I think that the panel's recommendation of 0.777, in terms of the profiling that's being supported through the data that's input, is appropriate, and I think I could open that up to others, Katie or Shannon, if they have more -- If they would like to offer some support or suggestions, but I think that moving -- I just want to say that I think, as the panel made the choice to move forward, based on the modeling for the data that we have, it wasn't based on the literature work that was done from seven years ago.

CHAIRMAN POWERS: But I think one of the things that Luiz is getting to is that, given that steepness is fixed, you can actually go ahead and estimate a BMSY, and it would be nice to know how closely that aligns with the B SPR 30. I think it would be reasonably close.

MS. CUMMINGS: Okay.

DR. BARBIERI: Right, Nancie, and that's exactly what I was trying to get to, because we are using an SPR-based reference point for this, and rightly so, and I agree completely, and I don't disagree with the 0.777 value that was chosen by the panel, and it was a reasonable process, I think, to choose that, but I just would like to see how the value chosen aligns with the corresponding SPR metric reference points that we are actually using.

MS. CUMMINGS: Okay. I think that's something that would have to be done outside of today, I think.

DR. BARBIERI: Okay. Thank you.

MS. CUMMINGS: Thank you.

MS. MATOS: Mandy Karnauskas has her hand up.

DR. KARNAUSKAS: I wanted to point out that analysis has been done. There was the Harford paper from 2018, where we looked at simulated relationships between steepness and SPR and MSY, and, granted, that was done based on the old SEDAR 33 life history, and so it might be a little bit subject to updating, but that analysis suggests that SPR 30 would correspond to approximately a steepness of 0.8, and so, generally, in the ballpark of what is being suggested by the panel.

MS. CUMMINGS: Okay. Okay. Thank you, Mandy.

CHAIRMAN POWERS: Thank you.

MS. CUMMINGS: The life history updates were minimal, and the L infinity was only minorly affected, and the maturity, also. Thank you. So we're using 0.78, basically, instead of 0.8. Okay.

DR. KARNAUSKAS: I would have to look at the exact number, and I'm pulling it from the graph, and so it could very well be very close to 0.78.

MS. CUMMINGS: Thank you very much, Mandy.

DR. BARBIERI: Mandy, I think that's a good point that you brought up, but that paper was actually based on groupers and not greater amberjack.

DR. KARNAUSKAS: No, and it was done for greater amberjack as well.

DR. BARBIERI: Oh, it was? Okay.

DR. KARNAUSKAS: Yes, and it was groupers, snappers, tilefish, and amberjack.

DR. BARBIERI: Okay, and so, if we have a value of 0.8 as the steepness that corresponds to the SPR 30 percent reference point, then excellent. Then that confirms it, Mandy. Thank you.

MS. CUMMINGS: Well, I think it lends stronger support that the 0.85 was outside -- It's outside the best choice bounds, also.

CHAIRMAN POWERS: All right. Thank you. Are there any other

questions at this point?

MS. CUMMINGS: Nancie has an offer to show you -- I believe Mr. Gill had a question regarding the selectivity with and without the spline function, without the commercial vertical line index, and are you seeing my screen?

MS. MATOS: Yes, we are.

MS. CUMMINGS: Okay. Thank you, Jess. I can show you that, on the left-hand panel, I have -- If you would like to see it, I will show you. If you do not want to see, then let me know, and I will move on, but I have located the run with its -- For the selectivity for the commercial handline fleet, and this is prior to removing the commercial -- The index, the commercial handline index, and so what we want to look at is how did it affect the selectivity for that fleet, and this is the final base model with that handline index removed, and so the selectivity is still -- The 100 percent mark is just slightly below, but it's very similar, very close, and so it did not affect the selectivity for that fleet by removing the handline index.

MR. GILL: Thank you, Nancie.

MS. CUMMINGS: You're welcome, and I did have that -- I believe one question from an email that came to me, and I just luckily saw it, about the jitter. The question was were those done independently, or were they all just lumped together, and they were -- In terms of the performance analyses, the stability analyses rather, these are all independent runs. That's a good question. I've never had that question, and that was really good. Are there any other questions?

CHAIRMAN POWERS: Go ahead and move on to projections.

MS. CUMMINGS: Thank you. We're going to move to -- We have two topics left, projections and then an overall summary, but, first, I will show you -- I will present the settings of the projections and the results, and just to say that the projection settings are, for the most part, pretty much similar to SEDAR 33 and the 33 update. They have been a couple of changes, and we will go through those.

The proxies were calculated based on 100-year projections and looking at the last ten years of the projection to obtain the equilibrium calculations. The proxies were for the F over F 30 percent SPR, and then the SSB -- That year over SSB at 30 percent.

MR. RINDONE: Excuse me, Nancie. Just real quick. For the equilibrium assumed over the last ten years, I presume that's supposed to be 2009 to 2018.

MS. CUMMINGS: It is, but what we tried to achieve is the equilibrium projection at that --

MR. RINDONE: That last -- So the tail-end of the period. Okay.

MS. CUMMINGS: Yes, and we show you -- I think we show you the tables for the last ten years. Just a reminder that MSST, the minimum stock size threshold, has been redefined for the stock as 0.5 times the SSB at SPR 30. Recruitment was fixed in the projection as the recent estimated mean, and that is from 2009 to 2018, and this is the main change in the projection from the 33 update, and, also, we have the gap years of -- We start the projections in 2021, and we have data through 2018, and we used the average of 2017 to 2019 data for the 2019 and 2020.

Then I just want to point out that the stock assessment report that you have, and the projections that are presented in there, they're slightly different, only because, after the assessment report was presented, and, actually, after the stock assessment executive summary was presented, then we were able to get 2019 data, and so we filled those 2019 and 2020 years with actual data for 2019, and so, instead of the 2016, 2017, and 2018 average, now we're using 2017, 2018, and 2019 averages. These are just details for the projections. What you have here is, again, the data go through 2018, and so you have the recruits, and then you have recruitment estimates from 1970 through -- Just to show you what we used.

CHAIRMAN POWERS: Nancie, recruitment was fixed at that level and not using a stock-recruitment relationship?

MS. CUMMINGS: Yes, sir, and that was a change from SEDAR 33 and the 33 update, and it was -- One of the reasons for that, and there were probably many reasons, or several reasons, but one of the reasons was that, as you see from the early period, we have -- Especially the data-rich period, meaning between the 1984 forward, we have these large spikes in recruitment, and it was also felt that the average, the last ten-year average, and there is two reasons here, but fixing it to that average would deter the recruitment from going outside the -- Like suggesting a regime change in recruitment, but, also, this has been a practice in our recent SEDAR assessments for some species, many species rather, that we have used the last ten years on the

average, as average recruitment, that single value, yes.

CHAIRMAN POWERS: Okay. A counterargument is that it's overfished, and, when you're projecting ahead, you are fixing the ability of the population to recover.

MS. CUMMINGS: I can see that, yes. I can see, also, that, during the data-rich period, given -- Except for this one spike, we don't see a whole lot of contrast in the recruitment, and so, even if it had been fixed to a mean of let's say earlier years, like 1990 forward -- You know, we don't know much about the stock, in terms of its dynamics outside of these early years, and we only have -- Back in time, we certainly are not -- We only have the landings data to inform recruitment, and, here, these are very -- As we can see from the tables and the graphical data, we have almost no age composition through here to inform the age comp and the zeroes, and, obviously, there are zeroes until here, when we start picking up our age composition data.

We have this one spike, and we do note that, as we have forward -- You know, management began in the mid-1990s, or early 1990s, and so, as we moved forward in time, we've additional regulations that have affected the stock dynamics, and notably the size limits, and some quotas, but we do see, as I note here, this average of -- This recent average, this ten-year average, you don't see a whole lot of change in the variability since like early 1990s, but, yes, Joe, I see your point.

Those are the settings, and so, just kind of reiterating what we've done here, in terms of moving projections forward, we have to fish the stock, select the stock, select the size, and retain some fish, describe fish, and then we have the gap years. As in most of the SEDAR assessments at the Southeast Center, we have used the last three years to set relevant F, selectivity, and retention, and, again, I noted that the average for the recruitment is that last ten years, and then we filled those gaps years, and then we, of course, have to fish -- We have to assign the fish to various commercial and recreational sectors.

Then the overall results of the projection are presented here in this table, and I have -- There is about five columns, and we were asked to do projections at the overfished limit, which would be the fishing at F SPR 30; maintaining those allocations; and then, since the stock is deemed to be overfished, to do projections at F rebuild, and we're showing you, I think, six years here.

CHAIRMAN POWERS: Can you remind us what F rebuild is?

MS. CUMMINGS: I will go through that in one moment, and I just want to set up the slide here, and that is I have given you the retained yield, and then I've given you the year that it will reach the overfished level, or pass it, and then also the year in which it will attain the SSB at SPR 30, and that's the unfished, the SSB at SPR 30.

We were asked, in the terms of reference, to provide the retained yields at fishing at F SPR 30 and then, given whether the stock was overfished or not, to do the projections fishing at F rebuild, and the F rebuild is calculated as that fishing mortality rate which would allow the stock to rebuild to SSB SPR 30 by 2027, and that was the year that was specified. It does that until 2026.

This is just the graphical figure, and so what we've given you is the current yields and then the projected yields at F rebuild, the orange, or red. Excuse me. The OFL. Then F rebuild is the blue, and you can see that, in the near, immediate future, the yield will have to come down to rebuild to SSB SPR 30, but it will achieve that by 2026 for F rebuild.

Now, this does -- This set of projections is slightly different from the SEDAR 33 benchmark, in that the constant catch projections were suggested for these years, and I believe they were asked for for five years, in addition to the OFL, and the ABC was not requested at that point, and it was decided -- It was between Assessment Webinar 3 and 4 that constant -- There was quite a discussion about this, that constant catch projections were not appropriate for this stock at this point, and so they were not requested, but, as the stock was determined to be overfished, then F rebuild was certainly requested, and these are -- I would just like to note, and my apologies, but these are retained yields in millions of pounds.

This is just a more detailed table that you just saw, in terms of the ten-year projections, what those recruits are, and the calculated fishing mortality rates. These then would be the metrics, the relevant metrics, that would be needed to be looked at, and this is OFL, and this at F rebuild, and it's showing you that that fishing mortality rate would be much lower, and it would increase as the stock continued to rebuild towards that magical number of 7,118, and it would reach recovery by 2026. Then, again, the final value to focus on would be that OFL, which is retained yield in millions of pounds.

Then there was also a question for the previous vermilion snapper and cobia assessments, because now we're using the FES landings, and so, had we had the FES landings in the SEDAR 33 assessment, update, what would that equilibrium yield have been, and, had the FES landings been available during SEDAR 33, the equilibrium yield would have been nearly twice as much.

Assuming the ABC from the hypothetical SEDAR 33 update FES run had been six-million pounds, the current recommendation for the equilibrium yield is about 33 percent lower than the larger increase that it would appear to have been, in terms of -- With the SEDAR 70 operational assessment, that equilibrium yield is about four-million pounds, and so this is just -- This might have been something that the council staff had asked for.

MR. RINDONE: Yes. Thank you, Nancie. I like seeing that.

MS. CUMMINGS: I know this is Ryan's table. You're welcome.

MR. RINDONE: Well, let's not call it that.

MS. CUMMINGS: I will just point out here that you need to look at the terminal year of data, and so we're not apples-to-apples here. We have new data and some revised data, meaning with commercial discards reflecting less discarding of the commercial fishery, and we have an estimate of recruits that is somewhere in between the SEDAR 33 and the SEDAR 33 update, had you had the FES number, and the Fs are somewhat in a similar ballpark, and, again, indicating, if you had that FES data back in the SEDAR 33 update, that you would have had a larger SSB, as we saw, and then the equilibrium yield would -- Now updating that information is not so drastically as different, and it's about four-million pounds.

Then, finally, I realize that digesting all of this is a lot to digest, and even though it was conducted over six months, probably, but there's a lot of components to this, and, also, I have sort of expected everyone to remember SEDAR 33 and SEDAR 9, and I know that's not possible, and some of us just sort of wear it on our arm, but the final summary is that the SEDAR 70 amberjack assessment is predicting a steady and significant decline in total biomass and spawning stock biomass and an associated and increasing and intense exploitation, as the stock remains in an unhealthy state. Like I said, it's about at 10 percent of the SSB zero level.

It is continuing to undergo overfishing, and it remains in an overfished state, according to the definition of overfishing and

overfished. Overall, we would say that the SEDAR 70 base model is an improved model, both in content, incorporating the newest data, the best available information, in terms of the statistics, the catch statistics, the sample data, and also incorporating all the new life history information that has been collected to-date and also has incorporated -- I would say probably not 100 percent of all the model issues that can be addressed, but it has certainly addressed additional modeling issues that were raised at the SEDAR 33 benchmark back in 2012.

That has resulted in an improved model, and that has resulted in improved stability, in terms of convergence, as you saw from the general analysis from SEDAR 33 to SEDAR 70. Overall, the model is a much improved model, and the assessment -- This bears out in the credibility of the results from the assessment.

As I said, some uncertainties remain. In terms of landings data and the recreational fishery, we feel that those are more uncertain than the commercial data, as the model, SS 3.3, can now entertain year-specific uncertainties, and so that is something that could be considered in a research track.

Again, the discards are estimated prior to 1981, and they are not quantified, and that would be something that would take a great deal of work, I feel, because there is not a lot of information available before 1981 to quantify the recreational discarding of fish, and, again, we can always use more discard size composition.

The coastal logbook program does provide information on the size composition of released fish, but it's only for recent years, and so these categories, in terms of the modeling, are two of the largest, in terms of the composition data. The composition data, as you recall from the SEDAR 33 benchmark, drove the assessment, and we downweighted the composition data because of the uncertainty in terms of the model fitting.

Research recommendations, I have probably paraphrased most of these, and we feel that estimates of maturity need to continue to be updated, and fecundity in particular, and to expand the observer coverage, and particularly in -- We have observations of fish that are being retained out-of-season. Currently, the discard size composition only includes fish that are discarded, and so what to do with these fish, and there's not that many, but we would like to know what is going on there, and, overall, baseline sample composition increasing is always what we would like, in terms of particularly directed to discarded fish.

Quantifying more refined weighting procedures, and, currently, the weightings are at a year/stock level. Considerations of what's going on sub-regionally is probably warranted, and, finally, to continue with the fishery-independent indices, in terms of supporting the three individual programs, but also to take a look at the larval data that are available through SEAMAP, and particularly to identify the specimens, and there were specimens available from 33, at the 33 benchmark time, but they had not been identified.

We see the issues, and we've talked about the issues, of the fishery-dependent indices, and so investigating options for developing fishery-dependent indices that better reflect the abundance of greater amberjack are important, and particularly those indices that may be affected or have confounding characteristics, because of regulations.

Then kind of a shoutout for these state-specific programs that are being developed, in terms of the recreational data, and those could be maybe platforms to maybe look at some of the -- Improving some of the recreational indices, for this species and other species.

Then I would like to -- I upgraded 3.24 pretty much solo, and I kind of touched bases with Rick Methot and Ian Taylor, and it was good, because we found that greater amberjack tested the 3.3 model, and we found a few things as late as even in the projection time period that had to be modified, and so we're always continuing to learn how to use SS.

Then I would like to thank all the reviewers, particularly the Center reviewers, and Skyler Sagarese, who worked effortlessly to move the greater amberjack stock assessment into the current markdown, with the use of the markdown, in terms of the formatting for the stock assessment report and the executive summary, and I thank you.

CHAIRMAN POWERS: All right. Thank you, Nancie. That's very illuminating. Let me open the floor to questions or observations, et cetera. I will go ahead, while people bring things up, and I will go ahead and ask a question, and I think it might be more of a question for Ryan.

It seems to me the bottom line is that, in SEDAR 33, they said that it was overfished, and, in SEDAR 70, we say it's overfished, and so whatever happened in the interim didn't really address the issue, and there's all kinds of complicating things about data changes and the different catch levels and so

on and so forth, but the bottom line is it hasn't been addressed. The stopping overfishing hasn't been addressed. I guess one of the questions I have is that, in SEDAR 33, they use the same F rebuild, with a goal of achieving it in 2027?

MR. RINDONE: Yes.

CHAIRMAN POWERS: Okay, and so the recommendation in SEDAR 33 for ABC and the catch limits and so on and so forth was trying to achieve that 2027 F 30 percent SPR?

MR. RINDONE: It's a ten-year rebuilding period.

CHAIRMAN POWERS: Ten years from what?

MR. RINDONE: So from -- Well, essentially, it's from when it was implemented.

CHAIRMAN POWERS: Okay, and so 2017 or whatever it was. Okay. All right. I am thinking ahead, as to how to explain it to the council and what issues of the FES will come up, what the actual catches were versus what the projected catches were and so on and so forth. Let me open the floor then. John Froeschke.

DR. JOHN FROESCHKE: My question is related to Slide 42 in the presentation and the projection settings. I have compared those to Table 22 in the report, which also has the projection settings, and I know that Nancie stated that they were different, and I see that reflected in the landings used, whereas, in the presentation, it's the 2017 through 2019, as compared to the 2016 through 2018.

I noticed that the landings used are quite a bit lower in the presentation, but I was just surprised that the ABC F rebuild is essentially tripled in the presentation, versus the report, and I just was having a hard time understanding why the changes in the landings were sufficient to increase the F rebuild in 2021 and forward so much.

MS. CUMMINGS: The difference in the stock assessment report and the presentation on the landings is that 2016, 2017, and 2018 were used at the average for 2019 and 2020 for the projections in the stock assessment report, and then we updated. After the stock assessment report was delivered, then we updated, and we were able -- We had 2019, and so now 2017, 2018, and 2019 become the average for 2019 and 2020.

Then the difference in the F rebuild projection, John, is that

we learned that there was a little issue with SS, and so that required some slight modification to how we did the projection for F rebuild.

DR. FROESCHKE: So it wasn't the landings, necessarily, that comprised most of the difference, and it was the issue?

MS. CUMMINGS: With the projection, with the F rebuild projection.

DR. FROESCHKE: Could you kind of summarize what that issue might be, just so we could understand, because it's a big difference.

MS. CUMMINGS: Let me just go -- Katie might want to take a whack at that, while I'm looking for a slide, for a document, or Shannon, if they're on, but I'm just going to look at something first.

CHAIRMAN POWERS: Katie or Shannon? Katie was on, and I'm not sure about Shannon.

MS. CUMMINGS: I will be back, but I just want to take a peek at something. It's just something that has to do with the F rebuild projection in SS and not the OFL projection.

DR. CALAY: I apologize, but I had to step away for a moment.

DR. KATIE SIEGFRIED: This is Katie. Shannon, did you want to speak to that, or should I?

DR. CALAY: Go ahead, Katie.

DR. SIEGFRIED: I do think that it was some of the issue that Nancie is talking about that had to do with the uncertainty around the projection, but the difference that you noted in the first two years of the projection, the almost tripling of the catch advice, was due to the fact that the catches were so much lower in 2019 than what we were assuming before.

The issue that Nancie is talking about is the uncertainty around the projection, that we actually had to ask Rick Methot, the SS developer, how to solve that problem, and it was a matter of how we specified the F SPR, but I am trying to pull up the previous report, but it's quite a bit different, quite a bit lower, for the actual 2019 landings than what was assumed before.

MS. CUMMINGS: Now I have it.

DR. SIEGFRIED: Which it's a good thing that we were asked to redo it with the actual landings, because it does give a more accurate picture of what was taken in 2019.

MS. CUMMINGS: John, did that get to what you were asking about? I was just looking for my spreadsheet.

DR. FROESCHKE: Yes, and it's just hard for me -- It's a little bit hard for me to understand how the stock could respond so fast to that. I mean, there was one year in there, when we changed the fishing year, that the landings were held low, because the season was very short, because of the change in the fishing year, and it just seems -- I don't know, and I guess I'm cautious that it could be so different.

DR. SIEGFRIED: I just pulled up the stock assessment report, and the difference is quite large in 2019, and it was 284 metric tons assumed for commercial vertical line, and, in the updated projections, it's 158. It's 130 metric tons.

MS. CUMMINGS: Remember that's the average. It was 2016, 2017, and 2018, versus 2017, 2018, and 2019, and it's that new year that brings that average down, that 2019 year. I mean, in the end, what happens, John, is because -- As expected, that average came down, and it went into the 2019 and 2020 gap years, and it allows -- It did respond fast, but it does allow more yield to be taken.

DR. FROESCHKE: I guess the concern is that that year, because of the changes in management, isn't really a representative year of how the fishery was operating.

MS. CUMMINGS: You mean the 2019 year?

DR. FROESCHKE: Yes.

MS. CUMMINGS: Well, actually, it may not be reflective, but those are the data. I mean, they're preliminary, and I agree, but I don't expect those numbers to change drastically.

CHAIRMAN POWERS: What he's really getting at is those numbers are used as a surrogate for 2020, correct?

MS. CUMMINGS: The 2017 through 2019 average is used as a surrogate for 2019 and 2020, yes.

CHAIRMAN POWERS: So what John is saying is it's kind of

sensitive. I mean, you can't get around that.

MS. CUMMINGS: Right.

CHAIRMAN POWERS: So then the question is, is there some expectation that 2020 was that low?

MS. CUMMINGS: Then you would be -- We would have to discuss the COVID impact, basically, on the fishery, and that's outside my purview.

CHAIRMAN POWERS: No, and I don't believe an answer is there, but, nevertheless, that's sort of the question that comes up, because, like we said, regardless of how you got there, what is being shown is that it's pretty sensitive.

MS. CUMMINGS: I will remind you that, in SEDAR 33, Ryan, we chose -- A constant catch projection was chosen, and the rebuild stock size was set, but it was a constant catch, and then, in SEDAR 33, it was -- You will have to remind me what they chose. I believe they went with the OFL.

CHAIRMAN POWERS: Okay. Doug Gregory.

MR. GREGORY: Thank you, Mr. Chair. My thoughts were similar to what Joe expressed earlier, and I wonder if we could take a look at -- I think we had two previous assessments, Number 9 and Number 33 and then the update, to look at what our ABC recommendations were and compare that to what the actual catches were in those years.

It really appears, to me, that this ABC projection, and I can understand why the panel did not want to take an average, given that this fishery apparently has been dramatically overfished, below one-half of BMSY, for twenty years, thirty years, and an average would give you a high landings, and so I understand that.

I actually would -- Since we're going to get interim analyses, and I have a hard time believing these projections, that this fishery is going to recover as quickly as its projected to recover, since it hasn't recovered over all these years of management, and so I think the projections are highly optimistic.

It has nothing to do with this assessment, and it's our assessments in general, and two, I guess, best practices that are being used, apparently, to me, it seems like, is, one, that

catchability is increasing over time, is assumed to increase over time, and that's built into the analysis, and, two, the projections, or extrapolations, of recreational landings back to the 1950s.

I understand why these two things are being done, but these two aspects of the assessments are speculative, and greatly increase uncertainty, but they increase uncertainty in a manner, or a bias in a manner, that gives more negative stock status results, and so we can save this for a future discussion, but, pertaining to this assessment, I think the projections are optimistic, as they're laid out in the assessment. Thank you very much.

CHAIRMAN POWERS: Thank you.

MR. RINDONE: Dr. Powers, I have what Doug was asking for, if we go to Table 1.1.2.

CHAIRMAN POWERS: Okay. Which document is it?

MR. RINDONE: This is an old framework action for greater amberjack, but it has the data that Doug was asking for, the landings against the catch limits and the percent of the ACL landed, and, in this case, it also shows the closure dates.

CHAIRMAN POWERS: These are pre-FES?

MR. RINDONE: Yes, and these are all in CHTS.

MR. GREGORY: If I may, that suggests that our ABCs were not overly optimistic in the past, since the industry had no difficulty catching them. Thank you, Ryan.

MS. CUMMINGS: I have a comment, or a response, to Doug on one item. Doug, if I may, you had raised a point that the panel had thought that constant catches were not working in light of particularly that the stock had not recovered and that it had been overfished by more than 50 percent since -- It's been forty years, in light of all the regulatory measures that have been taken.

I just want to point out that -- We can go back to the graphics and so forth and the actual table numbers in the SAR, but the stock has been overfished since way before regulatory measures. In fact, it's showing since 1977. If you look at the SEDAR 33 assessment, even though -- Let's say that the data have improved and the modeling has improved, and there is still uncertainties, I agree with, but the stock has been overfished since 1977 in

all but one year, 1984. It's even before the regulatory measures, and so it's almost as if the measures haven't had a chance to move it back into an un-overfished state.

MR. RINDONE: Nancie, I think that's one of the things that is kind of perplexing for -- Probably for the SSC, and definitely for the council staff, that it seems to be that, no matter what it is that we try to do, and regardless of the magnitude of the predicted effect of those changes, management has been otherwise unable to change the trajectory of the trend in biomass, from what we observed for the terminal year slide that you had in your presentation, and it has precipitously declined since 1950, and it's been overfished since 1980, and there is not a thing that we've done in the past, or the recent past, and, in the last several years, there have been numerous management changes to greater amberjack, and those have all seemed to have almost no impact.

It's just not something that we typically see with other species, and we can see evidence of changes in management show up in different parts of the assessment and different data, and we just don't see that with amberjack, and so that's kind of a head-scratcher.

MR. GREGORY: Real briefly, if I may, I think a large part of that isn't just my intuition talking, but it's the fact that we allowed, we management, allowed the recreational sector to fish on juvenile fish up until just a couple of years ago. Maturity is at thirty-two or thirty-five inches, and we started out, in 1990, with a twenty-eight-inch size limit, and that's been in place, and so we've been fishing juveniles a lot, and so that could be one of the major reasons for this lack of response. Thank you.

MS. CUMMINGS: I would like to applaud Mr. Gregory for that statement, because it's been very clear that the differential size limit has remained a differential size limit until recently and that it has only recently, as of 2016 or whatever the year was, been allowed to come into an area where it's now appropriate.

CHAIRMAN POWERS: All right. We're not resolving this yet, and so let's continue on with the discussion. Harry Blanchet, you were up next.

MR. BLANCHET: My question was more on a detail issue. On page 45, the top half of that graphic, you've got the -- It's the projections at SPR 30 percent, the OFL, and the ratio of F over

F SPR 30 is all above one.

MS. CUMMINGS: What is the question? I'm sorry, but I missed the question, because something happened to the slides. The projections are -- What is the question?

MR. BLANCHET: The question is, if the projections are at SPR 30, why are the ratios of F over F SPR 30 all above one?

MS. CUMMINGS: Under OFL, the stock doesn't recover until 2036, I believe, and so they --

MR. BLANCHET: It would seem like, in order to recover at all, it would have to, at some point, have Fs at or below the target that you are recovering to.

MS. CUMMINGS: Correct.

CHAIRMAN POWERS: My interpretation of a projection at OFL is a projection at F 30 percent SPR.

MS. CUMMINGS: It is fishing, yes.

CHAIRMAN POWERS: In which case all of those should be one.

MS. CUMMINGS: Maybe that's a typo. I have to check the spreadsheet, folks.

DR. CALAY: If you don't mind, I would like to make a comment about this.

CHAIRMAN POWERS: Go ahead.

DR. CALAY: Thank you very much. So this is not a typo, I don't think. This is something that we see frequently in SS projections, and we have certainly made Rick Methot aware of this issue, and kind of the bullet-point summary of Rick's advice to us is that the things that we attempt to hold static during a projection, including allocations, the F value, various parameter estimates within the model, is just not possible to hold everything static, the way that we attempt to do.

He claims that this is essentially transitory effect that we see in the age structure, and so this is something that we are looking into with a comprehensive examination of our projection procedures, but it simply may not be possible to hold the allocations and achieve F SPR 30 at the same time.

We do achieve F SPR 30 in equilibrium, but we see this transition in the initial year to the projection, where the values do exceed F SPR 30, and it does appear that these are transitory effects caused by age structure and composition data.

CHAIRMAN POWERS: The transition is a decade or so, and, I mean, it's not real short-term.

DR. CALAY: It's not. You're correct.

MS. CUMMINGS: Yes, that is correct.

MR. BLANCHET: It seems very flat at the end of it. I mean, it's at 1.33 for four years, or five years.

DR. CALAY: These are 100-year projections, actually, and so they achieve equilibrium, but way into the future, and so we have seen this before with several stock assessments. The severity of this issue varies from assessment to assessment, and this one is a little bit more extreme than some other examples that we've seen. We can look into it further, but we don't have a fix to this at this time.

CHAIRMAN POWERS: Thank you, I think.

MS. CUMMINGS: Thank you, Shannon, and I will reiterate that this isn't a typo, and what's happening here is that we are fishing that stock at that F at 30 percent SPR and holding that through those years, and it does reach equilibrium, but it is very far in the future.

MR. BLANCHET: So the difference then between the F at the F rebuild and at the SPR 30 -- In one case, it's less than half the F at the SPR 30, and so the difference in the F there is primarily in the rebuilding horizon? It still seems surprising that it would be that much different, considering that one achieves it and the other one achieves it ten years later.

MS. CUMMINGS: Yes, ten years later.

CHAIRMAN POWERS: Well, the F rebuild adjusts the F to achieve it by 2027, and it's basically saying that, in order to do that, the F has got to be about half of what F of 30 percent SPR is. I mean, that's the way you sort of interpret it.

MS. CUMMINGS: Correct, while the other is just maintaining that F throughout that time series.

CHAIRMAN POWERS: Anyway. We may want to revisit this. Let's go on then. Bob Gill.

MR. GILL: Thank you, Mr. Chairman. I would like to comment on John's question, and I guess it relates to Katie's comment on it. In terms of the change from the report yield streams to the supplemental, the change is driven primarily by the change in the private recreational, and it changed about 30 percent, whereas the vertical line changed about 45 percent, but, if you're averaging that over three years, then the real driver is the 10 percent change in the private side, and so what that says to me is, given the difference in results -- You know, you go from the funky yield curves that resulted in the report to the current ones, and there is an extraordinary sensitivity to a relatively small change in the assumption on interim landings.

That is a little scary, because that changes the management advice rather considerably. Have you all explored that sensitivity and thought about ways that that might be mitigated, or dealt with, other than the fact that it exists and we just have to live with it? Thank you.

DR. SIEGFRIED: Nancie, do you want me to speak on that, or would you like to?

MS. CUMMINGS: Yes, you can speak on that.

DR. SIEGFRIED: The one thing to note about your comment is that we don't really have any uncertainty around those recreational landings in 2019 that is put into the projection besides the averaging of 2017, 2018, and 2019. We haven't done any sensitivities around how many years to average.

One thing to note is, when the terminal fishing mortality is high, if the interim catches assumed for the projections are also high, it does have a larger negative effect on the stock sizes, and so I think it's following on high Fs with further high Fs that cause that big effect in those 2021 and 2022 yield estimates, but, other than that, we haven't done a lot of uncertainty analyses, or sensitivity analyses, around these interim catch years. In fact, we don't have a lot of uncertainty around our projections, besides those uncertainty bars that you saw in the plot that Nancie provided.

If the SSC has any advice about that, we are happy to take that as we look forward to our forecasting working group, to get some of these procedures more standardized.

MR. GILL: Thank you, Katie. It seems to me that one of the messages that we're seeing here is that exploring those kinds of sensitivities that will rebound through the process will be important in the future.

DR. SIEGFRIED: Thank you. We agree.

CHAIRMAN POWERS: Going back to the previous comments about doing those projections, these are being done at an allocation of 27/73 percent, correct?

MS. CUMMINGS: Yes.

CHAIRMAN POWERS: With the FES, you're increasing the recreational component quite a bit, correct?

MS. CUMMINGS: We are using the catches.

CHAIRMAN POWERS: Well, not correct, and I know it is, and the FES is higher.

MS. CUMMINGS: Yes.

CHAIRMAN POWERS: So, I mean, that sort of -- That sort of compounds things, in terms of maintaining the existing allocation, and when one sector changes considerably, which is something we have noted before, about that lots of allocations for lots of stocks are going to have to be revisited.

MS. CUMMINGS: But, Joe, one point. The way the OFL projection is done, remember, is that we go in and we look at those Fs for those fleets, those specific fleets, to achieve that SSB and the equilibrium, and those Fs are being input into SS.

CHAIRMAN POWERS: That's my point, is that it's forcing an allocation on a fishery that doesn't really operate that way.

MS. CUMMINGS: Right, and I did look, preliminarily, at some of what the distribution was for the different ages, for each fleet, and see when it got to equilibrium, and it was -- It's not fast, and so, yes, we're forcing the OFL projection. We're forcing those allocations.

CHAIRMAN POWERS: Okay. Thank you. We've got four people on the list, and what I would like to do, hopefully, is go through the first round of questions and comments and that sort of thing, and then we'll -- I think we're close to lunch, and so let's go through those, and then we'll break for lunch and then

return and, obviously, revisit where we stand with this. First up is Paul Sammarco.

DR. SAMMARCO: Thank you very much, Mr. Chair. I have just some comments to make, first, and then I have three questions, please. The first is I would like to congratulate Dr. Cummings on her presentation. It was excellent, and we're obviously looking at -- We're lucky, in that we're looking at long-range historical data. Again, excellent job for the in-depth analyses at all levels, with all aspects of the models being considered, and so bravo to you on that.

To me, the data are very clear, as it probably is to my colleagues there, that the fishery is overfished and needs attention, and I agree with that. Also, two options were presented for consideration for rehabilitation of the fishery, and one was more stringent than the other.

It's an important fishery, ecologically and commercially, obviously, and has been for some time, and I would like to recommend to the group that we recommend to the council the more stringent option to bring the fishery back to a strong position, perhaps in a shorter period of time.

My first question to Dr. Cummings is I was a little confused, and could you please explain why either you or the model would expect F rebuild, those numbers, to drop with time before they increase? Thank you.

MS. CUMMINGS: Thank you.

DR. SAMMARCO: That was the graph where you showed the two models, and you said, well, the F rebuild is going to have to drop before it goes up, and the other one didn't.

MS. CUMMINGS: I think -- It's just Ms. Cummings. I am looking at the graph on my computer, and I think it was the -- Are you talking about the yield? I think, Joe, Dr. Powers, the Chair, sort of explained it pretty well, that, if we want the stock to recover to equilibrium yield by 2027, that magical year, then the yield will have to come down, and it will have to drop before there can be continued growth, before there can be an increase in yield.

DR. SAMMARCO: Okay. Thank you. I appreciate the clarification.

DR. CUMMINGS: You're welcome. What happens is that, when you

drop that F by 50 percent or so, as Dr. Powers noted, it allows a pretty good increase in yield, in stock growth, in the first three years, and then you see it -- It reaches that point, that magical 7,118 number, in 2026, which is pretty fast, but it is a very large drop in F, and it's assuming all those other assumptions that we were noting.

DR. SAMMARCO: Thank you. The second question involves variance in the projections. In other words, does the model account for variance, and so you're basically looking at a projected average, but does it account for variances around that average, particularly in areas where -- Something like we're getting a drop, although that drop sounds to me like it's landings, where it could put the fishery in danger.

MS. CUMMINGS: I think Dr. Siegfried mentioned this, and I think she did a really good job talking about that, in the projections, we have minimal variance, uncertainty variance, going into the calculations. We're using average F, average selectivity patterns, and the recruitment is a fixed value, except for the time series, and so we know, and we've known for many years, many assessments, that our projections are probably -- We need to do more work in that area, in incorporating uncertainty into the projections.

DR. SAMMARCO: I was just curious, but thank you for that. The next question is more of a nuts-and-bolts question, and perhaps it's left to the council, but what do you -- What changes, or combination of changes, do you perceive in fishing controls that you think you would recommend to be the most effective in this case with amberjack, size restrictions, quotas, definition and duration of season, or whatever?

MS. CUMMINGS: I will defer to the council and the SSC for this question. I do think though that we may not have had enough time for this recent regulatory change in the recreational fishery, this last size limit, to be taken into account in the stock growth, in any new stock growth. That was a recent regulation, and I think it hasn't been fully incorporated into the stock dynamics.

DR. SAMMARCO: Okay. Thank you. Thank you very much. Thank you, Mr. Chair.

CHAIRMAN POWERS: Thank you. Kai Lorenzen.

DR. LORENZEN: I was just coming back to the why haven't we been able to reduce the fishing mortality, as it was intended, after

SEDAR 33 and the update, and I think there are sort of two things underlying that. One is that SEDAR 33, including the update, was still using the MRIP-CHTS, which, at that time, was sort of deteriorating fast, and so it was underestimating, and, over time, increasingly underestimating, the recreational catches, and, obviously, we have sort of rectified that with the use of the FES-MRIP now, but clearly the management then didn't quite catch up with the growth and the recreational catch.

The other is that there were actually two really large recreational overages in 2016 and 2017, as we saw at the beginning of that period, and so that hasn't recurred in 2018, and, in fact, I think there was an underage in 2019, but I think it's those factors at the beginning of that rebuilding period that basically meant that we didn't reduce fishing to the extent that it was intended.

CHAIRMAN POWERS: Thank you. Luiz.

DR. BARBIERI: Thank you, Mr. Chairman. First of all, I want to echo what Paul -- The comment that Paul made, Nancie. Great job, and congratulations to you and the panel on this assessment. Amberjack, of course, has a number of data limitations that make it a really difficult stock to assess, and I think that you did a great job, and the presentation today, again, was excellent, and so thank you for that. I mean, that, I guess I was Slide 16, when you walked us through the base model development, that was super helpful, and much appreciated, and so thank you there.

In terms of questions or comments that I have to make other than that, Kai already made a few of the ones that I was going to bring up, but I was thinking about us looking at a trajectory of fishing mortality, if we had fishing mortality estimates over time, a trajectory over time, and I think it's your Slide 25, Nancie, just to see that, really, over time, we have not been able to reduce the fishing mortality and decrease it to the level that was needed to rebuild the stock, and I think that slide helped us assess which one of the fleets, perhaps, were most influential in that failure to reduce.

Looking at the panel on the left there, I mean, if those are instantaneous rates, we have all of them being above 0.2, where we needed a lot lower fishing mortality to be able to achieve rebuilding of this stock, and so that's just some perspective there on -- You know, again, as Kai mentioned, what may have been some of the factors that prevented us from rebuilding the stock to what we need it to be.

CHAIRMAN POWERS: While we have this graph here, let me ask a quick question. The F on the one on the left is ratio of total kill over total biomass, and is that the same metric of F that was used in those projection tables, that you showed in the projection tables?

MS. CUMMINGS: Thank you, Joe, Mr. Chair. The values of F that are used in the projection tables are the values, the instantaneous values, and they are fleet specific. The values on the left-hand are the total across all fleets.

CHAIRMAN POWERS: In the projection tables, you have an F level, and is that an instantaneous?

MS. CUMMINGS: Yes, it is.

CHAIRMAN POWERS: Okay. Thank you.

MS. CUMMINGS: To go back to what Luiz was talking about, especially on the right-hand side, if one were to just look at the top two lines, the commercial vertical line and the blue, and then the yellow being the private charter, and then associate those levels of instantaneous F with the fleet-specific selectivity functions, and one knows that these values of F for the charter and private are being, per year, since the early 1980s -- Those values, that profile, has been -- It's been affecting, mostly until 2016, some of the fish that have not reproduced yet, and so that has contributed to this problem, this continual problem, of not reaching a sustainable biomass.

As we see here, with the vertical line, we know that some of the recent -- We've had quotas, and so forth, and then we've had the spawning season closure for both sectors, but we know that we've got -- At least we know that these levels of F for the vertical line fishery have not affected, to the same degree, the younger juveniles that the private charter fishery has been exploiting, and that's just sort the facts, but thank you. Luiz, thank you very much.

CHAIRMAN POWERS: Thank you. I think David Chagaris.

DR. CHAGARIS: Thank you. Just going back to that projections table, where we were talking about the transitory dynamics and the F being higher than the F SPR 30 percent, and I think it was Slide 45, is one possible explanation that the projections are assuming this lower average recruitment than what is considered in the equilibrium output from Stock Synthesis, due to how

recruitment is considered in the original estimate of your SPR 30 percent? I'm wondering if there's maybe a disconnect there between the level of recruitment and --

MS. CUMMINGS: We're assuming the same level, Dave. Thank you very much for the question. We're assuming the average for the last ten years.

DR. CHAGARIS: In both?

MS. CUMMINGS: Yes, sir. What I would note though, in response to an earlier question, or comment, from the Chair regarding the recruitment that was used, the assumed last ten years, and we noted that, in the trajectory of recruitment -- In fact, since 1990, that time series, except for one year, that estimate of recruitment has -- It's probably not totally dissimilar from the last ten years that we did use. That's a good question, and I appreciate that question.

CHAIRMAN POWERS: Thank you. I had said we would break after the four that we had there, and so, Ryan, are your questions short?

MR. RINDONE: Yes, but it's not a question, and it's a request, and I think it's going to have management effects. It's exceptionally unlikely that any change will be affected in time for the 2021 fishing year, even if we had brought something before the council, like an options paper before the council, at this January meeting, and there's just not enough time in the year, with the approval requirements, to get a management change in place. It will probably be more appropriate to begin projections in 2022, acknowledging that what is currently listed in 2021 won't be possible to implement in time to have an effect for 2021.

CHAIRMAN POWERS: Which implies that we also have to have a projection for 2020, or 2021, I mean.

MR. RINDONE: Well, so, for 2020, those data are outstanding, largely due to issues with the pandemic, and so assumptions had to be made, as far as inputting data for that year, but a similar assumption would probably have to be made for 2021, and then projections could begin in 2022 and thereafter.

CHAIRMAN POWERS: Right. Exactly.

MS. CUMMINGS: This would require a four-year average for landings for the gap years instead of -- For 2019 and 2020, we

would be using 2017 through 2019, for 2020 and 2021.

MR. RINDONE: Well, for 2019, you could use the preliminary landings from 2019, and then, for 2020, you could use 2017 to 2019, and then you just have to use that again for 2021.

MS. CUMMINGS: I will defer to Shannon and Katie on this, because, technically, in all of our SS projections, for the gap years, we use a three-year average, and so, even though you have 2019, they have not been reviewed by the panel, and they are not part of the base model, and so we would not use those solely, and we would still use the three-year average for 2019, 2020, and 2021, unless we deviate from that decision.

MR. RINDONE: I remember recommending using 2019's preliminary landings when we were on the webinars, and I had thought that that's what was going to be done. I am going to have to look back at my summary notes for that, but, for 2019, at this point, I know those landings are still listed as preliminary, but we're far enough removed that any changes in those landings at this point should be pretty minimal.

2020, obviously, is a completely different animal, and 2021, we just started that, and so I can understand averaging there, but there's really no reason not to use preliminary landings for 2019 at this point.

MS. CUMMINGS: I will defer to Shannon that.

DR. CALAY: I believe, Ryan, that you're just asking about putting the 2019 landings into projections, correct, and not as a new terminal year of the stock assessment?

MR. RINDONE: That's correct.

DR. CALAY: I think that's absolutely fine. I think what we would need from the SSC is a very clear description of what is being requested, so that we do it correctly, but, obviously, a variety of assumptions can be made about projections. What we need is a succinct description that we can work from of what the requested work is.

MS. CUMMINGS: This is a deviation from best practices for our projections.

MR. RINDONE: Joe, I am, obviously, not an SSC member. Do you want me to ask for this, or would one of you like to go forward with it?

CHAIRMAN POWERS: Well, go ahead and ask for it.

MR. RINDONE: Okay. So, basically what we're asking for is for the projections for 2019 to use the preliminary 2019 landings, as obtained from SERO, and then, for 2020 and 2021, for both of those years, to use the average of the 2017 to 2019 landings, acknowledging that the 2019 landings are still considered preliminary, and for the projections to begin in 2022. The justification for this is because it is highly unlikely that any management change would be able to be implemented and have any measurable effect on any of the fleets in 2021.

CHAIRMAN POWERS: All right. That is a proposal, and let's not -- I mean, we may want to discuss this a little bit more after lunch, and one of the things that comes to mind is it was said that a best practice was using something like a three-year average, but, given the world has worked, you may want to reconsider about which years you use in an average.

I want to defer this, and, basically, I want to get to lunch. Bob Gill, can you defer, or do you want to bring up what you wish to talk about now?

MR. GILL: I can defer, Mr. Chairman, and I was going to proffer a motion, to try and make a little progress, and so whichever way you want to go is fine with me.

CHAIRMAN POWERS: Why don't we defer, and actually maybe you can circulate your motion over lunchtime, to kind of speed up the process a little bit. Let's break for lunch, and do we need a whole hour? Can we go for forty-five minutes?

DR. NANCE: Yes.

CHAIRMAN POWERS: All right. Then let's break and reconvene in forty-five minutes with issues related to Bob Gill and also Ryan's request of us to make a request of the Center, and so we will return after lunch. Thank you.

(Whereupon, the meeting recessed for lunch on January 5, 2021.)

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January 5, 2021

TUESDAY AFTERNOON SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees reconvened via webinar on Tuesday afternoon, January 5, 2021, and was called to order by Chairman Joe Powers.

CHAIRMAN POWERS: All right. Let me sort of outline where I kind of see where we're going for the rest of the afternoon, unless there are -- There are a couple other questions to be asked, but let me first -- Basically, what we have to do is, in regard to this agenda item, is to have the motion about best available science, and we also have to determine the OFL stream and the ABC stream.

My suggestion is that we go ahead and deal with the -- That we deal with the motion put together by Bob Gill about whether it's the best available science or not, and then we also have Ryan's question about perhaps redoing the projections based on a starting point for 2022, and so therefore having to fill in for 2020 and 2021.

We also have to decide what we mean by OFL and ABC. My supposition is that the ABC value would be that projection based on F rebuild, because that's what is the required objective in the FMP, and so that's what their objective is, is to return by 2027, and so that would be the definition of ABC. OFL has a standard definition, but there's some issues there, as we mentioned previously.

The way I want to proceed then is first deal with Bob Gill's motion about the best available science and then deal with Ryan's suggestion about maybe redoing the projections, and then what timeframe that might be done, and then, after, that, then we decide on the actual time stream for ABC, OFL, and how we actually want to approach that. **Let's start out first with the motion by Bob Gill, which is given there.** Is there a second?

MR. MARESKA: I will second it.

CHAIRMAN POWERS: All right. Thank you.

DR. BENNY GALLAWAY: I am trying to put my hand up, and I joined late, and I couldn't join, but I would like to speak to this issue, at the appropriate time.

CHAIRMAN POWERS: To the motion?

DR. GALLAWAY: Well, it can be in regard to the motion.

CHAIRMAN POWERS: Well, you have the floor then.

DR. GALLAWAY: My hand is up now, and I'm in line. Never mind.

CHAIRMAN POWERS: Bob, do you want to discuss anything more about your motion?

MR. GILL: No, Mr. Chairman. That was put up so that I could make it.

CHAIRMAN POWERS: Okay. Thank you. Benny.

DR. GALLAWAY: Thank you. This is -- I don't quite know how to get into this, and I guess I'll just jump into it and see where it goes. On Slide 14, it talks about information that we provided from a BOEM study regarding the proportion of greater amberjack estimated to occur on oil and gas platforms, and I would like to point out that that's the numerical abundance alone.

Those fish are uniformly, or pretty uniformly, large. They average twenty-eight pounds. If you take the biomass, and they're all age-two and older, and you take the biomass of those fish on platforms in the western Gulf alone, and it's like 3.983 metric tons. In addition to that, for our studies that are being conducted at present for the State of Louisiana, it indicates similar size, in numbers of fish, occur at deep water, by deep water, thirty-one to ninety meters in depth, on the 300 or so artificial reefs, which are platforms laid on the bottom.

They are similar numbers, and so, in good faith, I look at -- Right now, I am comfortable with the nearly 4,000 metric tons of spawning amberjack on platforms, and I think there's at least that number on other structures, and I know it's too late to have them incorporated in the stock assessment, but, knowing that those numbers are real, I just can't accept the results of the stock assessment, based on the data that are being used.

I believe they are brand-new data, and it's nobody's fault that they weren't available until now, but I can't accept these as being representative of the status of the greater amberjack stock in the Gulf of Mexico, and so I will vote against this motion.

CHAIRMAN POWERS: Thank you. That was one of the things that

was brought up in the assessment, is that it would require a fair amount of revisiting the spatial structure of the model considerably, which is why it wasn't dealt with in a simple operational assessment. Sean.

DR. POWERS: Thanks. What I struggled with, with the best available science determination, is the analysts and the assessment team did the best job they could with what they had, and I really think they should be congratulated for their work.

The problem though we've always had with this stock assessment is, obviously, it's driven by the recreational data, and that data has a lot of noise associated with it, as well as other problems, but a lot of noise, and that variance isn't captured in this stock assessment. We know that the discards are very important too, and obviously it's all self-reported, for the most part, and that variable has a lot of variance with it.

What I got from Nancie's presentation, and diving into it, is that the CVs were set and that variance that we know are around this catch isn't there in the model, and so we know we can put it in the model, but not in an operational assessment, and it would have to be a research track assessment, apparently, and so, while it's best available on hand, it's not the most appropriate, and we have struggled with this.

The history of the assessments show us that we can't manage this fishery, or that they're wrong, and I don't know which it is, but I do feel that the model isn't capturing the uncertainty that we need, and, obviously, we don't have any true fishery-independent indices to judge that with, and so that's why I'm struggling with it, is I know the model could be improved, and it's kind of similar to Benny, but what we have in hand is probably the best available, but it's not the best we can do, and so that's my comment.

CHAIRMAN POWERS: Thank you. Ken Roberts.

DR. ROBERTS: Thank you, Mr. Chairman. I guess my sentiments are very much along the same lines. There is a difference between availability that was made to the people who had to do the analysis and existence, and I go back to what I think Ryan said before the lunchbreak, and that is that they probably can't do anything with this, if I'm paraphrasing correctly, that you can't do anything with this and get it to the council in time for action in 2021.

If that's the case, maybe we can wait a little while and

encourage people to wait until the existence data gets turned into available data, and so that's just a general comment, and I may have paraphrased it incorrectly, but that's the way I'm thinking right now. Thank you.

CHAIRMAN POWERS: Thank you. One of the things I was thinking of is, if this motion were not approved, what would happen, and could we make the statement that our perception of the greater amberjack is that it is still overfished and still undergoing overfishing, and that sort of a fallback position, and I'm not sure we can do that, but that's something to think about, but, before we get into that, we have Shannon, Paul Sammarco, and then Jason Adriance. Shannon.

DR. CALAY: Thank you. I just wanted to make a few points. One is that we are certainly aware that a great deal of information is becoming available, or is now available, that may change our perceptions in the future, and, in fact, there is an effort to spend about $10 million on a greater amberjack project, which you will hear about during this SSC meeting.

Clearly there is a need to conduct a research track assessment of this species, to try to integrate some of this research that's coming online. However, it will take years for that process to be complete, because, to my knowledge, it's not yet on the calendar, unless I have forgotten it, which is possible, and it's about a two-year process to go from research track assessment to operational results, and so that's one point.

It was also brought up that we could handle uncertainty differently within the stock assessment and the projections, but I did want to remind the group that that can change your perception of, for example, the width of the PDF, but it doesn't typically change our perception of the central tendencies that we tend to base our management advice on, especially OFL, and then the last point is that certainly we are aware that this stock tends to remain overfished and undergoing overfishing, and that the projections that we make show quick recoveries that are not realized.

I do want to remind the group that there has been a history, in this fishery, of relatively frequent overages, and so there are good reasons that the stock has not recovered as rapidly as expected, but, all that being said, I think it's very likely that, as we bring in this research that is being conducted on greater amberjack, it will change our perceptions of the dynamics of this stock, but I think that result is years away, and so that's all I had to say. Thank you.

CHAIRMAN POWERS: Thank you. Paul Sammarco.

DR. SAMMARCO: Thank you, Mr. Chair. I think that Benny has brought up a very good point and that certainly these populations of amberjack may be very important to the Gulf of Mexico, perhaps even helping to sustain the pelagic populations, but my feeling is that there's been a great deal of work and energy put into these analyses, which Ms. Cummings presented, and they are fairly telling, and certainly it would be critical to bring in this information, these data, into analyses as soon as the data become available, but, for the present time, I think it would be wise to play the ball where it lies, as the analyses have not been stated, let alone been completed, regarding new data coming in.

At worst, at worst, we would be erring on the conservative side, particularly when the data show, or suggest, that the species has some population problems at the moment, and so I would say that, with the work that's been done, I would recommend that we stand by the work that's been done, and that doesn't demean the data that's out there and available, but, as soon as possible, bring those data in and interject them into the analytical process, so that, the next time around that we're discussing this, we may very much change our minds. Thank you.

CHAIRMAN POWERS: Thank you. Jason Adriance.

MR. ADRIANCE: Thank you, Mr. Chairman. I find myself struggling with this motion as well, for all those points that Sean brought up, and, while we have that new information, it obviously wasn't in time to incorporate this, and there are other things going on that will hopefully incorporate that.

While this may be the best we have, I'm starting to lean towards the side of maybe it's not suitable for management, because, obviously, using this assessment hasn't gotten us anywhere, and that's all I had.

CHAIRMAN POWERS: Will Patterson.

DR. PATTERSON: Thanks, Joe. You know, we find ourselves in this discussion about best available quite a bit. In the context of this assessment, I think what we have to ask is was the assessment conducted with the best available science, and so, when the analyst and team sat down to do the assessment over a period of months, did they actually use the best available information to conduct their analysis?

Sean raises an interesting point about the CV on catches and whether that should have been fixed or could be input, and apparently that couldn't have been done in this framework in the timeframe that was available, and so that actually wasn't available to the analyst to be conducted.

Benny raised an issue about estimates that his team has made in a couple of different studies, and he cited the BOEM study and then work he's doing now, that LGL is now doing, for the State of Louisiana, and that's important new information, but, unfortunately, that only could not be included in the assessment, but none of the members of the SSC, beyond Benny, have seen that work, and it's not in front of us to evaluate whether it should or shouldn't be included in a research track assessment, which obviously this wasn't, and those data couldn't be included here.

The last thing, with respect to that, is, if the biomass scales up and down, that doesn't really change the age composition in the assessment model. It could be that, if there were lots of fish unavailable to the amberjack fishery, and different areas that had a different age composition than what the landings were, and the habitats that were targeted by fishermen, then the population, overall, could have very different dynamics than what the fishery data, the landings data, are informing the model and the estimates produced.

However, if in fact the information, which is coming, Benny said, from artificial reefs and from platforms, which we know are targeted by the recreational fishery, as well as the commercial fishery, for amberjack, if the age composition and the estimates that he cited, from the work that LGL and colleagues have done, is actually captured in the assessment model, and, after peer review, it's determined that those estimates are accurate and acceptable and should be utilized to scale the biomass estimates in the model, that still wouldn't change the overfished or overfishing status if the age composition of the population being fished is the same as the age composition of the population that is part of this pool of biomass that apparently is not being scaled correctly in the model.

If this issue that Benny highlights is determined, through scientific review, to be real and present, that doesn't change the overfished and overfishing, unless you have this disconnect between the fished and potentially unfished populations.

CHAIRMAN POWERS: Thank you, Will. Kai.

DR. LORENZEN: I wanted to sort of speak in favor of the motion, because I think that, although I recognize that there is new and important information out there that Benny described, and there is more information that will be forthcoming out of the greater amberjack research program for over a larger range of habitats and a larger area of the Gulf, but that's like three years away, and, in addition to, as Will mentioned, the fact that, of course, we have not reviewed that information that is currently available, I think, also, it will take a great deal of effort and reworking the assessment models to really account for this new information, because of the spatial elements and the reason -- The fact that it may be that it is counting components of the stock that are less available to the fishery than those that we are looking at with the assessment data and the assessment as we currently conduct it.

I think there are a lot of questions that we will not be able to address, even within a year or two, and it seems to me that the prudent thing to do is to move forward with the information and the assessment we have for the time being.

I would also note that I think, once that the new information is accounted for appropriately, I am not sure that we will see changes in management advice that are as large as people perceive at the moment on the basis of simply information that we have, and I think that goes for this, and it also goes for the Great Red Snapper Count, because -- Which is, obviously, similar in the challenges that it poses to us, simply because we'll have to account for spatial structure and differences in the exploitation rates and so on.

The end result will be different from what we get straight out of the assessment, probably, and it might change our perception of exactly how this stock is working, but it may not lead to the magnitude of change in management advice that I think people are kind of anticipating at the moment.

CHAIRMAN POWERS: Thank you. The way I kind of look at this is that the SEDAR 70 operational assessment was the best science that could be done on the particular assessment, given the availability of data and so on, and that, currently, the stock status is classified as overfished and is undergoing overfishing, and so the question, to me, becomes has SEDAR 70 provided information that would indicate to us -- To change our minds, to say that the stock is not overfished or that the stock is not undergoing overfishing, and I don't see that. So, given

all the caveats about the assessment and those sorts of issues, I am speaking in favor of the motion. Sean Powers.

DR. POWERS: I will go back to what I said, and the original point, which I think I confused with Benny's point, and that is that this model is essentially driven by recreational data, and we know that collection of those data have changed over time, and I'm just uncomfortable with so much weight being put on that, because that's essentially all we have, is that catch data, and how sure are we of that catch data, particularly with the record of the past assessments?

I recognize Shannon's point that we've gone over the quota several times, but we seem to be getting the same answer over and over, and I think that's largely because we have such limited data, and, as far as what happens if we don't accept this motion, I would think that we would go to our control rule, because we don't have an assessment, or we would keep the status quo with our current management advice, and those are the two kind of options if this motion fails. Anyway, I mean, that's my real hesitation, and, again, it's not a remark on the analysts. They only can deal with what's in front of them, but that's my struggle.

CHAIRMAN POWERS: Will Patterson.

DR. PATTERSON: Responding to Sean's comment, I don't understand the idea being expressed that all we have is the recreational data. You know, it's true that the majority of the removals are estimated to come from the recreational fishery, but there are lots of other sources of information in the assessment model, fishery-independent indices and fishery-dependent indices of abundance, which are informing the model.

Then there are the ageing samples, and the age composition, obviously, is really important in fitting the model, but, as far as the removals and the magnitude of removals, yes, that's coming from the recreational fishery, predominantly, because that's larger than the other sectors, but this issue of scaling, which these count studies, like the Great Red Snapper Count and Benny's work on platforms, and now other habitats off of Louisiana, but platforms in the western Gulf, and now the artificial reef stuff that he just mentioned off of Louisiana, with amberjack, those types of studies -- I mean, I think everybody in the room is aware that the preliminary estimates from the Red Snapper Count are quite a bit higher than the age-two-plus red snapper abundance estimates from the most recent stock assessment.

As far as the recreational removals, we as a body voted, a couple of meetings ago, that FES was the best scientific approach and should be utilized to estimate recreational landings and the effort recalibration, while not perfect, is the best available, currently.

I will just point out that, when the historical landings estimates go up, that means the removals, historically, were higher, which means the stock productivity would have been higher, and the stock biomass would have been higher, and so, if the stock biomass was higher historically than we estimated, then studies like Benny's, where he is apparently estimating much higher amberjack biomass in the western Gulf than the assessment estimates, that actually is a way to converge, or rectify, those two different estimates.

When the recreational removals are estimated to be higher, it's actually in the same direction of these higher estimates that are coming out of things like the red snapper project and Benny's work off of Louisiana and the western Gulf on platforms with respect to amberjack.

CHAIRMAN POWERS: Thank you. We have a number of people. First Benny and then Paul Sammarco, Shannon Cass-Calay, and then Kai Lorenzen, but, before that, let me ask Ryan a question. If this were rejected, and the SSC made no recommendation, what would be the default position?

MR. RINDONE: If the SSC makes no recommendation, then we are left with the management that we currently have on the books. If the SSC determines, as an example, that the assessment may represent the best available information, but you guys don't recommend its use for management, then the council would likely request you to give them something to work off of, and Dr. Frazer can speak more to that.

CHAIRMAN POWERS: What's on the books is it's classified as overfished and undergoing overfishing, and then do you recall what the ABC and OFL on the books is?

MR. RINDONE: So over -- Whether or not a stock is experiencing overfishing is determined annually, based on the landings relative to the OFL. Its overfished status is based on the most recent stock assessment, and so, in this case, the stock would continue to be classified as overfished, but undergoing overfishing. However, if, in the future, landings are less than the OFL, then overfishing would be determined not to be

occurring, based on the status determination criteria for greater amberjack.

At present, for 2020 and subsequent years, the OFL, which is equivalent to the annual yield at the maximum fishing mortality threshold, or F 30 percent SPR, is 2.167 million pounds, and the ABC, which is the annual yield at F OY, or 75 percent of F 30 percent SPR, is 1.794 million pounds, and so 2.167 million pounds for the OFL and 1.794 million pounds for the ABC, and that is for 2020 and subsequent years. That's in MRIP-CHTS currency and not FES. That was to rebuild the stock by 2027.

CHAIRMAN POWERS: All right. Thank you. As I said, we have four people now. Benny, Paul Sammarco, Shannon, and then Kai. We'll begin with Benny.

DR. GALLAWAY: I would like to point out that the BOEM platform study's information was published in June of 2020 as an environmental study report from BOEM, and it had external peer review by three scientists.

Also, I would like to also note that the location of the platforms where the majority of these large fish occur are not readily exploited by the recreational fisheries, because they are not close to any population center, and they're hard to get to, and so I think they are basically unexploited.

CHAIRMAN POWERS: Paul Sammarco.

DR. SAMMARCO: That's fine, Mr. Chair. I will pass. Thank you.

CHAIRMAN POWERS: Thank you. Shannon.

DR. CALAY: Thank you. I wanted to agree with some of the conversation that there are certainly some uncertainties having to do with greater amberjack that are larger than for some other species that we manage. However, I do think we need to be very careful about setting a precedent where we expect information to be very data rich in order to manage fisheries, because few of our stocks actually meet those expectations.

In general, the data that we have available to us are going to be FES statistics, and that is what is recognized right now as best available science by NOAA, and in very few situations do we have data as high quality as say red snapper, and so I want to kind of stress that best available science does not require us to have a perfect understanding of the stock in order to manage the fishery, and, in fact, the SSC could consider the increased

uncertainty and use that uncertainty to provide a larger buffer, say between OFL and ABC, but to abandon stock assessment advice derived from stock assessment projections, because there are known uncertainties, sets a precedent for abandoning a number of stocks, because this is one of many for whom the uncertainties are larger than expected, or larger than average.

CHAIRMAN POWERS: Thank you. Kai Lorenzen.

DR. LORENZEN: I would also say that, although it's, to the discussion between Sean and Will there, it's true that, obviously, the recreational catches have played a major role in scaling the assessment, and it is using a much wider set of data, and, even though amberjack is comparatively data poor, compared to red snapper, I would also point out that the assessments have actually been quite consistent over time, and those were assessments done with, obviously, continuously expanded data series, but, also, if you think about the sensitivity that was done with the production model, and so the results are actually quite consistent over time.

I would say that the current assessment is an improvement over SEDAR 33, not only because of, obviously, the updated data series, but because of the use of the FES estimates, which we have recognized as the best available science, in terms of the recreational catch estimate, and so I think that it's a better, more prudent approach to work -- To base management on SEDAR 70 than to fall back on essentially the last assessment, being the SEDAR 33 update. Thanks.

CHAIRMAN POWERS: Thank you. Will Patterson, and hopefully you're the last one.

DR. PATTERSON: Okay. I will try to keep it brief. Thanks, Benny, for the correction there about your study's peer review and publication, and I wasn't aware of that BOEM document, but I look forward to checking it out.

The other statement Benny made was about the fish on those platforms being farther offshore, and, therefore, that might provide some type of refuge effect. You know, amberjack are coastal migrants, and they move around, and diffusion models could be utilized, with movement data that exists, to try to estimate the likelihood that fish on those offshore platforms would be exposed to fishing mortality, but we don't have anything to actually evaluate that, in this case.

As far as this idea of the uncertainty here, you know, the

current reauthorized Magnuson Act requires that the benchmarks be estimated, OFL to be estimated, and then discounting based upon uncertainty, where we're required to manage, or the councils are required to manage, in the face of uncertainty, based upon the best scientific information available, and the legislation is pretty clear that, the greater the uncertainty, the more precautious, or the greater the buffer, that should exist.

It's not, hey, we're not quite sure about this, and so we're just going to fall back, as Kai mentioned, to either earlier estimates or to punt until an updated assessment that may incorporate some of these new data streams becomes available. We're meant to estimate the OFL and then set the buffer based upon, or estimate the buffer based upon, scientific uncertainty.

Now, in this case, we run into the issue that we often do, which the PDF is not likely to capture all of the uncertainty, or full account for the uncertainty, in the assessment, and Sean pointed out this issue with CVs and whether the large CVs were directly estimable, estimated and put into the assessment, or whether it's fixed. You know, that's going to have an effect on the overall distribution at the end, and, the more parameters that are fixed in the assessment, the less the process error, the natural variability, is actually going to be carried through into that PDF.

This may be a case where we actually depart from the control rule altogether, because the uncertainty in the assessment is not fully captured in the PDF, and, now, obviously, we haven't looked at that to this point, but, in thinking ahead, that would be where the legislation, and the operating procedures, require us to move, is to actually inject more precaution and not just disregard it.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: Thank you. A couple of things, and I will be quick. The best scientific information available document provided to us by National Marine Fisheries Service asks the peer review people, which is the SSC at this point, to do four things.

It's to determine if there's a sufficient scientific basis for the stock status for projections and for any technical merits to modify the status determination criteria, and it doesn't say, I don't think, unless it's elsewhere in this document, that we need to say this is the best available scientific information,

and I know Shannon is more familiar with this, and she can correct me in that regard, but, if that's the case, then we don't have to get hung up on the best scientific information point, and maybe this motion should be separated into two.

The other point I wanted to make is the buffer requirement with ABC, based on uncertainty, is in the National Marine Fisheries Service's technical guidelines, and it's not in the legislation of the Magnuson Act. It's simply guidelines, and so we can take that as it is, because the guidelines are pretty strongly enforced, and so I'm not saying we can ignore them, but it's not in the legislation. Thank you.

MR. RINDONE: Dr. Powers? Is Joe still there? Kai, you're up, as the Vice, until Joe gets back online. To Doug's point about the NMFS guidance, in this particular case, the SSC is not only responsible for determining whether the assessment is suitable for management, but, also, as this motion suggests, you are conducting the peer review of the assessment, and so you have kind of a double duty that's being passed on to you guys here. I sent Jess the NMFS guidance that Doug is talking about that she can distribute to all of you guys here in just a minute.

It's on the SSC to be able to judge the assessment based on its merits, as far as whether it is the best scientific information available, and all of those questions and debates should be satisfied prior to making any recommendations, as far as future catch, and that's a broad generalization of the process outlined in the NMFS guidance document.

DR. LORENZEN: Okay. Thanks for letting me take over, if Joe is still absent, and we have Bob Gill.

MR. GILL: Thank you, Mr. Chairman. I call the question.

DR. LORENZEN: Okay. Should we vote?

MR. RINDONE: To call the question is a vote to end debate and then to subsequently vote on the motion.

DR. LORENZEN: Yes.

CHAIRMAN POWERS: I lost the signal, but I'm back again. Where do we stand?

DR. LORENZEN: Bob Gill called the question.

CHAIRMAN POWERS: Okay. Theoretically, when you call the

question, you have to vote on calling the question, whether to shut off debate. If that's what we're doing, then let me see if we can -- Let me see if we've reached the point where we have general agreement with the shut off debate at this point. Are there any objections to calling the question to moving forward to the vote? Are there any objections to that?

DR. POWERS: Yes, and I just had a brief point to mention, and then I would be fine with going forward.

CHAIRMAN POWERS: Okay. Sean, go ahead.

DR. POWERS: Based on Will's comment earlier, I agree with Will that the uncertainty would lead us to discount the OFL even further, and I think that's pretty clear in the intent, but the question is do you accept the OFL from the stock assessment, and that's where I am having concern, is the OFL. I recognize that there's some standard uncertainty, and we might want -- The PDF probably won't capture it, but the issue is the OFL value, and that's it.

CHAIRMAN POWERS: Thank you. Were you finished? You sounded like you were cut off.

DR. POWERS: No, I'm finished.

CHAIRMAN POWERS: Okay. Thank you. All right. If there's no objections to going ahead and voting on the motion, and, given the diversity of comments, let's do a voice vote, and I think that would be easier at this point. Can we just go through the list?

MS. MATOS: One second.

CHAIRMAN POWERS: Sure.

DR. FRAZER: I am just sitting here trying to think about this from sitting around the council table, right, and so I'm trying to reconcile a few things in my mind. In the current situation, you have an OFL that's about 1.5 million pounds, and you've got an ABC that's about 1.18, and so the buffer there is about 22 percent.

Then, all of a sudden, you go to the new assessment and what was written in the report, and the OFL, in the original report, is 1.16 million pounds, and the ABC is only 0.315 million pounds, and so the buffer there is about 73 percent, and so that gets to Will Patterson's point.

You have some uncertainty in this new assessment, and you're kind of dealing with that conservatively, but then, all of a sudden, you change the landings data, and you include that 2019, and you double your OFL, and you nearly quadruple your ABC, and so I'm trying to explain, in my mind, to the council why you made the decision, or how you would defend the decision, to include the 2019 data, right, and so now you would have an ABC that's almost more than your OFL in your original assessment report.

To me, I just want to know how I'm going to be able to convey this information and whether you guys, as a group, feel good about including the 2019 data as part of the assessment, or are the projections actually part of the assessment here that you're voting on?

CHAIRMAN POWERS: That's the next issue, you conveying it to the council, and also me conveying it to the council, and, you know, we have to be very careful about that, but much of the issue we're talking about is kind of the next thing that we have to deal with, and the first step is do we want to continue classifying this as overfished and overfishing, and that's the vote that we're taking now, and so thank you. Then can we go ahead with the individual votes for this?

MS. MATOS: Lee Anderson.

DR. ANDERSON: Yes.

MS. MATOS: Luiz Barbieri.

DR. BARBIERI: Yes.

MS. MATOS: Harry Blanchet.

MR. BLANCHET: No.

MS. MATOS: Dave Chagaris.

DR. CHAGARIS: Yes.

MS. MATOS: Benny Gallaway.

DR. GALLAWAY: No.

MS. MATOS: Bob Gill.

MR. GILL: Yes.

MS. MATOS: Doug Gregory.

MR. GREGORY: No.

MS. MATOS: Walter Keithly.

DR. KEITHLY: Yes.

MS. MATOS: Kai Lorenzen.

DR. LORENZEN: Yes.

MS. MATOS: Camp Matens.

MR. MATENS: No.

MS. MATOS: Jim Nance.

DR. NANCE: Yes.

MS. MATOS: Will Patterson.

DR. PATTERSON: Yes.

MS. MATOS: Joe Powers.

CHAIRMAN POWERS: Yes.

MS. MATOS: Sean Powers.

DR. POWERS: No.

MS. MATOS: Ken Roberts.

DR. ROBERTS: No.

MS. MATOS: Steven Scyphers.

DR. SCYPHERS: Yes.

MS. MATOS: Jim Tolan.

DR. TOLAN: Yes.

MS. MATOS: Jason Adriance.

MR. ADRIANCE: No.

MS. MATOS: Judd Curtis.

DR. CURTIS: Yes.

MS. MATOS: John Mareska.

MR. MARESKA: No.

MS. MATOS: Andrew Ropicki.

DR. ROPICKI: Yes.

MS. MATOS: Cam Ainsworth.

DR. AINSWORTH: Yes.

MS. MATOS: Mandy Karnauskas.

DR. KARNAUSKAS: Yes.

MS. MATOS: Paul Sammarco.

DR. SAMMARCO: Yes.

CHAIRMAN POWERS: Thank you. Obviously, there are lots of differences of scientific opinions of how to proceed with this, and it's up to me, I guess, to convey this to the council, the reasons for this, and, again, much of the issue is not the analysis, per se, but the kind of data and how we might proceed with it, and, again, this is no criticism of the analysis, per se.

DR. GALLAWAY: By the way, I totally agree with that.

CHAIRMAN POWERS: As I said, it's concomitant to me to convey this diversity of opinion to the council. All right. The next question then is how do we proceed for OFL and ABC? That also brings up the issue of, if we're going to use some sort of projection, how do we want to adjust the projections, and, if that's the case, is this something that can be done in the next day or so?

This is going to Ryan's original comments about not being able to implement things in 2021, and so the projection would probably begin in -- The management part of the projection would probably begin in 2022, and so let me ask, I guess Katie, and,

given a well-defined set of instructions about how to include the 2019 and 2020 data, is it possible to get an update of these projections in a relatively short period of time?

DR. SIEGFRIED: Yes, it is. It won't take long to run those projections. Nancie will know better how many days and hours exactly, but it shouldn't be difficult to do.

CHAIRMAN POWERS: Well, all right. Let me ask Nancie then. Is it days or hours?

MS. CUMMINGS: Thank you, Chair. They can be run within a day or so. I'm just very concerned about the 2019 catches, as an analyst, that they will change, in particular for the recreational, and so I'm very concerned, and that's why normally we do use an average over these years, the years.

CHAIRMAN POWERS: The issue of how we do it, we're getting to. My question is can it be done within -- For example, if we gave you instructions now, could we revisit this tomorrow afternoon or Thursday morning?

MS. CUMMINGS: Tomorrow afternoon or Thursday morning, yes.

CHAIRMAN POWERS: Okay. Thank you. So let me begin with Bob Gill.

MR. GILL: Thank you, Mr. Chairman. I have two questions, and the first one is for Ryan, and that is we have different start years for commercial and recreational in this fishery, in that the recreational starts, if I recall correctly, on 1 August, but that's called the 2021 fishing year, I believe, and so what data are we really talking about using for the recreational side, and I understand your comment relative to starting with 2022, and it certainly works for commercial, but is that also appropriate for the 2021 recreational fishing year? Then I have a question in follow-up to that.

MR. RINDONE: I think it does, Mr. Gill, because I just don't see a scenario where we are able to get any functional management change in place to affect greater amberjack in time for the start of the August 1 beginning of the recreational fishing season, and so just our recent experiences over the last few years, with the rate at which things are developed and implemented, there's just not time for that to happen, and then you combine that with other factors, like COVID and administration changes, and those aren't the kinds of things that are going to speed the process along.

With respect to the effect of fishing year specifically, the rule that changed the recreational fishing season went into effect on January 27 of 2018, and so the first split season, if you will, was the 2017/2018 season, and then this fishing season that we're talking about, like Mr. Gill said, would be the 2021/2022, but still any management change coming from this likely isn't going to come into effect until some point in 2022, hopefully early, but still. Mr. Chair.

MR. GILL: Thank you, Ryan, and my comment relative to my other question is I would suggest that we should go through the ABC control rule, just as standard practice, to see what it says, and that may or may not help us determine next steps, but, given that that's our guiding document at this point in time, we should go through that, relative to greater amberjack, and deal with the results of that. Thank you, Mr. Chairman.

CHAIRMAN POWERS: Thank you. Before we get to Doug, it's not really written in the control rule, but this is why I brought up that the FMP itself is defining F rebuild, and that might be interpreted as ABC, but we'll address that issue. Doug.

MR. GREGORY: I was just thinking, procedurally, it might be appropriate to have the presentation on Something's Fishy, the anecdotal data, before we actually discuss what quotas should be, ABCs should be, and it seems kind of odd to have that input from the public after we make a decision. Thank you.

CHAIRMAN POWERS: Thank you. I have no objection to that. All right. If that's the case then, let's go through the Something's Fishy section, and, when we return, what I would like to look at is the actual projections. Well, we'll get there, but the actual projections, as they exist now, that table that's in the presentation, and so let's go ahead with the Something's Fishy section.

SOMETHING'S FISHY

MS. EMILY MUEHLSTEIN: Okay. Thank you for this opportunity. We did run a Something's Fishy effort for greater amberjack. Just as a quick reminder, this is a tool that we use to gather information on fish stocks from active fishermen on trends or unusual occurrences that we may not have observed, and so these responses particularly were gathered in 2020, pretty much the month of May, and we did it intentionally this month because it's a fishing month for the recreational sector of greater amberjack, and then we generated a final report and emailed it

to the stock assessment scientists in June of 2020.

We didn't get a great number of responses here, and we only got sixty-four responses, and we did not limit respondents to a singular response, and you will see that a vast majority of the respondents were recreational fishermen, or for-hire fishermen, which are also part of the recreational sector.

We analyzed the comments two ways. We analyzed comments manually, where two analysts read the comments and classify them as either positive, negative, or neutral, and we also use automated sentiment analysis, using R, and one of the main things that you will notice here is both type of analysis showed about the same proportion of positive comments, and the major difference here is that the manual analysis showed that the remaining comments were mostly neutral, while the automated text analysis showed that the remaining comments were split sort of between negative and neutral sentiment.

You might also notice that there is a difference in the number of comments that are total through each one, and that is because the automated analysis actually drops comments and doesn't analyze them if none of the words used in the comment are recognized by the lexicon library.

CHAIRMAN POWERS: When you say positive or negative, relative to what?

MS. MUEHLSTEIN: We had started, in earlier efforts, to make it relative to abundance. However, because the automated analysis does not have any way of discerning whether the comments are abundance related or not, it's really the overall sentiment of the comments here, and so it is important, sometimes, to recognize that a negative comment could be like, hey, the stock is in great shape, but you are terrible at managing it, and the regulations are ridiculous, and now that's one positive and two negative sentiments, and that would come out as a negative comment, even though it's not abundance related, and it's just sort of a negative sentiment overall, and does that make sense?

CHAIRMAN POWERS: Okay. Thank you.

MS. MUEHLSTEIN: Sure. Okay. It is important to notice that most of the responses that we got were off of the central Florida and the Panhandle of Florida, and we did have a few areas, in both the western Gulf and Florida Keys, where we only received one response, and that's mostly important for this next slide, where we look at the sentiment by location, and you will

see, in each box, there is an actual number that shows you how many comments we got by each location, and then it breaks it down by sentiment in that comment.

One of the things that you will notice is that most of the negative comments that we received are sort of clumped up in the Big Bend area of Florida, with some in western Louisiana as well as in sort of the west Texas area.

The automated analysis does a little breakdown for us on the most frequent words that we see, and we just want to display those here. These most frequently used words could indicate that anglers with negative perceptions of the greater amberjack stock were seeing smaller fish and that they were dissatisfied with the size limit.

Then, finally, through manual analysis, we did see some themes emerge, and we saw that a majority of the neutral comments were critical of management, but indicated that greater amberjack are prolific, and, in this case, comments were critical of management, but indicated that greater amberjack are prolific, and, in this case, comments were considered neutral, because they indicated a positive trend in abundance, but a negative impression of amberjack regulations, and so that sort of speaks to that overall comment sentiment.

We also heard that some of the comments classified as neutral indicated that amberjack were so abundant that they are an ecological problem, or nuisance, and so, again, that's another one of those instances where the overall sentiment is influenced because there is a positive thought, followed by a negative thought.

Then we also heard that most of the responses from the western Gulf were classified as positive, while responses from the eastern Gulf were more likely to be neutral, and that summarizes that report. Any questions?

CHAIRMAN POWERS: Thank you. Are there questions? All right. Doug, do you want to make any comments?

MR. GREGORY: No thank you.

CHAIRMAN POWERS: All right.

MR. GREGORY: Thank you, Emily. I appreciate that.

MS. MUEHLSTEIN: My pleasure, Doug. Thanks for thinking to put

it in that order.

CHAIRMAN POWERS: Cam.

DR. AINSWORTH: So what is it that you're hoping to get from this? I mean, why not separate those questions into satisfaction with management and perceived abundance changes?

MS. MUEHLSTEIN: So I think, in an ideal world, we would be able to do that. However, we are constrained by the Paperwork Reduction Act, and so the way that we frame the collection of this public comment has to be in a very general manner. If we were to sort of ask specifics, we would have to get each effort cleared by the Paperwork Reduction Act, and so this is sort of our way of doing this without having to spend a year getting it approved to do it. It allows us to be a little bit more nimble.

Now, in the actual analysis, which we can -- The full text comments, which we can share, if anybody is interested, one of the things that we do, when we are manually analyzing the comments, is categorize whether or not the comment is related to abundance or not, and so I guess, for future efforts, one of the things that we could do is do a little bit better job of teasing out abundance-related comments, versus just sort of management-related comments, if you think that that would be a useful thing. It's just that's then something that -- We were trying to remove the human element, by having the automated analysis sort of groundtruth what we were finding.

DR. AINSWORTH: Maybe it's sufficient to analyze attitudes.

CHAIRMAN POWERS: All right. Thank you. Harry.

MR. BLANCHET: My question was right along those same lines. It seems that, if we separate the two aspects between fishermen's satisfaction with management versus their perception of stock status, while that might not be something that would be -- That automated analysis could handle, but it certainly is something that manual analysis could handle, and you could combine them into -- Just do that matching against the automated, but it seems like that would be useful for future attempts at this.

MS. MUEHLSTEIN: Yes, and we can certainly do that, and, if you actually look at one of the tools, and I can share that with you guys in a future meeting, if you want, but we sort of set them up to be asking about abundance, and so what we're doing, when we're prepping them for this open comment, is actually sort of leaning towards telling them what we're looking for without

actually asking the direct question, and so I can also sort of see if there's a way that we can play with the setup, in order to make it more clear to respondents that we're not really looking for satisfaction with management and that we're actually looking about trends in abundance and things that are actually happening with the stock itself, but we will certainly take that advice for future iterations of this tool.

MR. BLANCHET: I mean, I'm fine with open-ended questions and then receiving whatever that person is going to share, rather than pointing them in a specific direction, but it just requires more work on the backend, to get what hopefully is a similar result.

CHAIRMAN POWERS: Thank you. We have Kai, and I think then Ken Roberts after him.

DR. LORENZEN: I just wanted to give a little sort of additional insight here, because we did, as part of our visioning for the greater amberjack research project, we did about ninety in-depth interviews with greater amberjack stakeholders, including fishers from all sectors, and it's somewhat similar to what we're seeing here.

I think we had more positive than negative comments, and we did ask specifically about management, but also the perception of the science behind management and the stock assessment, and I think relevant to what we're discussing today was that the majority of the people we talked with felt that the stock assessment and the stock status determination was realistic for the Gulf, and they also were, broadly speaking, more positive than negative about management, and acknowledging that this is quite a complex fishery, with many different stakeholders who use the resource for different things, but, overall, the feedback was more positive than negative. Thanks.

CHAIRMAN POWERS: Thank you. We have Ken Roberts and then Shannon Calay.

DR. ROBERTS: Thank you, Mr. Chairman. I am familiar with the press release, or the media release, that comes out in the various sportsmen's pages and magazines and whatnot about Something's Fishy, with the amberjack example, but my question is, in looking at the number of respondents that come about as a result of whatever your method is that you're using, and the distribution throughout the Gulf, what are you doing in the future to improve the response, since these are not solicited and they're just informed that this is available, and you're not

soliciting a sample out of a population that is known? What are you doing for the future, in terms of getting the word out better to get a response and then know something about the representativeness of the response? Thank you.

MS. MUEHLSTEIN: That's a great question, and it's something that we've certainly been considering. We actually brought an overview of the tool and the analytics from our past efforts to our Outreach and Education Technical Committee.

It's very clear that, when our call for responses to a Something's Fishy tool is amplified by a state agency, that we get higher response rates. Just recently, we published a gag Something's Fishy, and that's actually still open for this month, and we already have 400 responses to that one, and that's because we are pushing our state agencies and asking them to amplify the availability of these tools, through their social media and their sort of press release lists as well.

Some of them are also published, like you said, and picked up from *Florida Sportsman* and some of the other sort of forums and things like that, and so we have been pushing really hard to try and get those things to be amplified.

Really, when it comes just from us, and it doesn't come amplified by a partner agency or a media outlet, we get lower response rates, and I also think that sometimes just the controversy around a species could make it more or less tantalizing to respond to, and so I think that that's another factor that plays in, but we're certainly doing our best to sort of get not only our sort of fishermen allies that have their own groups of captains that follow them and talk to them, but also our partners in the state, as well as the media, to keep pushing them and make it better, because the tool definitely improves with increased response rates.

DR. ROBERTS: Good news. I think you're on the right track, and I appreciate that.

CHAIRMAN POWERS: Thank you. Shannon.

DR. CALAY: Thank you. I also wanted to note that I think that the results of the Something's Fishy information are not at all surprising to me. They reflect some changes, some differences, in the perception of the stock, west and east, which are probably quite real and would have to be addressed by using a model with more spatial structure.

Also, I wanted to remind the group that this stock has been essentially static in its abundance for about thirty years, at least, and so it's not surprising to me that the fishermen are not reporting large changes, large increases or decreases, consistently.

In fact, we don't see that in the stock assessment either, and we see a stock that is relatively static through time, with some variations in abundance, and so I see that there is some consistency, actually, between what the fishermen have reported and what we see, both in the stock assessment and in what we have pointed out as research objectives.

CHAIRMAN POWERS: Thank you. Go ahead, Benny.

DR. GALLAWAY: On the slide titled "Manual Analysis", the last two points, some of the comments -- The last two points, I was curious. Some of the comments on amberjack were so abundant that they were a nuisance, were those largely from the western Gulf, and is that consistent with the last point?

MS. MUEHLSTEIN: Yes, that's absolutely right, and so the western Gulf is where people were reporting that they were a nuisance, and I think that there were some comments in there that also sort of put them -- Amberjack, triggerfish, and red snapper sort of in that same category, and it was all western Louisiana over to sort of central Texas where we heard that.

DR. GALLAWAY: Which is exactly the area that the platform numbers come from, and so that's just an observation.

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CHAIRMAN POWERS: Thank you. Thank you for the presentation. I think these sorts of inputs can be very illuminating, and so we return to OFL and ABC and whether we want to redo a set of projections, and so I'm looking for some guidance here. Shannon.

DR. CALAY: Thank you. Of course, we are willing to make some revisions, if they are requested by the SSC, and it would be helpful to know that the SSC has agreed that stock-assessment-based management advice can be derived. What I'm getting at is usually there's a second motion about whether the stock assessment advice will be used to create management, OFL and ABC.

We can make limited analyses now, limited revisions, to assist

you, if that would help you make that determination. We can't do anything too elaborate in the timeframe. More extensive revisions will require a subsequent meeting, and so, if it's really just a matter of the treatment of the 2019 and 2020 catches, that's something we could probably do relatively quickly.

I just want to be sure, and I know we've heard a request from Ryan Rindone, and we are willing to make that analysis, if the SSC agrees it's useful. If the SSC does not believe it's useful, then we prefer not to do that work.

CHAIRMAN POWERS: Understandably. All right. Essentially, yes, we have to come to some agreement about how we want to approach a problem. My attitude is, if we're going to do some sort of projection-based OFL and ABC, then, ultimately, you have to decide how you're going to deal with the 2021 data and go from there. It's really more the larger issue of how to proceed for what do we define as ABC and what do we define as OFL.

Bob Gill has suggested, for ABC, that we go through the control rule with the scaling that we traditionally do, in order to get a P*. It's also been suggested, by me, that the ABC, by definition, is the F rebuild, and there's also questions about what the OFL is, given some of the issues about the projections, and so all of those things are kind of on the table. Ryan, did you have a question or a comment or solution?

MR. RINDONE: Yes, sir. Taco Tuesday has fueled our brains a little more over here, and we have a slight modification to the recommendation for modification of the projections. For 2019 -- For better or worse, what was landed in 2019 was landed in 2019, and I don't disagree with Nancie, or the rest of the Science Center folks, at all that 2019 is a little weird, especially compared to everything else.

However, we're talking about 2020 and 2021 here, and we've had discussions at other meetings, other SSC meetings and other council meetings, between ourselves about our perceptions of recreational fishing effort in 2020, especially as it relates to COVID, and one of the things that we heard routinely, from people of all walks, was that there was a lot more recreational fishing effort in 2020.

Using 2019 as part of the average for 2020 would certainly undercut those observations, and we don't have those data from MRIP in front of us, obviously, but we certainly can make some probably defensible assumptions about what we think could have

happened in 2020, and there's not much to say that 2021 would necessarily be much different than that.

What I would like to propose to you guys, as a way of doing this, is that we use 2016, 2017, and 2018 data as they are for those years, use 2019 data for 2019, even though it's still considered preliminary, and then, for 2020 and 2021, to use the averages of 2016 to 2018. Using the three-year average for 2020 and 2021 keeps with best practices, to the extent of using a three-year average, even though it doesn't use the most recent year of 2019, but it does use the most three recent years of finalized data.

If you look at -- Well, you don't have it up in front of you, but I can tell you, but if we look at the landings history, 1.962 million pounds was landed in 2016, 794,000 pounds in 2017, and 622,000 pounds in 2018.

The ACTs for 2017 and 2018 were adjusted for the overage in 2016, which then there was an overage in 2017, and 2018's ACL was -- The landings were kept under that ACL, but it would certainly seem inaccurate to presume that 2019's landings, which right now look to be round about 500,000 pounds, and assuming that for 2020 seems like it's probably a bad idea. That's what we're suggesting at this point. For 2019, use the preliminary data, and, for 2020 and 2021, use the average of 2016 to 2018, thinking that will be more realistic. Mr. Chair.

CHAIRMAN POWERS: Thank you. I don't have any problems with that sort of scenario, but, to me, the larger issue is what F values are you going to use, and what are you actually going to project? In essence, what are we defining as OFL and ABC? Harry.

MR. BLANCHET: Thank you. This is to Ryan's point of 2020, and we do not have the data yet for that, obviously, but, at least for the MRIP, we do have I believe through Wave 5 with some preliminary data that could be used at least as a check to see if that projection is in the ballpark or if we need to come up with an alternative. I'm not saying to use it, but I'm just saying to just see if it's in the ballpark.

CHAIRMAN POWERS: Thank you. Luiz.

DR. BARBIERI: Thanks, Joe, but I don't know -- Nancie, do you have something to that previous point that you wanted to make a comment about?

MS. CUMMINGS: Yes, and thank you. I will just repeat what Ryan said, because I have a question. 2019 as 2019 preliminary for landings, I understand, and you're suggesting to use 2016 through 2018 for 2020 and 2021, correct?

MR. RINDONE: Yes, ma'am.

MS. CUMMINGS: So, in my interpretation as an analyst, it tells me that's indicating that we really don't trust the 2019 datapoint, and that's just a perception I see here, because, if you want to use 2019 as 2019, then I would suggest using 2017, 2018, and 2019 as your three-year average, unless you have some reason, and it's my understanding that 2019 data are about 95 percent complete, and that's just my kind of thought, but I may be off here in my understanding.

CHAIRMAN POWERS: The issue isn't the, quote, unquote, proper average, but you're basically trying to say, well, what is the most likely catches for 2020 and 2021, and is it best represented by some average of 1990 to 1992 or is there a --

MS. CUMMINGS: I understand that, Chair, but look at the --

CHAIRMAN POWERS: Excuse me.

MS. CUMMINGS: But look at the 2019 landings. They are much lower than the 2018, and so we already know the average is going to come down, and 2019 is already going to come down more.

CHAIRMAN POWERS: Thank you. Luiz.

DR. BARBIERI: Thank you, Joe. First, I guess, to this very point, what is the issue with the 2019 landings estimate? Can somebody help clarify what the issue that was identified is, because we should have final numbers for the 2019 MRIP estimates.

DR. FROESCHKE: I will try to answer that. The issue for 2019 is exactly what Joe Powers said. It's that, based on the management that was in place, and, in that year, there was no May fishery, and it was only open in the fall, and that's not the season that we would project that happened in 2020 or what we would predict would happen in 2021, and so we have no problem saying that's what actually happened in 2019, and those numbers reflect that, but we don't think that is a good predictor of what the landings are likely to be in 2020, nor 2021, because the management and the seasons are different, and the 2016 through 2018, although imperfect, are likely to better -- Be a

better surrogate of what's going to happen in 2020 and 2021, based on what we actually know when the management is going to be in place.

DR. BARBIERI: Great, John, and, yes, that answers my questions, and so, in that sense, I would say we would -- If we follow the suggestion, recommendation, made by Ryan, we would perhaps use the average of 2016 to 2019, but apply it to 2019 through 2021, and wouldn't that be a viable way to avoid the 2019 that we do not trust and have something that can fill in those years for the projection?

CHAIRMAN POWERS: What John just said though is not that we don't trust 2019, but that 2019 isn't a good predictor for 2020 or 2021.

DR. BARBIERI: Right, and I didn't mean "trust" in that way. If it's not a good predictor for 2021, then it's not something that we can say that the recent past is a good representation of the near future, and so, as far as completing the projections, we might be better by having something that reflects what it's going to be into the future, if I can phrase it that way, Mr. Chairman.

MR. RINDONE: Luiz is exactly right. When we set the split season, the intention was that there would be a fall and a spring season. In 2019, that was not what was experienced, due to overage adjustments in previous years, and, in what we would presume to be a typical management scenario, we would be managing to the ACL, and we wouldn't have overages, and we wouldn't have payback provisions that would cause us to have modified ACLs in the following year, and thereby truncated seasons, and so all of those things worked against 2019, and it's management bias, and not a change in fisher behavior, but management bias, that makes 2019 atypical.

By using years where there is hopefully a little bit less of that -- I mean, we had adjustments in 2017 and 2018, but, by using 2016, which was, by all accounts, unbridled, it makes it a little bit more along the lines of what we would expect to see as far as the landings for greater amberjack, when we have both a fall and a spring season, and so 2019, for better or worse, happened as it happened, and so those landings are real, and so it's for that reason that we think using 2019's preliminary landings for 2019 is appropriate.

For 2020 and 2021 though, including 2019 introduces that management bias that we have no way to say whether that should

or should not occur there, and the default should be that it shouldn't, since the management is not designed for the species to work that way, and it's designed to have a fall and a spring season, and so, for that reason, that's why we're saying we should be looking at 2016 to 2018 for the average to 2020 and 2021.

CHAIRMAN POWERS: Luiz, did you want to follow-up?

DR. BARBIERI: Well, yes, and I agree completely with that, and since other parameters that we're using, or ought to be used, in the projections are also averages anyway, this is just a different way to estimate an average that we feel is going to be better to reflect the future, the projection scenario that would be most reflective of reality into the future, and so I would go with that, using that 2016, and that would be my leaning towards as well.

CHAIRMAN POWERS: So you're agreeing with the proposal put forth by Ryan for 2016 through 2018 for projecting for 2020 and 2021?

DR. BARBIERI: Yes.

CHAIRMAN POWERS: Okay. Thank you. Benny, is it on this issue?

DR. GALLAWAY: I have no comment. I'm sorry.

CHAIRMAN POWERS: Okay. Thank you. Shannon, on this issue?

DR. CALAY: I withdraw my comment. Thank you, Joe.

CHAIRMAN POWERS: All right. I think we've got agreement that, given that we do a set of projections, this is how we handle the gap years. Now, the question is, what are the projections that we're actually going to do?

The ones that were done in the report were the OFL that was conducted, the methodology that was conducted before, and then also the F rebuild, which basically is searching for an F solution that will get you there in 2027. What I want -- I don't want these projections being done unless we're in pretty good agreement that we're going to actually use them to define OFL and ABC, and so we really want to make clear what it is we're asking them to project.

Before we get to Luiz, I would remind you that, in terms of ABC, there are several different discussion points about how to define that, and one of them is to use the normal buffer system,

based on the OFL, and we also have the F rebuild, and I'm sure we could come up with something else as well, but, also, how do we -- The OFL is -- Well, the methodology that was used for the OFL is also there, and so Luiz and then Doug Gregory.

DR. BARBIERI: Thank you, Joe. So, first of all, I think that we have two separate discussion points here. One is whether we want to proceed and accept the projections, any set of projections, going forward. We just discussed some of the ways to configure these projections, but some folks may not be comfortable with projections, given all the uncertainties that are involved, and so that's one discussion.

Another one, and I am leaning towards accepting that some projections would have to be made, and, I mean, we just accepted this assessment as representing the best scientific information available, and so I think that projections, going forward, would be with parameters that are consistent with that determination, and so the stock was determined to be overfished and undergoing overfishing, and so we have to have a rebuilding plan that is set based on F rebuild, and so we accepted the assessment, and we have a yield stream for OFL that already exists, and that will be the projection for OFL. As far as the ABC, because we are to follow a rebuilding schedule, that ABC then becomes the yield at F rebuild.

CHAIRMAN POWERS: Okay. Thank you. In terms of the OFL, you said the OFL already exists, and presumably, if we change the gap years, that would have to be redone as well.

DR. BARBIERI: Right. Defined as it is right now, but with the actual data that goes into it, and perhaps different values, given that we are changing some of the input data, but following the definition of OFL that we have on the table right now for that part, yes.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: I have a question and a comment. Mr. Chair, are we obliged to rebuild the population by 2027, or could we rebuild it quicker than that? I mean, if it's the former, then we're stuck with a yield stream that comes out of the projections, it seems like, that we have to do that, which kind of bothers me.

That's my question, and the other comment I wanted to make is I think, since it's in the plan, we have to do F rebuild, and we can't do F OY or P*, based on the OFL, and they're irrelevant,

but it would be interesting to know how they compare, and maybe not in a projection sense, but in some sense, but I think F rebuild is probably going to be the most conservative approach, because, if you look at the first three years, comparing the OFL and the yield that we've got now, the F rebuild yield is like 53 to 63 percent of the OFL, and I don't think we've ever done an ABC that conservative before, and so, as far as being conservative, I am comfortable with the way this is going, as far as F rebuild goes, but I have no comment on how we do 2020 anything, and it seems to me this current projection we have actually starts out OFL with current landings, which we could see how current landings would be affected. Thank you.

CHAIRMAN POWERS: Thank you. Let me characterize what Doug said, that basically the F rebuild is the defining guidance that's been given to us by the FMP, and that that needs to get done, in order to provide the council information relative to that goal, and that de facto defines what ABC is.

You also made the comment that OFL is irrelevant, and it is, in terms of management, but presumably, if you have some out years in a projection, and, two years from now, before this gets revisited, that OFL level is what defines overfishing, and so it becomes relevant, in that sense, but, in terms of defining the real management, I think you're right. So how do you want to proceed?

The discussion that's gone on thus far, I'm interpreting it as redo the projections for the OFL level and the F rebuild level, and that will become the basis for OFL and ABC. Obviously, I am not requiring people to agree to this before actually seeing the results, but there is tacit agreement about this is the best approach, because I don't want to come back and revisit something else after this.

Let me ask the people from the Center. If that's the way we go, have we given you enough guidance, and then, one, when we might be able to see these results?

DR. SIEGFRIED: We would prefer to present it on Thursday, just so that we can give it a good review, and we all know what happens when we try to go too fast, and so, if we could produce it on Thursday for you, that would be preferable.

CHAIRMAN POWERS: Okay. Remember that we have limited time on Thursday, and so, I mean, it has to be first thing. Well, we've already promised somebody else the first thing on Thursday morning, but the meeting is scheduled to end in the morning, and

so we do need to -- It has to be in the morning.

DR. SIEGFRIED: Okay. Is there sufficient time in the morning, or are you saying we need to have it to you by Wednesday afternoon?

CHAIRMAN POWERS: All I'm saying is the meeting cannot -- It has to be done, including the debate and all those sorts of things, has to be done Thursday morning, and so it's not so much when it's ready as we also have to debate and come to some agreement, and so it's holding everybody's feet to the fire, getting it done, and, obviously, you can't predict how a debate will go until you see the results, but, nevertheless.

I guess there is -- At this point, I don't see us being able to debate that tomorrow, and so you might as well have it Thursday morning, but it could be a full agenda Thursday morning, unless we start switching things around. Is that acceptable to everybody, or perhaps another way to say it is that not acceptable to anybody? Doug.

MR. GREGORY: I apologize, Mr. Chair, but I'm just -- Before we do all that work, and maybe this is a question for Ryan, but can we propose an OFL and ABC yield stream that is more conservative than what we might see than what we see now, because I am concerned that this is a very optimistic projection.

It shows that, within three years, the ABC is right back where the OFL is now, or current landings are now, and, given the history of this fishery -- Unless the size limit change has a dramatic impact on the recovery, and that was done in 2016 or 2017, I just feel like this is overly optimistic, and we have, in the past -- I think, with the exception of red snapper, which had a 2032 rebuilding timeframe, and, even with red snapper, I don't know if we recommended that long of a yield stream, and so I guess my question is can we recommend a shorter yield stream?

I know that we've got scheduled probably an interim analysis in 2022, and so are we constrained by doing something that goes to 2027, or can we do something that appears to be more conservative, and, if we can do something more conservative, than maybe we can build that off the new yield streams we get, like take the average of the first three years or something, but then that would have to be projected as well at some point, but that can be done before the council meeting. I guess my question is are we constrained to actually having to project the 2027, or can we do something more conservative? Thank you.

CHAIRMAN POWERS: Go ahead, Ryan.

MR. RINDONE: Thank you. You guys can recommend something -- You can recommend anything that you think is appropriate, but you just have to have something to defend that decision. Easily enough is to use the analyses provided and the catch advice that comes from that, and, if you guys are going to go down a different road, you just need to have something to justify that decision.

With respect to comparing our current catch limits to those that are being proposed as part of the projections, or the stock assessment, it's important to remember that our current catch limits are based in CHTS, and the proposed catch limits, both from the stock assessment and the ones that are in the projections that Nancie presented, those are in FES, and so they are not necessarily apples-to-apples.

I hesitate to call it Ryan's table, but, if that's what helps identify it for the sake of this, if you guys recall that table that compared the equilibrium yields for the equilibrium yield resulting from SEDAR 33, and I think it was 3.706 million pounds, and then, if you had run SEDAR 33 using FES data and the same terminal year, it was 5.968, and so it's about a 63 percent difference there.

It's a considerable increase just from moving data currencies from CHTS to FES, and so, when you're thinking about how the proposed catch limits compare to what we have on the books, it's a reduction. Mr. Chair.

CHAIRMAN POWERS: Thank you. I want to close this out. Shannon.

DR. CALAY: Thank you. I just want to clarify the projection setting, so we're all on the same page. If I could reiterate, we will use the actual 2019 landings. For 2020 through 2021, we will use an average from 2016 to 2018, and we will -- Management recommendations will begin in 2022, and is that correct so far?

CHAIRMAN POWERS: Yes.

DR. CALAY: Then one more clarification, which is that, for the assumptions about selectivity, retention, and relative F, we used a three-year average of the last three years of the assessment, which was 2016 through 2018, and we will retain that, and we'll retain all those specifications, with no changes.

CHAIRMAN POWERS: Unless I hear something to the contrary, yes.

DR. CALAY: Okay. All right. Thank you. I think we're clear on what is needed.

CHAIRMAN POWERS: Harry.

MR. BLANCHET: To Shannon's last point, since that size limit was implemented, was it in 2017, and then I don't know if the selectivities from 2016 are appropriate in the projections, and that's just a thought.

DR. CALAY: The alternative would be to just use the most recent two years, 2017 and 2018, but we need to be clear on what is the preferred specification.

CHAIRMAN POWERS: Harry, you have the floor.

MR. BLANCHET: Well, my preferred specification would be just those two years, but I recognize that that also doesn't give you as much confidence in those values.

DR. CALAY: Well, also, just to make sure that everyone understands, because we would be changing from a three-year average to just those last two years, it has the potential to change the estimates of stock status in the terminal year, and so you might see some differences, and I don't know how large they would be, but you might expect to see some differences in our stock status estimates.

CHAIRMAN POWERS: Harry, do you have any further comment?

MR. BLANCHET: I did not realize it was as far-reaching as that, just thinking in terms of the selectivities, because, to me, I was seeing that purely as a projection value and not necessarily as a current estimate.

CHAIRMAN POWERS: Well, you have to get them to line up the last year.

MR. BLANCHET: Yes.

CHAIRMAN POWERS: Given that, Paul Sammarco, on this particular item?

DR. SAMMARCO: Just a quick comment on the one that we were just discussing, and it might be a matter of just the wording, which

is the 2027 that's been identified as a point at which the model would take us out to, and perhaps restrictions might assist the recovery of the fishery, but, as I say, a change in wording to something like we're going to follow these guidelines up until 2027, and to be renewed annually, or, in other words, they wouldn't go beyond 2027, and they would definitely be reviewed again in 2027, and, if it reaches its potential, let's just say, for argument, in 2024, then the restrictions would be changed back to normal.

In other words, it might not be necessary to change the whole system of analysis, but simply look at the bottom line, and then assess whether you're going to carry on for the next year, and I don't know whether that makes any sense or not, but it's just one way to address the issue that's been raised.

CHAIRMAN POWERS: Thank you. The issue goes back to the projections of the selectivity in the final two years or final three years, and Shannon made the comment that the way the assessment works is it adjusts that final year based upon the average over the last three years, and so what you get for that average will adjust a little bit the final year status. For those reasons, my attitude is to continue the three-year average.

DR. SAMMARCO: Yes. Thank you.

DR. CALAY: That is certainly the Science Center's preference as well.

CHAIRMAN POWERS: All right. We have successfully punted, and we will look at these things Thursday morning, and I expect everybody to have a very limited debate. If you don't want to take the projections at face value, then have a proposal, and one of those proposals would be limit the number of years that we want to project ahead, in terms of providing OFL and ABC guidance, but, whatever the issue is, if you have some disagreement with the way we're going, then we should -- You should have a proposal, because we're not going to have much time to debate that. All right. Thank you.

Given that, I think we're finished this particular item. For some reason, on the screen I guess is the specifications for the projections, and I'm not sure who put that up there.

MR. RINDONE: I asked that it be put up there, Joe, in case you guys had any other modifications.

CHAIRMAN POWERS: Okay.

MR. RINDONE: It's just to visualize what was being talked about.

CHAIRMAN POWERS: Okay. Great. All right. Then we're basically putting this off until Thursday morning, and the next agenda item under this was the Executive Summary.

STOCK ASSESSMENT EXECUTIVE SUMMARY

MR. RINDONE: Dr. Powers, just to frame this for you guys, with respect to the Executive Summary, this was developed, as it states, in November, and so the projections, as listed in the Executive Summary, differ greatly from those that were presented by Ms. Cummings today, and they will change again, and so this document doesn't actually reach its final status until after the SSC meeting, and so that's just something to bear in mind as you guys are taking a peek at this thing.

CHAIRMAN POWERS: So, yes, as we go through it, think of that in terms of -- You probably should have already gone through this, because it's been available, but think about this in terms of providing some guidance about modifications that they might make for the final version. We will briefly go through it. The stock and stock status sections.

MR. RINDONE: These are all as presented, as they were in Ms. Cummings' presentation, and so if you want to just keep scrolling down.

CHAIRMAN POWERS: Yes.

MR. RINDONE: There's your reference points there, and you can see the status determination criteria defined, and that the stock is overfished and undergoing overfishing. The recommendations part, right here underneath that table, that will be populated after this meeting, based on the information that's in our meeting summary.

Then the characterization of the Something's Fishy tool is under the socioeconomic and ecosystem considerations, and then, just as a quick aside, we have Something's Fishy up for gag right now, and it has over 400 responses, and so we want to thank the State of Florida for helping to push that tool out there, and so it's great to get a lot of responses like that. This projections section will see some updating, but any input on the way the content is presented is always helpful.

CHAIRMAN POWERS: Well, that section talking about P*, again, depending on what we end up doing, that's going to have to be maybe reworded, because I'm not sure we'll be dealing with P*.

MR. RINDONE: I think, for this particular section, in this instance, this whole section is probably going to get a little bit of a re-tool, depending on what decisions you guys make on Thursday morning.

CHAIRMAN POWERS: All right.

MR. RINDONE: Then the data that were used in the model and the way they were generally treated is detailed here. The meristics, and so these are very valuable to a lot of people, and so we've tried to make sure that this maintained in the Executive Summary.

MR. MARESKA: Ryan, before you continue on, I would like to address Figure 3.

MR. RINDONE: Okay.

MR. MARESKA: I think this was a comment that Nancie made in her presentation about the video survey, that it was relatively flat, and this figure is dramatically different than what's in the working paper from the SEDAR process, and so there was no data collected from 1998 through 2001, and the 2002 data point, that high point, is a stand-alone, and no data was collected again in 2003, and so this figure is a little bit misleading, and it's kind of indicating that there was a whole time series in which the abundance were -- The relative index of abundance was building, and so --

MR. RINDONE: Nancie, where those data points are connected between 1998 and --

MS. CUMMINGS: Ryan, we'll address that, and thank you so much for pointing that out.

MR. MARESKA: While I've got the floor, and just after we're done with this, I would like to circle back and go over some research recommendations.

MR. RINDONE: Okay.

MR. MARESKA: Thanks.

CHAIRMAN POWERS: So what we're going to do with Figure 3 then is make sure that the lines are disconnected if there wasn't any data there?

MR. RINDONE: Yes. Correct.

CHAIRMAN POWERS: Okay. Thank you.

MR. RINDONE: Then the characterization of recruitment, Nancie went over that with you guys. Landings data. Then we've gotten positive feedback from stakeholders, as far as using the stacked bars to be able to visualize when different fleets are combined together to show the landings data. Then discards are here, and that's it.

CHAIRMAN POWERS: All right. Are there any further suggestions or comments? We will wait with bated breath for the projections section, when that gets done.

MR. RINDONE: Thanks to the Center for working hard on putting this together, and we've gotten a lot of positive feedback from folks on being able to use this as a way to more quickly digest the contents of the stock assessment report, which means that it's meeting it's intended purpose, and so that's good to hear.

CHAIRMAN POWERS: Thank you. Katie, did you have a comment or a question?

DR. SIEGFRIED: Yes. Thank you. I just wanted to clarify which set of projections is preferable to be included in the Executive Summary, and we struggled with that, Skyler and Nancie and I, because this was originally produced right after the stock assessment report, and is it most useful to wait for this until the SSC meeting, both because of the projections and also the SSC section, or is it good to have multiple revisions?

CHAIRMAN POWERS: I sort of viewed it as the projections would be the time series associated with OFL and the time series associated with ABC, both yield and spawning stock biomass. Is that correct, Ryan?

MR. RINDONE: Yes, I think so, but I think Dr. Siegfried is also asking if the projections that should be included in this are the ones that are presented in the stock assessment report or the ones that they present initially, and like what set of projections is the one that's ultimately put in here? Katie, is that correct?

DR. SIEGFRIED: Yes, and I'm trying to avoid the confusion of multiple versions of an executive summary.

MR. RINDONE: Sure. So, to that effect, I think, since this document needs to have an end, and it needs to be able to stand alone and be able to summarize what happened, the projections that are ultimately used to determine management advice, and so, whatever you guys discuss on Thursday morning, that should be what's included in here, because that will be what folks need to see when they reference back and they try to figure out, all right, what was used to generate OFL and ABC.

CHAIRMAN POWERS: Yes, and that's my opinion, too.

DR. SIEGFRIED: Okay. Thank you.

CHAIRMAN POWERS: All right. I think we're done with amberjack, except for the actual research of amberjack. Let's take a seven-and-a-half-minute break, and we'll come back and Kai will present his --

DR. LORENZEN: Joe, sorry, but can I just interject for a sec?

CHAIRMAN POWERS: Yes, you may.

DR. LORENZEN: I actually wanted to propose a change, whether we can move the presentation and discussion of the greater amberjack research program to tomorrow afternoon, after the presentation about the Great Red Snapper Count, and the reason for that is the greater amberjack research program really is sort of the amberjack version of the Great Red Snapper Count, in many ways, and I think the discussions we'll have tomorrow about the Great Red Snapper Count, and in particular how that will be used in the interim advice and future assessments, may have lessons for the greater amberjack research program.

I think it would actually be more useful to have the greater amberjack discussion after we have reviewed the Great Red Snapper Count tomorrow, and, since two points in the agenda tomorrow have been cancelled or moved, I think, time-wise, that should be a possibility, and so I wanted to float that suggestion.

MR. RINDONE: You have the time, Mr. Chair.

CHAIRMAN POWERS: I have no problem with that. I will leave it to Ryan to how to juggle things for tomorrow, but then what I suggest then for the rest of today is there are several things

that we could move to today, and two of them were the Other Business items, and then also Agenda Item XIII, and maybe there's something else, and so let's take a ten-minute break, and we'll come back, and my expectation is we'll start dealing with some of the Other Business or Agenda Item XIII or whatever Ryan comes up with to try to fill in the rest of today, if that's okay.

MR. RINDONE: Yes, Mr. Chair. That's fine, and I think, if we're going to do order of operations, let's do Agenda Item XIII and then the two Other Business items, to stick with the things that were already noticed first.

CHAIRMAN POWERS: Okay. All right. Thank you. We'll come back in ten minutes.

(Whereupon, a brief recess was taken.)

CHAIRMAN POWERS: Ryan, are there other changes in the schedule, or should we just start with Item XIII?

MR. RINDONE: I hope not. We'll go with XIII.

CHAIRMAN POWERS: All right. Agenda Item XIII, everybody.

REQUEST FOR PARTICIPANTS: SEDAR 79: SOUTHEASTERN U.S. MUTTON SNAPPER

MR. RINDONE: Okay, folks. The background for Agenda Item XIII, which is the SEDAR 79 stock assessment of southeastern U.S. mutton snapper, the background information includes the terms of reference and the schedule.

This will be a benchmark-style assessment of mutton snapper, and that is going to be done by the Florida Fish and Wildlife Research Institute, and Luiz is personally going to do all the work for this himself, and he's very excited.

We are looking for volunteers from the SSC to participate in the different components of this assessment. If we scroll down a little bit, you can see the schedule of events, as it were, and so we have the data workshop, an assessment workshop, and then a review workshop. If you participate in the data or assessment workshops, you cannot be a reviewer on the review workshop, but you can be the review workshop chair, since the chair is more of a coordinator and non-decisional for the review workshop. After the review workshop, it will still come back to you guys for things like BSIA, appropriateness for management, and catch

limit recommendations.

If there are not any questions, we would love to get some volunteers to participate in this assessment, and it will be joint between the Gulf and South Atlantic Councils, and so it will be participation from both camps, is basically what that means, since the stock is in both areas. Julie, did I miss something?

DR. JULIE NEER: Just that you guys don't have to bring a chair to this one, since you chaired the yellowtail last time, and Joe was our illustrious chair for that, and so it's the South Atlantic's turn to provide a chair.

MR. RINDONE: Even better.

DR. NEER: So you can have two actual reviewers.

MR. RINDONE: All right. We can do that.

CHAIRMAN POWERS: I will volunteer for the review part of it.

MR. RINDONE: All right.

DR. LORENZEN: I will, too.

MR. RINDONE: Thanks, Kai. All right. Anyone else for the review workshop? So we still have the data and the assessment workshop, too.

DR. NANCE: I will put my name in.

CHAIRMAN POWERS: There are several people with their hands up.

MR. RINDONE: We'll go down the list. Bob Gill, what do you want to volunteer for?

MR. GILL: My first question, Ryan, was how many folks are you looking for for each, and you can put me as the lowest priority for the assessment side, and, if there is other folks, I can step aside.

MR. RINDONE: Julie, if I remember correctly, we have twelve slots that we can fill, and is that correct?

DR. NEER: Let me pull up the memo. You should have the memo, too.

MR. RINDONE: I should, but I have about forty-seven things open right now.

DR. NEER: I will open it. Give me one second.

MR. RINDONE: It would take me less time to write it by hand than it would to find it.

DR. NEER: Participants memo, Gulf Council. Here we go. You have a total of ten panelists for data, and that includes SSC, AP, and other data providers. The assessment panel is six technical people plus two industry reps to serve as observers.

MR. RINDONE: All right. Okay. I have Bob Gill for the assessment workshop. Jim Tolan.

DR. TOLAN: I was going to volunteer for the review workshop, but it seems to be filling up rather quickly. Since I'm mostly comfortable on the data side of things, I will volunteer for the data workshop.

MR. RINDONE: All right. Data workshop. Thank you, sir. Dr. Nance.

DR. NANCE: Data for me too.

MR. RINDONE: All right. Dr. Chagaris.

DR. CHAGARIS: I will volunteer for the assessment workshop.

MR. RINDONE: All right. Is there anybody else? So far, we have two for each workshop, which is not bad, but we still have some room on the data and assessment side, if anyone else wants to participate. Jud.

DR. CURTIS: Thanks, Ryan. I will volunteer for the data workshop.

MR. RINDONE: Thank you, Dr. Curtis. Speak now or forever hold your piece, folks.

DR. SAMMARCO: I will volunteer for the data evaluation workshop, if you would like.

MR. RINDONE: All right. Thanks, Dr. Sammarco. Mr. Chair, we have four for the data workshop, two for assessment, and two for review, and so, if there aren't any others, I think we're covered.

CHAIRMAN POWERS: That review is a long ways in the future, and so I'm not guaranteeing. That's two years from now.

MR. RINDONE: We have you penned in, and so --

CHAIRMAN POWERS: All right. Thank you. Did you have something on the terms of reference?

MR. RINDONE: No, sir. The terms of the reference and the schedule have already been approved.

CHAIRMAN POWERS: Okay. Thank you. All right. What next? If we're dealing with Other Business, let's open it to what Doug had originally suggested, which essentially was to revisit our control rule and limit it to Tier 1 issues, and, as we can see in previous assessment reviews, and in this one, we're having trouble defining how we do things, and the criteria that we have in our control rule has been kind of loose and hasn't been revisited in some time, and so, Doug, do you want to kind of introduce what you're talking about?

OTHER BUSINESS
DISCUSSION OF ABC CONTROL RULE

MR. GREGORY: Certainly. Thank you, Joe. I was just thinking, in a simplistic way, of looking for what we could agree and use consistently as a buffer. The P* varies, and, theoretically, it varies according to the PDF. In the beginning, we tried to develop PDFs, and one idea was joint distribution of the different scenarios run in an assessment, and that turned out not to work.

We have toyed around with the idea of the Ralston method of using a sigma of something like 0.37. Now, since then, the Ralston method has been expanded, I think by the Pacific and the North Pacific Council's SSCs, and there is some documentation on that, and, in one sense, not only does the sigma get larger with the different tiers, but it changes based on how long it's been since there was a previous benchmark assessment. It changes depending on how far in the future you're projecting your landings and some other things.

I was just simply thinking, well, lately we've been focusing on optimum yield, which appeals to me, and optimum yield tends to give us a little bigger buffer than P* does, and I think a lot of us were disappointed in how ineffectual P* became, and it didn't matter if we chose a P* of 0.3 or 0.4, and it was still -

- It gave us an ABC very close to OFL, and I know, at the time, the Regional Director, Dr. Crabtree, who is now retired, was concerned that it didn't give management much chance of managing without exceeding OFL, which is a big no-no, and everybody in management wants to avoid that.

I was thinking that, okay, let's talk about this. Let's look at P* again, and let's look at OY, and let's look at the Ralston method and come to an agreement, as an SSC, as to which way we want to use going forward -- Which one we want to use going forward for our Tier 1 assessments.

Now, since I mentioned this to Joe, he has been thinking along similar lines, and he has compiled some papers and some analyses that are more theoretical and more sophisticated, which makes sense, relative to what I was trying to do, but just to try to get away from this concern that we have about, well, the P* doesn't capture the uncertainty that we know is in the population.

Therefore, we want to do something different. Well, that's not just a good enough excuse, because even what something different is doesn't capture the uncertainty, and so -- All we really are trying to do is have a buffer, a buffer that seems reasonable, a buffer that can be used consistently, and not worry about uncertainty.

That's a National Standard requirement, and it's not in the Magnuson Act, and it's something that I have been bothered by since day-one, because we all know that the uncertainty that we're dealing with is massive, and it's unmeasurable, and, the more we talk about it, the more nervous I get, from a scientific perspective, since we can't measure it, but we have some means of dealing with it, and I think, if we limit our discussion to Tier 1, we might be able to get through it in one day.

It might take more than one day, but I would like to have a day of just talking about that and not built into an agenda of multiple items, and so, if there's no objection, I would just like to kind of make a motion that would say the SSC requests the council Executive Director convene an SSC meeting to review and discuss our Tier 1 ABC control rule.

MR. GILL: Seconded.

MR. GREGORY: I've already looked in the SOPPs, and the Executive Director has the authority to convene the SSC, and we don't have to go to the council itself for approval, and not

that I don't think they would approve it, but we would just have to wait for them to have a meeting, whereas our Executive Director can make a decision tomorrow.

CHAIRMAN POWERS: All right. Thank you, Doug. As you know, I sort of put through a short little discussion paper about some of the issues that we're dealing with, most of them related to Tier 1, and I would pass that out, but, also, more importantly, the background papers that you alluded to, in terms of how other councils are dealing with this, and one of the things about P*, and I'm sure Shannon would appreciate this, is that we have this elaborate system where you have certain criteria, and you rescale it on a logarithmic scale and it comes out with a number that turns out to be like 0.45 or 0.40 or something.

It would seem to me that, having been integral in defining what this was, I'm not real happy with it, and it would seem to me that it would be much more straightforward to say, all right, here's a set of criteria that would imply a P* of 45 percent, and here's a set of criteria that would imply a P* of 40 percent, and kind of turn it around, and so I think that's kind of what Doug is alluding to.

The other issue that I have in this document that I will pass through is that, given that you have a model and a biomass at MSY, or a surrogate, it's the same thing -- I'm thinking of P* as the same thing as adjusting the F value, and you can kind of translate one into the other, and so you can couch it in terms of P* or, equivalently, you could couch it in terms of a percent of F 30 percent SPR, that sort of thing, and so, again, that's something to think about.

Then the last thing that really relates more to Tier 1 is do we want to just set some criteria that, given the assessment does not have a suitable PDF, or overfishing limit, can we substitute something, and how might we modify that, and, as Doug mentioned, some councils adjust it according to how long from the last assessment, and then also how much into the future you're doing projections, and so those are kind of the issues, and I would very much support doing this, because we seem to be always revisiting all of these things, and nobody has ever been real satisfied with how these issues came up, and so I would support this sort of thing.

Again, by making it an SSC meeting, then I think it would be very helpful that, if we deal just with Tier 1, that we could probably deal with it within a day, and then, secondly, as the SSC Chair, and if I were chairing this, and I presume that I

would, then I would probably ask a couple of people to present some strawmen about what kind of criteria would cause you to have a P* of 45 percent or what kind of criteria would cause you to have a CV of 30 percent, those sorts of things, and so that's kind of where we're going now. Shannon.

DR. CALAY: Thank you, Joe. The Science Center would very much like to be involved in this process, and we do service three different councils that have three different ABC control rules, and, to the extent possible, we would like to encourage similarities between the control rules.

I do want to say that we have done some exploration, and, obviously, we were not completely satisfied with the buffers that evolved through our current ABC control rule, and they tended to be much more narrow than we had expected, and changing just P* itself doesn't lead to a larger buffer if you use the stock-assessment-derived PDFs, because they are very narrow.

The approach that we have recommended with other SSCs, including the Caribbean SSC, is to actually look at the width of the PDF, using something like the Ralston approach, or the most recent document that built on that approach, and so, while I agree with Joe that we could consider basically categories of P* and guidance for the level of P* that might be most appropriate, the biggest benefit is to actually properly characterize the scientific uncertainty by looking at the expected width of the PDF, the PDF on OFL, for example.

A wider PDF will produce a larger buffer, even at the same P* level, and we have developed some documentation that we shared with the Caribbean Council, and I would very happy to participate in this meeting and share similar documentation.

CHAIRMAN POWERS: All right. Thank you. We do have a number of documents, including the presentation that Shannon made some months ago about this. Will Patterson.

DR. PATTERSON: I think, if we're going to really get into this, which we've kind of threatened to do over the past couple of years, I think we need to think seriously about just scrapping the whole distribution-based and P* approach. I mean, we've proved to ourselves repeatedly that the distributions that come from the assessments don't match, or don't fully capture, uncertainty.

If we're going to inject a distribution by saying it's this wide or that wide, it's kind of like -- It's the same thing as if we

fixed steepness, where we're really fixing MSY at the same time, but so, if we're going to inject, or impose, a distribution, then we're kind of lying to ourselves that that, in any way, shape, or form, reflects uncertainty.

It just says that we want the distribution to be wider, and we're going to come up with some type of scientific justification for how wide that should be, and so I would hope that we consider approaches similar to the recommendation to the council after the Sustainable Fisheries Act in 1996, where we had a true target OY, and then the MSY level, and we recommended management based on the OY target, and then, in this case, under the new -- It's not new anymore, but the reauthorized Magnuson Act, you have penalties that occur when you actually exceed the threshold, the OFL threshold, that's the yield at FMSY, or the proxy.

I would hope that we would consider other approaches than -- You know, beyond just these distribution types of approaches and P*. You know, while the initial P* publications I think were well received and elegant in their approach and simplicity, our experience with this just hasn't borne out that this is a reliable way for us to feel confident that we can fully capture uncertainty, and, if we're going to impose the distribution, then why not just take a step back and say, you know what, we're just going to make a reduction and say this is our target, and it doesn't have to be the target.

The F OY doesn't have to be 75 percent of FMSY, which was what existed in the Restrepo et al. 1998 document, and we can come up with rules where we would set the two Fs closer to each other than a 25 percent reduction in F, but another thing about the Restrepo et al. approach that I think that's always been appealing to me is that, as stocks approach the OY level, then the difference between the yield at FMSY and the yield at F OY is almost negligible, because you have built in that buffer.

Even though you're fishing at a much lower rate, and it has a much more appealing scientific basis, in that you're actually -- You have a target that you're trying to achieve, and there's not this amorphous uncertainty that we can't fully describe even to try to discount the OFL to the ABC, but, instead, we would come up with a true target. Anyway, that's just my two-cents.

CHAIRMAN POWERS: Thank you, but what you have said, Will, in my mind, is very much translatable into you having picked a P* and having picked a CV. Ultimately, that's what you're doing, indirectly or directly, and you have -- I mean, you suggested

what may be good reasons to actually couch it, in terms of F, but, essentially, all these things are related, and so, in a sense, it's how you characterize what you're doing and what's the simplest way to characterize it and the most objective way to characterize it. That's my opinion, but anyway.

DR. PATTERSON: Joe, I think that's true, and, in a given year, and a given circumstance, you could come up with a distribution of a P* that's equivalent to an F reduction approach. Where the two approaches differ is, as the stock recovers, if you have an overfished stock, then you always have that static buffer, unless there's another assessment done and you end up changing what the buffer is, because the stock is performing one way or the other, but, with the F reduction approach, you actually have a convergence, as the stock approaches the -- As the stock approaches the biomass at OY, and you get a convergence in the two yields, and so it's more dynamic.

CHAIRMAN POWERS: But, again, this is the kind of discussion that I think we should have, and it will be limited, because it will presumably be only one day, and so I think, obviously, people are interested in this, and people have been frustrated with where we've stood thus far, and so this motion is an attempt to try to address that, and, without further ado, then let me just ask if there is any other discussion relative to this motion. All right. **Is there any objection to this motion? If none, then the motion carries.**

I will put together some of the documents that we've been talking about, including discussions and that sort of thing, and we'll kind of go from there. Recall that we are limiting it to Tier 1, because that's where most of our difficulties have been.

All right. Other items? If we're talking about Other Business, Carrie, did you want to talk about the --

NEXT TERM APPLICATION PROCESS FOR SSC MEMBERS

EXECUTIVE DIRECTOR SIMMONS: Yes. Thank you, Mr. Chair. That would be great. I just wanted to let everyone know that it's been three years, in June of 2021, since the SSCs were appointed, and so it's going to be that time, very soon, to reapply.

If you are currently on the Standing or the special SSCs, and you want to stay on there, you will need to reapply, and so the plan right now is to do that in early April and give you all plenty of time to get your applications in for that, and then

the council, during closed session, would deliberate on those applications and make a decision during their June council meeting. We will remind everybody of that as it gets closer, but I just wanted to put that on everybody's radar, and we will be hounding you about that very soon, and so thank you.

CHAIRMAN POWERS: On an issue dear to my heart, I have been Chairman now for going into the third year, I guess, and so when are we going to have an election?

MR. RINDONE: Given that the reappointment is going to be happening this year, it may be premature to have an election now, but it seems like it would be most appropriate to have one after the reappointment process is completed, and so, unless you guys want to do something different, but that's really up to you, at this point.

CHAIRMAN POWERS: Okay.

MR. RINDONE: COVID proved to make things interesting.

CHAIRMAN POWERS: Indeed. All right. Is there anything else that we could do today, because it's four o'clock. Is there anything else to do today that we can take care of?

MR. RINDONE: I think we're probably at as decent a stopping point as we'll have, Mr. Chair. Looking at what's left on the presentations, some of these things just simply can't be moved, and so I think we're in a good spot right now, if you wanted to adjourn for the day. Then we'll begin tomorrow with the red grouper data.

CHAIRMAN POWERS: Okay. Very good then. With that, then we will adjourn until nine o'clock Eastern time tomorrow, and we'll come back then. We don't need to have a motion for this or anything.

MR. RINDONE: Nope. You're still the Chair.

CHAIRMAN POWERS: All right. John Mareska wants to say something.

MR. MARESKA: Thank you, Mr. Chairman. When we were talking about the greater amberjack executive summary, I wanted to loop back and talk about research recommendations, while they were still kind of fresh on my brain.

CHAIRMAN POWERS: Yes. Go ahead. I'm sorry.

MR. MARESKA: I think particularly they could examine the fishery-independent indices, or just examine the fishery-independent SEAMAP vertical line survey, particularly, off of Louisiana, to see how those catch compare to the commercial vertical line indices, just to evaluate if that spike is real or not.

Also, looking at the video surveys, the combination of the joint combined survey with the FWRI and Panama City, they really did a good job of covering across the shelf, which really picked up on the abundance of juveniles, and that particular information is missing, spatially, from the western Gulf, and so, if there was any way to expand the video surveys across the shelf in the western Gulf, that may help that survey as well, and particularly the combined video survey -- Given the life history of amberjack, the current survey uses fixed cameras that sit on the bottom, and most of us aware that the life history of amberjack puts them up in the water column, and so, if there was any way to incorporate videos from ROVs into abundance estimates, as well as length comps, and particularly maybe age comps, and so those were three things that I had jotted down. I haven't read the LGL report, to know how that may actually be incorporated into future research recommendations. Thank you.

MR. RINDONE: Mr. Chair, I've got those written down. It looks like Joe has gone for five o'clock. Harry.

MR. BLANCHET: My thought was -- We're on this topic now, but then we're getting ready to go into the discussion tomorrow about the Great Red Snapper Count, and my thought was that there may be -- After discussions of that and the Sea Grant AJ study, there may be some methodologies that come out of some of that that might be useful in terms of monitoring some other species, including AJ, and so that might -- I was just saying that some of those might get pulled into some of the research recommendations down the road.

CHAIRMAN POWERS: I just got cut off, and I'm back now, and so I'm not sure what we were talking about.

MR. RINDONE: Harry, for Joe, would you mind repeating what you said?

MR. BLANCHET: Research recommendations be the two research studies, the Great Red Snapper Count and the one that's upcoming on the AJs, and I think that may have some processes, or methods, that might prove fruitful, going forward, in terms of

developing appropriate fishery-independent sampling regimes for monitoring the stocks.

I am thinking specifically of some of the acoustic work, because, in the western Gulf, you have issues with visibility, often, and so some of that kind of stuff might get put into some of the research recommendations, and that was where I was going, but it would probably be more appropriate to discuss it after hearing those two presentations tomorrow.

MR. RINDONE: Okay. Well, all the same, I've got that one written down, too.

CHAIRMAN POWERS: Thank you. I was thinking to discuss this in the context of Kai's presentation, but he sidelined me by saying he wanted to delay this until tomorrow, but we may want to revisit this again a little bit tomorrow, as he gives his presentation.

DR. LORENZEN: I agree, and I think we can revisit that tomorrow.

CHAIRMAN POWERS: Okay. John, are you happy, John Mareska?

MR. MARESKA: Yes, sir. Thank you.

CHAIRMAN POWERS: All right. Then we will adjourn until nine o'clock Eastern tomorrow morning. Thank you. Thank you to all the people that contributed and made presentations. Thank you.

(Whereupon, the meeting recessed on January 5, 2021.)

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January 6, 2021

WEDNESDAY MORNING SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees reconvened via webinar on Wednesday morning, January 6, 2021, and was called to order by Chairman Joe Powers.

CHAIRMAN POWERS: We'll reconvene, and I believe we are on Agenda Item VII, Review of Red Grouper Recreational Landings

Data. We'll start with a presentation by Dr. Sagarese. Ryan can correct me if I'm wrong, but the genesis of this is that the council wished us to look at some of the differences in the recreational landings of red grouper and some of the drivers associated with that, and so, with that background, I would ask Dr. Sagarese to initiate her presentation. Thank you.

REVIEW OF RED GROUPER RECREATIONAL LANDINGS DATA

DR. SKYLER SAGARESE: Good morning, everybody. Today, I'm going to kind of quickly summarize and give a brief review of the SEDAR 61 stock assessment and just highlight some of the justification for this presentation and then try to address some of the inquiries that were made by the council.

Just for familiarity, what happened in the last council meeting was there was a request for this assessment to come back to the SSC, just to kind of look at some of the differences in recreational landings, and this is really spawned from Amendment 53, which is looking at changing, or evaluating, the allocation ratio for red grouper, and, when you do compare the different landings time series, whether it's the assessment-predicted landings versus the ACL monitoring landings, they are not identical, and there are some differences. The council was concerned, with seeing such a large difference, and what can we do about that issue.

Just to set the stage here, and, if you all remember, back in September of 2019, the monstrous red grouper presentation we had, and, right at the very end of that presentation, we had a slide that said, basically, if we changed allocations based on what we had at the time, which, at this point, when I had given this presentation, the only way that I had, at my disposal, the recreational landings and the commercial landings both in weight units was from the prediction of the stock assessment.

What I did, at the last minute, for that presentation, was I threw this slide together, and I said, if we were to use those estimates coming out of Stock Synthesis, this is what the allocation ratio would have been, using the same assumptions of 1986 to 2005, but, in this case, it wasn't quite using the MRIP-FES raw data, and it was using the assessment-predicted values, and so, when folks look at this slide, they definitely see a different allocation than what would be used, or what would come out of using, the ACL files, and so the topic of what data gets used to determine allocations, as we all know, can play an important role in what those fractions will be.

Just to reiterate, this was from that presentation, and so some of the reasons why, at the time, and we kind of struggled with this a little bit when we were working on the first executive summary for red grouper, because we had been requested to put in a table of the landings by modes and by weights, but, during SEDAR 61, and the data and assessment workshop was back in September, and, at the time, this was the first assessment where the new MRIP-FES data was available.

At the time, we kind of had -- We didn't have the full-blown suite of all MRIP-FES data, and we did not have the weight estimates that are now currently and consistently available within the red grouper data file, and that was just due to the start of FES, and there were a bunch of assessments on the docket right after red grouper, and so SEFSC was really working hard to meet those deadlines.

There was also some work at SEFSC that had to go on behind the scenes to automate some of their weight estimation procedures, because they do additional analyses on top of the numbers that MRIP provides for FES, and I guess the biggest reason, really, why, at the time, we just forged ahead with the numbers only was that the SEDAR 42 red grouper assessment model had only used recreational landings in numbers, and that's generally how the assessments operate.

The inputs that we use are landings in numbers, and, at the time, given the other requests, the recreational landings and weight estimates were not prioritized, and, therefore, those weight estimates weren't reviewed at the data workshop, or the data/assessment workshop, and we really didn't dig into those until the very end of this assessment, as we were further refining the executive summary for the council.

Just some background is I should say now that there is a lot of improvements that are being made, and so the SEFSC, the fisheries statistics, has been making amazing progress with automation, and, if you just look at the new working papers for scamp, a lot of these statistics, in terms of numbers and weights, as well as average weights, all of that information is now available in working papers, and so it's very transparent and easy to find, but SEDAR 61 was just kind of the first one, and we were still working on it.

The whole reason I am here today is, basically, when you look at -- The figure here is showing just the recreational landings in millions of pounds in gutted weights, and so they're both in gutted weights.

Over time, and so from 1986, which was the first year of the assessment model, to 2017, which was the terminal year, and the blue line, in this case, is basically the predicted recreational landings in weights from the Stock Synthesis assessment model, and so we input the numbers, and input rec landings as numbers, but then it produces a derived product of what those recreational landings would be in weights, and so that's the blue line.

Then, when you compare that to what is actually identified as the recreational landings of red grouper in the MRIP-FES ACL monitoring dataset, which now includes MRIP-FES, but it also includes the other sources, like LA Creel, Texas, and headboat, and so, basically, the suite of recreational landings, all in weights, we do see a bigger difference here, in terms of, many of the years, you see that the ACL monitoring, the recreational landings are higher, and there are some years that are somewhat similar, but, for the most part, you see a pretty large difference, and this is the concern that the council had.

What I want to do now is just to kind of propose a couple of different reasons why we're seeing such a difference, and I will go one-by-one, and I am focusing on this, for now, from the assessment perspective, because the concern is what effect does this have on the assessment, but I also want to highlight, at the end -- Comment on some of the differences with the weight estimates from the ACL files, but I certainly encourage -- Vivian Matter is on this call as well, from Fisheries Statistics, and, if I say anything incorrectly, or if she just wants to clarify, I certainly welcome any input.

Just a refresher for SEDAR 61, and, traditionally, for our Stock Synthesis assessments, we handle the recreational landings as numbers, and that's what we use, and that's what we're fitting to, and, to my knowledge, recent assessments have not used recreational landings in weight estimates, and the need to produce recreational landings in weights really came from the implementation of the ACLs back in about 2010, and so what we do with the assessment is we do have commercial landings in weight units, in gutted weights, and we have recreational in numbers, and, in addition to those landings streams -- As you remember, there is bunch of other different datasets, and so we're fitting to commercial and recreational discards in numbers, and we're fitting to composition data, and we're fitting to indices, and so there's a lot of different pieces.

The first thing is, when you look at that figure of the

comparing weights from the ACL monitoring dataset to the stock assessment, it's not really apples-to-apples, because we're inputting numbers, and then, at that time, the assessment is piecing all this information, and it's fitting to all these datasets, and then it's producing an expected output.

The second reason -- So, in addition to starting with numbers in the stock assessment, we also -- Within the red grouper assessment model, we're considering a very -- A pretty large uncertainty estimate with those landings, both commercial and recreational, and so, for context, the commercial CV that we input for the landings is 0.15, or 15 percent, and recreational is quite high, at 0.30, or 30 percent, and these CVs were set at the SEDAR 42 review workshop.

Initially, the analysts, at the time, had CVs of 0.05, and I just want to highlight here that red grouper is kind of an outlier. Traditionally, the other reef fish assessments have much lower errors associated with their landings, essentially saying that those landings are known.

In this case, because, for red grouper, we do have pretty high uncertainty within the stock assessment model for those data inputs, the model is not fitting them perfectly, and there is flexibility there, and so it's taking into account all the other data sources and the fits and the likelihoods, and it's kind of piecing everything together.

What we see is that, for the recreational landings, and also the commercial landings, when we look at the predicted landings, they are not identical to our input landings, and so, just looking back at the slide from the SEDAR 61 review, SSC review, to orient you, this is just showing the plots of the landings, and so the black, solid line is essentially the input data, and so those are the inputs that we put into the model.

The blue, dashed lines are the expected, or the Stock-Synthesis-predicted landings, and so you can see that the top-left is our commercial vertical line, the top-right is showing commercial trap, the bottom-left is commercial longline, and then the bottom-right is what we're really concerned with here, is the recreational.

Just to orient you, there's also -- This is comparing to SEDAR 42, and so each column is either SEDAR 61 or 42, and so, essentially, the take-home here is, with that higher uncertainty that we're allowing, we're not getting perfect fits, and these plots are in the report, and they were reviewed when we reviewed

the stock assessment, and nothing was too concerning.

We do, at least for recreational, when we look at those landings, the fits, those are in thousands of fish, and we do see some -- That the model is essentially not matching the observed input landings in those mid-1980s, but, for the most part, there is no really concerning trend, and, again, this is fitting to the numbers, and then, when you look at the numbers for SEDAR 42, just note that that assessment model started in 1993, and so you're not seeing that mismatch that we have in the 1980s, because of the SEDAR 61 change in start year.

In Stock Synthesis, we're fitting to numbers, and we're inputting numbers, and so there's nothing too concerning here about what the model output is showing. What we do see the difference, and what has caused the reason for this talk, is when you look at just talking about the stock assessment first, and so the assessment model has inputs for the length weight, and so it has an equation to convert lengths into weights for the population.

Those equations are produced by the life history group, and they are developed using a statistical analyses that uses all available data, fishery independent as well as fishery dependent, and so that equation is what the model is using to convert the numbers of fish into weights, and so, in terms of the landings, it's taking into account the selectivity patterns that we specify, and retention, and it's converting the landings numbers into a weight estimate.

That's what I had shown on that Slide 94 early on, because, at the time, that's what we had for essentially a quick-and-dirty analysis of what it would look like.

This is quite different from what is done with the ACL monitoring data file, and so I'm going to try to give you a quick summary of what's done with the ACL monitoring data file, but, again, please chime in, Vivian, if I say anything incorrectly, but, essentially, what happens is the ACL monitoring dataset that SEFSC produces is it does have weight estimates, or it includes weight measurements, and so the weight measurements are obtained at the interviews, and so it's actually raw data.

What that dataset has is weight measurements that are observed, and the SEFSC looks to develop a mean weight that's representative, to allow a conversion from numbers to weight estimate, using that mean weight, and it's by strata, and so,

ideally, your best resolution of your strata is you would have a mean weight by -- For species, region, gear, state, mode, wave, and, finally, area fished, and so the finest-scale mean weight you would have is that.

They hope for a sample size of fifteen fish, and so, if there's fifteen fish at that finest-scale strata, that's the mean weight that is used to then develop a weight estimate. If there's not fifteen samples for that strata, then they go back one, and so then, for example, if there was fifteen by wave, and so you keep going back, in terms of the strata, to the coarsest resolution, until you have a sample size of fifteen, and so, once that's achieved, that's how those weight estimates for ACL monitoring are calculated, and it's from that approach.

That sample size was recently reevaluated, and a working paper for vermilion paper was uploaded, as well as Vivian had presented that information at the July MRIP-FES workshop, and so there's a very clear difference, in terms of where those weight estimates are coming from, and they're data driven, and they're coming from the data, whereas what we had initially shown on that assessment slide was the expected recreational landings in weights, and so it's not really comparing the same exact things, but it certainly was an interesting analysis to do that, to see how they could differ.

Just to kind of summarize where we're at here, in terms of why we have always used recreational landings in numbers, that's just traditionally what's been used, and that's what the survey has consistently collected. Weight estimates are now consistently provided by the SEFSC weight estimation approach, and this is a question that we will be looking at for the ongoing scamp research track assessment.

The assessment development team supported a sensitivity analysis to look into this issue, but I just want to highlight that this was -- We followed the same approaches for SEDAR 42, and this is kind of something that it's worth looking into, but, really, this issue is a difference in methodology, from how the ACL monitoring data is provided and then the derived product that we show from the stock assessment. That's all I have, and I'm happy to address any questions or go back and have any discussions with this.

CHAIRMAN POWERS: Thank you. In my experience, and this has always been sort of a problem with the assessments, in that we have always done -- Even when I was doing them, to make that conversion of recreational catches in numbers to weight, you

would use samples that are external to, in those days, the MRFSS process, and so you have a different source of data, and the justification, of course, is because you have lots more data when you do that, and so you get different sorts of issues associated with that.

I can understand the council's concern, in terms of not understanding -- What they are concerned with, probably, in my opinion, is what's the metrics that they are being managed by, and how is that different from the assessment, and so that's kind of the explanation I think they're looking for, and so let me open it up to questions in general.

As we go through this discussion, what I am looking for, I think, more than anything else, is how I or Kai is going to explain this and the kinds of things that we need to emphasize. David Chagaris.

DR. CHAGARIS: Thank you, Mr. Chair. Skyler, thanks for the presentation. I think it was really concise and informative, and I think there might be another way forward with the assessment model, if you could include -- You can include mean weight by fleet, and so, if you could get the model to fit to the numbers and the average weight, then that might actually make it more consistent with the ACL monitoring database, rather than trying to convert the landings to weights, and I think that's what that option is sort of set up for, and so I'm wondering if you all have explored that at all, and maybe it's something that we could add to the scamp research track.

DR. SAGARESE: Thanks, Dave, for that insight, and so it's a great idea, and it's certainly something that we have internally talked about with scamp, potentially, and that's certainly one way we could handle this, is input the mean weight, because we do have that SEFSC Fisheries Statistics that includes that in the working paper, and we specifically asked for that. I do think this is something that we will absolutely look at with scamp, and so we could still include numbers, like we have, but then we can include that extra information, yes, to incorporate that information in, and so, yes, thanks, Dave. That's a great comment, and hopefully we'll work together with that on scamp.

DR. CHAGARIS: Excellent. Thank you.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: Thank you, Joe. I guess one way to try to avoid this problem in the future is to not use assessment data for

anything other than status determination criteria. In other words, that slide that we saw in September shows a 31 percent recreational, and then the Amendment 53 has recreational at 40 percent, which I assume is based on the monitoring database, and that's part of the concern.

How did it go from 31 percent to 40 percent? We didn't catch that in January, when we reviewed the three alternatives that are in Amendment 53, and so I think that's one way to look at it.

Now, relative to what we did in January, and this is a different type of tangential topic, but related, is, when we looked at those three allocations, we weren't given a comparison to the current allocation, and, when we saw those three, they were very close together, and I think the recreational or commercial percentage varied by 3 percent, or 3,000 pounds, between the three alternatives, and you can't measure that, and so, essentially, the three alternatives were the same.

We just passed it, and said they're all good, choose whatever you want, but then, later, I got a question from a council member of, well, what's the impact of this change in allocation on discards? In other words, the concern was, if we allocate more to one sector, not only how does it affect the landings, but how does it affect overall mortality, and he was trying to get at that overall mortality through discards.

I couldn't answer the question, and I don't think anybody could answer his question, but I did look at those three scenarios that we looked at in Amendment 53, and it indicates that, when the recreational sector gets more fish, the estimated OFL and ABC goes down, which indicates that, the more you allocate to the recreational fishery, the higher the overall fishing mortality -- The thing is, when you ask a question like this, or when somebody is looking for answers, the only place they can go to is the stock assessment, because we don't have access to the monitoring database and the, quote, real numbers.

That's going to be an ongoing force of frustration, I think, for people outside the system, is which numbers can we use to do our own comparison analyses, and so, anyway, I just wanted to comment on that, and I think we do need to try to work on minimizing this type of confusion. Thank you very much.

CHAIRMAN POWERS: Thank you. Jim Tolan.

DR. TOLAN: Thank you, Mr. Chairman, and thanks, Skyler, for

putting this together for us. I really should have been quicker typing my name is, because Doug really got at the part of the question that I was asking, in terms of the very last slide you put up, and that was the one with the caveat that says it simply doesn't get at recreational discards, and so can you just refresh my memory in terms of the magnitude of the existing size limits and what magnitude of discards would be for the recreational side, but, again, and Doug pointed to this, is, if you increase the allocation to that side, it's just going to be a bigger problem -- Thank you.

DR. SAGARESE: Hi, Jim. Thanks for your question. Just a refresher, for the recreational discards -- Our discard mortality rate for red grouper is about 11 percent. As we've seen with the MRIP-FES data, the data that's coming out of that data stream now, the recreational landings essentially -- Sorry. The recreational discards, the B2s, can be quite high, but the discard mortality is only 11 percent.

In terms of within the way that the allocations -- They are based on the average catches that traditionally they have not included any discard information, and the dead discards are not accounted for within those allocation ratios. That is how it was done in the past, and, for consistency at this point, that's how Amendment 53 has approached this, just to look at the landings, but I hear what -- Going back to Doug's question about, again, if the allocation ratio does change -- When you use the MRIP-FES data, it's about 40 percent recreational.

Amendment 53, I believe, was looking at three different time periods, which, when you look at the ratios between those three time periods, it's pretty similar. The projections that we produced for SEDAR 61 included the old allocation ratio of 76 percent commercial to 24 percent recreational, and so there is some comparison that can be made there, but I do understand the concerns of how the discards fit into the projections, but, from the way that we operate our OFL, the projected yields -- It's essentially recreational landings are the As and the B1s, and not B2s, and the commercial landings are strictly commercial landings and no dead discards.

I think this is a big issue that has come up in the past, and, at least for what the Amendment 53 is currently considering, there's not that large of a change in the derived output, based on those ratios, because they are within -- I believe they're all within 1 percent, but, yes, when you look at the comparison with what was previously on the books, to what is now, and then when you throw in this confusion with the assessment-model-

predicted allocations, Doug, I completely agree with you that that slide caused more confusion than helped, but, when you look at all those iterations, it does make a difference, but what the group for Amendment 53 was using was best available science, the MRIP-FES recreational landings.

DR. TOLAN: Thanks, Skyler. That 11 percent number was a little higher than what I remembered, and I thought it was a little bit lower than that, but it was in the general ballpark, but thank you so much.

CHAIRMAN POWERS: Thank you. Harry.

MR. BLANCHET: We essentially have three sets of numbers in this particular case, in that we have what the assessment-output-estimated landings were, and then you've got what the ACL monitoring program has, and you have the report-outs from the MRIP program, and so I think that -- I will agree with the other folks that the effort that you made to get some information to the council was the best you could do at that point, but, obviously, it went kind of sideways.

The problem with those, of course, is that it's no longer the best estimate of those particular landings. It's the estimate that fits the model the best, and so it may or may not reflect what actually happened in the fishery, and it reflects the best fit to a much larger model, and so then we were left with either the basic MRIP-FES estimate or the MRIP-FES estimate as reviewed by the ACL monitoring, and I think that those two numbers are much closer together, historically, than what we typically get from the outputs.

I think that the -- For me, the recommendation would be, if at all possible, to use the most reviewed data, which would be the dataset that is going into those stock assessments, rather than the publicly-available data, but I understand where the problem is there, in that that is no longer going to be the data that people are seeing, or is that data that has been seen and has been reviewed, and questions about what is the most appropriate way to estimate weights, whether you're imputing from one direction or another direction or whatever, and that seems like that's kind of a -- That's an improvement on the data, because that thought process has been worked through, rather than just accepting what's on the website.

CHAIRMAN POWERS: Thank you. What we're getting into, I think, is how best to communicate, in general, these sort of issues, and, of course, from an assessment standpoint, the best

information is being used. By doing that, the implication is that, well, the catches could be different than what the actual observations are, and the best estimate of balancing all the other indices, size frequency, et cetera, et cetera, ends up being what comes out of the assessment.

What I think we're talking about here is that, maybe at the level of the executive summary, we need to make those more consistent with the MRIP ACL sort of process, and basically what Harry just said, I think, but maybe through the executive summary.

Let me ask a question then. When people are -- Doug, when you said you had talked to somebody who had asked a question about this, what are they -- Are they interested in what the catches are or how those catches affect allocation? I mean, what's the goal of wanting to know exactly what those catches are?

MR. GREGORY: It was the discards. The goal is to find out if allocating more fish to the recreational sector would increase overall fishing mortality, which is important, particularly if a fishery is overfished or of concern, and there is no way to determine that directly, and he was trying -- He, and now I have exposed my friend, was trying to look at discards as an indication of increased fishing mortality.

Of course, my first reaction to these questions is to call council staff, Mr. R, or Mr. J, but I get asked the question, and so I look into it too, and so I don't think we could find any documentation on how changing the allocation changes the discards, and that should have been an important part of the discussion for a fishery like red grouper.

I have one other request. When looking at this, I went back to SEDAR 12 and SEDAR 42, and SEDAR 12 did have weights in gutted weight, and SEDAR 42 had weights in whole weight, and SEDAR 61 just had weights, without -- I assume they were whole weight, but it didn't say that, and I couldn't find it, but, in these stock assessments, to try to -- I think Skyler addressed it going into the future, but report the data in the same way from assessment to assessment.

The only reason that was important here is because we're trying to compare FES to CHTS and looking at ratios that way, but, anyway, what I found is that the landings were being -- Other than numbers being reported in different units.

The third thing I want to say is isn't the input data to the

assessment the same as the ACL monitoring data, and, if so, isn't the input data what we should be using for anything other than status determination criteria, rather than predicted data? Thank you.

CHAIRMAN POWERS: I believe that last question -- I am going to refer it to Skyler, and I think I know the answer, but one thing I wanted to mention before I call on her is that a lot of this has to do with -- As Doug just said, they want to know what the overall impact of an allocation is, including the discards, and one of the ways to address that, and I've seen this in some assessments, and not in the Gulf of Mexico, but is to look at the contribution to the reduction in spawning potential ratio of individual sectors, which combines all the sources of mortality, and it kind of highlights where it's coming from.

That might be a useful metric, and it's a little detailed, in terms of general lay public about how to interpret it, but it's also fairly illuminating, and that's just an aside, I think. Skyler, Doug had asked, essentially, about why -- Well, he had asked about the recreational catches in the assessment versus the monitoring.

MR. GREGORY: My question is, isn't the input data in the assessment the same as the ACL monitoring database, and, if we just use that data for other comparisons, then we could avoid the differences with predictions.

DR. SAGARESE: Yes, that's correct, and so, currently, the ACL files that use the MRIP-FES data are the files that are submitted for the assessments, but, as I alluded to earlier, the problem with SEDAR 61 was we had gotten the data -- At the time, it did not include the weight estimates.

It wasn't until the very end of the assessment process where we developed the -- Where we requested the new data for the 2018 landings to be included in projections that we then had weight estimates that were provided, but there might have been some differences with the original, and so the original data used in SEDAR 61, and a year later, the change to the weight estimation procedure, I believe, had been done during that time.

Normally, yes, they're the same, but I think, for red grouper, there was some growing pains as we moved forward and got everything together, but just commenting that absolutely, moving forward, all of the recreational working papers for data will have the same format and the same data, in both numbers and weights, and the average weights and the assessment report will

also have a summary of all that information as well, but it's just that, for red grouper, it was just the first one, and we were kind of working towards where we're going down with the markdowns, but I believe that the recreational landings in weights should have been consistently shown in the assessment report, at least since vermilion snapper, and it should have been in for king mackerel, cobia, and greater amberjack, and so hopefully that will absolutely be consistent.

CHAIRMAN POWERS: Thank you. Do I have enough information here to convey this all to the council? Apparently so.

DR. LORENZEN: I think we may have to mull this over, but I don't see how we can take this much further.

CHAIRMAN POWERS: Okay. All right. Thank you, Skyler.

MR. RINDONE: Hold on one second, Joe, before we move off of this. John.

DR. FROESCHKE: I think the primary objective is to get the SSC's input on the alternatives in the document that use landings data to determine allocation of a historical catch. Is it appropriate to be used in the ACL dataset, which we've done in the document, that results in the approximately 60/40 split?

Everything that we have discussed prior to that has said, yes, that's the approach that reflects BSIA, and so we want to make sure that the SSC is comfortable with that approach, that those numbers reflect BSIA for the purposes of the amendment.

CHAIRMAN POWERS: Thank you, John. I got distracted by something, and I'm sorry. Can you kind of repeat the issue there?

DR. FROESCHKE: Sure. In the amendment, the alternatives that provide new allocations are based on percentages as computed from the landings and historical time periods, using the FES data, and so those are approximately 60/40, based on slight nuances in the time series used, and those percentages were computed using the ACL monitoring database with FES data and not the weights -- Not the estimated data from the assessment, and so the way it's in the amendment now is consistent with how it's been done in the past, and the previous deliberation of the ACL monitoring reflects the best -- We want to get the SSC's input that they are comfortable with that approach and that the ACL monitoring data reflect the BSIA for this purpose.

CHAIRMAN POWERS: Thank you. To that point, Leann Bosarge.

MS. LEANN BOSARGE: My clarification, and I guess this is for Skyler, and so I know there were some issues with red grouper, as far as the average weights and not having those ready, because I'm pretty sure that was the first assessment where we actually used the FES numbers, and we were waiting -- We actually had to wait. The assessment team had to wait for those calibrated numbers to come out, but so I was under the impression that, regardless of the assessment, that what was input into the model was numbers of fish.

MRIP-FES, that sampling program, would generate numbers of individual fish landed, killed, whatever you want to say, and then, in the assessment model, you have a length-weight key, and it takes those individual total number of killed fish and converts that to total pounds of killed fish, landed fish, for that recreational sector.

I was -- My understanding is that is where the big difference was coming in, in some of those years that you showed, especially in the 1980s. I mean, you have years where the ACL monitoring database will show twice as much, or more, as what the assessment was generating as pounds of landed fish recreationally, and, I mean, I remember that one year it was like three-million pounds, per the assessment length-weight key, and it was seven-million pounds on the ACL monitoring, and so those are big differences that have a lot of implications, and not just allocation, but even in your stock assessment model. Which one of those is right?

It goes to how big the overall stock gets, right, in my mind anyway, but so can you clarify that for me? Do you input the numbers of fish from the MRIP ACL monitoring database, and then convert that to pounds, based on a length-weight key in the assessment, or do you actually enter the ACL monitoring pounds of fish into the assessment?

DR. SAGARESE: Hi, Leann. We input the numbers of fish from the MRIP-FES data file provided for the assessment, and, again, you're right. You're correct that this was the first one using these new numbers, but, at the time, the file that we had did not have the weights, but you're correct in saying that the ACL FES files should have the same numbers in weights that are provided for the assessment and is best available science moving forward, but, for red grouper, at the time, we just had numbers, and we input numbers, and then the model converts those recreational landings -- It takes all the different inputs and

produces -- I think Joe said it best, where there's a lot of different pieces of the puzzle moving around, and then, once you get into the expected landings, that may not reflect -- Or it may not be similar, for the reasons that I discussed earlier, but you are correct that it's numbers of fish going into the model.

MS. BOSARGE: Okay, and so let's use a different fish, amberjack, that we just finished up. So, when you took the MRIP-FES database, the ACL monitoring database, you took the numbers of fish, of amberjack, landed recreationally. What about the pounds that are listed on the ACL monitoring? Did you input -- Does that go into that amberjack assessment?

I am using that because we have this issue with red grouper, where these weights weren't ready, blah, blah, blah, and so I'm trying to understand, on a normal day, how this is done, and so did you enter those weights from the ACL monitoring into the amberjack assessment, or did the assessment model simply take the number of individual fish and then use that length-weight key to generate pounds?

DR. SAGARESE: Traditionally, and for amberjack and vermilion and all of the recent Stock Synthesis assessments, we always input the recreational landings as numbers, and we do not input weight estimates, and so we input numbers, and the model then converts those numbers to weights, but the one difference was we had CVs for red grouper, but a lot of the other reef fish assessments generally have very low errors with their landings, assuming the unknown, and so your observed and your expected would be a lot similar, but, in this case, red grouper was the outlier, because we did have a lot of uncertainty that was allowed, but we always use numbers.

This is an issue we may consider for the scamp assessment, what if we input recreational landings as weights, but it sounds like inputting it as numbers, but also getting to a mean weight coming from the MRIP survey, might be the best way forward.

MS. BOSARGE: Okay, and then a follow-up, if I may, Mr. Chairman.

CHAIRMAN POWERS: Yes.

MS. BOSARGE: All right, and so there are big differences on red grouper, as far as the pounds. The individual numbers, from what I could see, there are some years that have some differences, but it's not 100 percent differences, like you're

seeing on the pounds side.

That's why I have a bias, inherently, because I'm commercial, and I need to say that, so that you know that, but what I am seeing is that everything should come out in the wash. Even when you reallocate, the quotas that commercial fishermen had before should -- In pounds, they should stay about the same, because, if you think about it holistically, there is a lot more fish out there, and so the OFL and ABCs go up enough to kind of flush out this shift in allocation.

Well, that only works though if you're using the same sets of numbers for both calculations, and so, when you're shifting allocation based on ACL monitoring pounds, which are sometimes double what is put into the stock assessment, then your OFLs -- It doesn't balance out, and so what effect -- Can you tell me, does it have any ramifications on the stock assessment itself?

So, when you put in landings into the stock -- I mean, you put in fish, numbers of fish, into the stock assessment, and you use the length-weight key, and it generates total rec landings that are sometimes half of what an ACL monitoring database would have been, if you would have input those pounds in, and does that even matter in the stock assessment? Does that stock assessment care at all that it was a much bigger fish, I'm guessing?

If the number of fish is the same, and the pounds on the ACL monitoring database are twice as much as the pounds generated by the length-weight key, then I have to imagine that, somewhere along the lines, it was bigger fish that were killed, and does that have any ramification on OFL and what comes out of the stock assessment at all?

DR. SAGARESE: Just to mention that the input numbers -- Because red grouper had a CV of 0.3 for rec, the input, and so the MRIP-FES number estimates, would not equal the assessment-predicted estimates, because we allowed for uncertainty, and it's fitting to other data streams, and so there would be some difference.

I agree with you that some of those differences are quite striking in those landings estimates, but, again, it's -- You know, we're fitting to different inputs, and one thing we can do is look into the sensitivity and do sensitivity runs, which we'll explore in scamp, of using recreational landings as weights, inputting them as weights, but this is traditionally how we've operated in the Gulf assessments.

We input numbers, and we are fitting to lots of other inputs,

and we generally assume relatively higher CVs, errors, for recreational compared to commercial, but, yes, this is certainly an issue that I think we can explore for scamp, as we kind of look for different ways to approach this, but this is an issue -- We input numbers, and, to my knowledge, we don't usually compare the -- But, as I said earlier, because of the high uncertainty for red grouper, and most of the other reef fish assessments assume a lower error for the recreational landings and commercial landings, and so they're treating more as known than they were for red grouper.

CHAIRMAN POWERS: All right. Thank you. We have several people now. We have Harry, Kai, Doug Gregory, and Dave Chagaris, and so let's start with Harry.

MR. BLANCHET: Just a quick question. So, Skyler, essentially, with your table that you had presented on your Slide 3, the information, rather than that data, would be essentially what's currently in the Amendment 53, Table 2.1.2, that begins on page 16, or am I reading that correctly?

DR. SAGARESE: My Slide 3 was the assessment-predicted landings, and so that is not the landings estimates that are coming from the MRIP-FES. Correct. These are not the numbers that are currently being used in the amendment. The ones being used in the amendment are the MRIP-FES ACL files.

MR. BLANCHET: So, essentially, if you were redoing that presentation today, the numbers in that ACL file that are in the amendment, that's what you would be putting in that right-hand column?

DR. SAGARESE: Absolutely. That's honestly what should have been done in the first place, but that's my fault, and I just kind of threw something together at the last minute, and right. That whole table should be updated to show the MRIP-FES landings.

MR. BLANCHET: Okay. Just for clarification. Thank you.

CHAIRMAN POWERS: Can you just send me that updated table, Skyler or somebody, as I prepare for the council meeting? In other words, just recreate the table with the different right-hand column in it, and I can use that as a method to kind of explain things. Is that possible?

DR. SAGARESE: I can certainly pull the -- Just to clarify, the commercial column there was well will change, because that's

also the assessment-predicted commercial landings, but I can produce this slide using the information that is presented in Amendment 53, which would be the ACL monitoring files for both commercial and recreational.

CHAIRMAN POWERS: Okay. I think that would be helpful, in terms of my explanation. All right. Kai.

DR. LORENZEN: I am still struggling through this a little, but it seems to me that the allocation review has to be based on the ACL monitoring data, because that's also how the allocations are used, sort of moving forward, but there are those questions, and, of course, yes, there are different ways of calculating those numbers, and it's not immediately obvious that one is necessarily better than the other, and I think I am with Skyler's suggestion that we should look into that in the scamp context, to shed more light on that, but it does seem to me that, in terms of the question that John asked, that the best practice should be to use the ACL monitoring data in the review. Thanks.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: Thank you. Joe, I think the data you're looking for is in the Amendment, and it's Table 2.1.2 on page 16. It has the ACL monitoring commercial landings and recreational landings from 1986 through 2019.

CHAIRMAN POWERS: Let me come clean here. Basically, I was asking somebody else, and so forgive me.

MR. GREGORY: The other thing is, in reference to John's request about us specifying this is -- The table on page 13 of the amendment, I would be uncomfortable doing that unless there was an analysis in the amendment that indicated how a change in the allocation affects overall fishing mortality on red grouper, and I'm not asking for a detailed change in landings, projected landings, or discards, and it's something I think the Center can do for you, but give an indication that, when you change allocation, that you're changing the selectivity in the fishery overall, and you're changing the overall effective fishing mortality rate, and I think that information should be a part of the evaluation. Thank you.

CHAIRMAN POWERS: Thank you. David Chagaris.

DR. CHAGARIS: Just a quick comment to the motion from the council, and, because the model is fitting to the numbers with

the low overall weight, I think the explanation for that difference is likely due to the growth and the length composition, which ties back into recruitment deviations and everything, and so there's a lot going on within the assessment, and small differences in certain areas could cumulatively lead to big differences in total landings. For that reason, I mean, I recommend using the ACL monitoring data to set the allocations. That's all. Thank you.

CHAIRMAN POWERS: Thank you. I think I've got enough guidance here, and I'm sure it will be debated further within the council itself, and so, if there's no other comments or questions, then I think we can move on. Thank you, and thank you particularly to Skyler. I think that was very helpful. Next up is Agenda Item VIII, Interim Analyses, and Ryan.

REVIEW OF COUNCIL PROPOSED INTERIM ANALYSIS SCHEDULE

MR. RINDONE: All right. The council asked for a list, or a schedule, of the species that we might consider for interim analysis, and this is a draft, and so please keep that in mind. You can see the year being considered on the left there and then species and the likely representative index of abundance to be used in the interim analysis, based on the Science Center's past presentations on the topic, a suggestion for terminal year and when we think it might be appropriate to receive that interim analysis, based on when the index data are available, terminal year requested, and some consideration of how each particular fishery operates.

You will see that red grouper shows up every year, and that's because we have requested red grouper interim analyses annually from the Science Center, and then, the rest of them, we plugged in there based on when other assessment activity was on the SEDAR schedule, and so, if you scroll down a little bit there, you'll see some points to consider here, and so it takes about three months to pull off an interim analysis, or sometimes less, but we should assume that it's going to take a little bit of time for Science Center staff to be able to get it off the ground and running and reviewed and to the council.

You guys meet five times a year, and you are the sole review body for this work product from the Science Center, and it takes about six months or so, at the best of times, for regulations that are transmitted from the council to NMFS to be implemented, and so these are all things that we tried to think about when putting this together, and so it would be the messiest of matrices, if I were to try to map out all the decisions that we

tried to think about in putting this table together here.

We're certainly looking for your input on this, and also that of the Science Center, and I know we've had this up on the page for a little while now, just to try to make sure that there is -- Whether or not there is some sanity in this list and what we need to tweak, and so, Mr. Chair.

CHAIRMAN POWERS: Thank you. I am just perusing this. Any comments or suggestions? Typically, we, the SSC, when some problem arises in an assessment, our immediate reaction is we ought to revisit that, and, of course, revisiting it means changing this whole schedule, and so we need to think a little more strategically, which is essentially what Ryan is trying to do here. David Chagaris.

DR. CHAGARIS: Thank you. Does this imply, Ryan, that, at each of these meetings, we would review the interim analysis for that particular species? I'm just wondering if maybe there's a way to roll them out together, so that we could review more of them all at the same time, since these should be less involved.

MR. RINDONE: So I thought about that, but the point of these is to provide catch advice to the council, and so, in some cases, it's better to have that advice brought forward to the council at specific times, which is why you guys wouldn't be reviewing all of them at once.

For instance, red grouper coming to us at the beginning of the year allows any updates to the catch limits for red grouper, theoretically, to be able to be put in place before the end of the fishing season, which has recreational and commercial fishery implications, and so there is -- As we get towards the end of the calendar year, there is the possibility of either keeping open the recreational sector and/or adding additional pounds available to the commercial sector, depending on the results of a particular interim analysis, or, conversely, if something needs to close more quickly.

Greater amberjack uses a split season, and so, by getting greater amberjack in say September, it may open up the possibility of being able to leave the season open in the spring, which is something that we've heard a lot of feedback from stakeholders that they would like, especially in the eastern Gulf.

King mackerel, the fishing season for the western and southern zone handline, those commercial fishing seasons begin in July,

and the recreational season runs year-round and has been impeded for the last two decades, but, for the commercial sector, it may make a difference on whether some of those zones can reopen, depending on when those data are received, and so it's that kind of a balancing act, and, again, that's just one of about twelve different decisions that I had to try to weave together in making this list, but that's why you're not getting them all at once.

DR. CHAGARIS: Thank you.

CHAIRMAN POWERS: Thank you. Katie.

DR. SIEGFRIED: Thank you. Can I wait for my time to comment until everyone else has had a chance, so I can hear all of the comments? Thanks.

CHAIRMAN POWERS: Sure. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I think another thing, and I think Ryan has touched on this, that we need to think about at the council level is, if the council does want to make changes to catch limits, after we receive these interim analyses, or this tool that we have available outside of SEDAR, if they want to act upon these changes, we need to think about a way to change these catch levels in a more timely manner.

Right now, we're just doing it via framework, and it's taking us eight months to a year to get that through the process sometimes and then make it a rule, make the catch levels change through that process, and so that's one of the other things that we're thinking about, and we're looking at what other regional councils are doing, and I think this is also to Dave's point.

I mean, if we get all of these at once, it's going to be difficult, and the council says, yes, we want to act upon these changes, and we want to change these catches up or down, it's going to take us a while to prioritize those and get them through the process, and so we also need to think about that. Is this a health check that we think we need for red grouper, or does the council really need to be making changes to management? Thank you.

CHAIRMAN POWERS: Thank you. Julie.

DR. NEER: Thanks. I just wanted to touch base, and I didn't know if Katie was going to speak to it, but has anyone talked to

the Pascagoula Lab about the SEAMAP larval index? That index, in particular, needs about an eighteen-month window, and those samples are pulled in, and then they have to be shipped back from Poland and stuff, and so that's not necessarily as easy of an index to update, and I just wanted to give you guys a heads-up that you should probably circle with the Pascagoula Lab and see if that's even feasible, timing-wise, for them to handle that index, and that was my only comment, because I know that one is always a struggle to get updated for any of the assessments that we do. Thanks.

MR. RINDONE: Thanks, Julie. I was thinking about the turnaround time from Poland to get those sample data back, and that's why I left that one out at about two years, and the one for kingfish is kind of difficult, right, because we don't really have a lot of options for a fishery-independent index for kingfish that could be applied to the Gulf as a whole, and so that may be one where a terminal year has to be sacrificed a little bit more than it currently already is, if we want to try to use that index, because, right now, it's my understanding that that's the best index to use for an interim analysis for king mackerel, but we haven't attempted an interim analysis for king mackerel yet, and that's the one that would make the most sense, based on years and spatial coverage.

DR. NEER: I think it's a great idea, if you can make it happen, but I just wanted to make sure that you try and circle back with someone there, to see if that's even feasible, before the council goes, yes, let's do it.

MR. RINDONE: Yes, good point.

CHAIRMAN POWERS: Thank you. Kai.

DR. LORENZEN: I actually had my hand up from the last thing, but, since I'm on here, I did want to point out that the red snapper interim analysis is a very different beast from all other interim analyses on this list, and so it's more like -- Since it's involving a new dataset that we haven't fully reviewed and so on, and so we'll come back to that as we discuss it, obviously, but I did want to point out that this is very different from all the others that are really relatively straightforward analyses. Thanks.

CHAIRMAN POWERS: Thank you. Luiz.

DR. BARBIERI: Thanks, Joe. Kai already brought up one of my points, and it was also about the red snapper and the fact that

this is a very different process that is going to require different treatment by all involved.

Two is -- Maybe this is something that Katie will be addressing after our comments, but I wanted to know if this schedule here -- Has this already been vetted and discussed and coordinated with the Science Center? Meaning, does this have already the Center's seal of approval that it integrates well with their workflows and workloads and all the other assessment and analytical products that they have to generate?

MR. RINDONE: No, Luiz, it doesn't. We've tried to work -- We used the presentation that Clay has given a couple of times to the council talking about the indices that would be the best candidates for particular species, and we have not included any species that haven't been previously discussed between the council and the Center as possible candidates for an interim analysis, and I tried to make considerations on terminal year that were -- That accounted for when we've been told in the past that data may be available from an index, combined with when the council might want to get those data and when we could get you guys to review it.

There are many things all plugging into this, but this hasn't undergone any sort of Science Center blessing. This is purely trying to get feedback, at this point, and this is not something that we're setting into stone tomorrow or anything like that. We're trying to develop it, and this is just all part of that process.

DR. BARBIERI: That makes sense. Thank you, Ryan. The last question is, having heard what you just mentioned, will we be reviewing and looking at this schedule over time, to see if there are changes that need to be made from time-to-time, because this schedule -- The list of interim analysis stocks that are there, scheduled, just like we change the long-term list of species that we have set up for SEDAR, and we may want to look at this, from time-to-time, as an SSC and kind of provide some input.

MR. RINDONE: Yes, of course, and, whenever you guys want to take a look at this, we can certainly do that, as capacity by the Center changes, up or down, for the ability to be able to do interim analysis, and we'll certainly review how many are being requested for a given year and for years in the future.

This particular analysis, the scheduling for this, will need to be a little bit more nimble, to accommodate both council needs

and expectations and what the Center can actually provide. I know that they have a long-term goal of being able to automate this process, to the greatest extent practical, and they're not quite -- I know they're not there yet, but it is something that they're working diligently towards, and hopefully that will open a lot of doors for the council to be able to be more nimble and reactive to changes in how things are going for a particular stock, but you guys can review this as often as you are comfortable doing so,

DR. BARBIERI: Sounds good. Thank you, Ryan.

CHAIRMAN POWERS: Thank you. Will Patterson.

DR. PATTERSON: Thanks, Joe. Even without full automation here, I'm confused about the statement that it takes approximately three months to complete an interim analysis. Does that mean, in 2021, if you have two stocks scheduled, that it would take six analyst months to complete, and then, in 2023, it would take fifteen, or does that three months to complete have to do with getting the data and the indices, the index information, to actually recompute the updated index?

I mean, what does that three months actually mean? I'm confused, because, if it only takes a couple or three months longer than that to do a full update, why would it take half that much time to do a much simpler analysis?

MR. RINDONE: The time commitment is an estimate, and it will vary depending on which index has to be used and which species we're talking about. The greatest would be about a three-month process, and using the Great Red Snapper Count and red snapper as kind of like the north end of that estimate.

Red grouper, at this point, Skyler has done three of those, and I don't think it takes her three months to do those anymore, and she can certainly more to that, and Katie could speak more to that, about the different time commitments for different species and indices, but I've tried to tell you guys that the worst-case situation, and we'll use that as the north end of that estimate, knowing that some of these will take less time, but just in order to make sure that we don't have too much overlap, and, again, it's not the same analyst doing all of the interim analyses for all species.

CHAIRMAN POWERS: I think we're approaching the need for Katie to talk, but, John, Mareska, let me go to you first.

MR. MARESKA: I was just looking at the schedule and thinking that it might be better if we could have an interim analysis on greater amberjack in 2021, and hopefully that would update that video index through 2020, because what we've seen in the assessment was only through 2018, and that would just before we're implementing, or the council is implementing, the changes to catches for 2022, as we discussed yesterday, and so, again, just any way to move that interim analysis up one year.

MR. RINDONE: An issue that we would run into with using -- Or including more data for greater amberjack for the video index is that we may have data for 2019, but 2020 data, for many of the fishery-independent surveys, are going to have holes, due to the pandemic, and I will let Katie talk more about that, but that would just be something to think about.

The other thing to think about is it's 2021 now, and the Science Center workflow is more or less locked in place, and so the ability to plug in an additional analysis may prove difficult, or it may require a concession elsewhere, in order to make that happen, and so that's just something else to think about.

CHAIRMAN POWERS: Thank you. Katie, I think it's time for you to resolve all our problems.

DR. SIEGFRIED: I will give it a whirl. Everybody has mentioned most of the things that I was going to bring up, and so I can address all of those. First, to address Will's comment about how long per species, I think Ryan did a good job of explaining it, but it certainly doesn't take, for instance, Skyler three months to do the red grouper, and it's more of an average. We were providing an estimate of how long based on the potential to do an MSE for a species, which is how we would determine whether the indices that are shown in the third column are most appropriate for those species.

Clay has already presented these indices as the best, as far as we know now, but doing all of these probably pushes off the ability to do an MSE for each, and, obviously, we can't do an MSE on all of these species, to determine if those indices are correct, and so we would move forward with these assumptions.

We would like the ability to investigate that though, and so it doesn't sound like these indices are prescriptive, and it sounds like, Ryan, and this is a nimble schedule and a nimble species list, and so hopefully we could work with you all on that, if we found a different index was more appropriate.

MR. RINDONE: Absolutely. These indices that are listed are the ones that came out of one of Clay's presentations a while back, with the exception of red snapper, because we plugged in the Great Red Snapper Count there, because that decision came after the fact, but these were just the indices that were listed as the likely best candidate for that species at that time, and so, if it comes to pass, in the future, that another index is more appropriate, then that would require us to revisit the schedule and rethink things like terminal year, and perhaps even delivery date, to accommodate the use of the more appropriate index.

DR. SIEGFRIED: Great. So that was the other issue, is the terminal year may be something we would need to discuss particularly, because 2020 is going to be a problematic year for our indices, and Skyler finished the red grouper interim using the bottom longline survey, which is easy to update, and we do have that automated, and there's been a lot of effort within the Center to get that done, but it was not a complete sampling for that index, and it's something that we would have to explain in better detail when that interim is reviewed by the SSC.

We don't anticipate it being very easy to review these interims in the next year or two, because of the issues with 2020 indices, and maybe into the future, because the year is not -- It's going to be burned in our brains for a while.

Julie is correct that the combined video index is not something that we yet have automated. Kevin Thompson in Florida has been great to provide that for us, but it is better that that's timed in a certain way, and I think that the delivery date might need to be discussed more with him, as to the best date each year when all of the data are read and available to be analyzed.

One of the other comments was -- I was looking at our master calendar, and we do have some things that we might be able to work with Ryan and other staff on the timing, but it sounds like they're open to that, and so that's something that we can do, potentially, on the fly in between SSCs.

I don't think that there's any other issues with this, besides I know it takes a lot of effort to consider everything that Ryan has had to consider to create this matrix of interims, and I'm glad that we have time in the Science Center to ramp up our efforts. We're going from two species in 2021 up to four or five by 2024, and so those are all of my comments. Did I not address anything, Joe, that you thought I needed to address?

CHAIRMAN POWERS: Thank you. I think you're okay. Ryan, did

you want to comment on that?

MR. RINDONE: Yes, and I just wanted to emphasize that we're absolutely looking for input on this, especially from the Science Center, since you guys are the ones that have to do it, and so, if we need to make tweaks anywhere, let's definitely get all that ironed out, and this is something that, like I was telling Luiz, or responding to Luiz, that we can definitely keep bringing back to the SSC.

This is a great tool to have in the toolbox, to be able to get these sorts of analyses from the Center, and just keeping that communication open and working together, and hopefully we can maximize the benefits of this ability, but, whatever changes need to be made, we're definitely open to talking about that.

CHAIRMAN POWERS: All right. Thank you. Thank you, Katie. Are there any other guidance or comments? Julie.

DR. NEER: Just one additional comment on that combined video index. I don't know if the SSC has heard, but the SEDAR Steering Committee did approve an indices procedural workshop to look at the combining of video indices as well as some other index issues and other indices development issues. That workshop is, hopefully, on tap for September of this year, and so, after that workshop, there might be additional guidance or tweaks to those combined video indices development processes.

That's just a heads-up, and soon I will be asking for participants to be part of that workshop, but, additionally, using the combined video index, as designed in these current assessments, may not represent best practices, and we went down the line, and so that just might be something we have to take into account, and Katie is right that the combined video index requires three indices data to be available, and then Kevin Thompson has to produce the combined, and so that is also not an easy or a quick one to get done, but it's a great index, once we have it. I just wanted to provide that information.

CHAIRMAN POWERS: Thank you. No other comments? Then I think we have provided some guidance, in terms of how to proceed.

MR. RINDONE: Yes. Thank you very much.

CHAIRMAN POWERS: All right. The agenda, the next thing on the agenda, originally, was the red snapper supply chain. The Great Red Snapper Count, is Dr. Stunz available before lunch, because this is scheduled to be after lunch.

MR. RINDONE: Yes, he's on now.

CHAIRMAN POWERS: Okay.

DR. GREG STUNZ: I'm here, and I'm ready to go if you are.

CHAIRMAN POWERS: Okay. Great. Then, before you get started though, let's take a ten-minute break, and then we'll move on into the Great Red Snapper Count. Thank you.

(Whereupon, a brief recess was taken.)

CHAIRMAN POWERS: The next item on the agenda is the Great Red Snapper Count with Dr. Stunz, Greg, but, before we do that, I would note that a short presentation by the Center has been delivered to us, which is to augment our discussion about this, about how this might be used, in terms of an interim analysis, and so that will follow on after Greg has made his presentation, and so let's move then to the presentation. Greg.

PREVIEW OF GREAT RED SNAPPER COUNT

DR. STUNZ: We are just completing, obviously, the Great Red Snapper Count, and that's a name that, as many of you know, kind of was given to us, and it sort of stuck, and so we just went with it, but the real premise and goal of the project, or what the real official title is, it's "Estimating the Absolute Abundance of Red Snapper in the U.S. Gulf of Mexico". It just publicly got known as the Great Red Snapper Count, and so here we are.

To bring everyone up to speed a little bit about the goal and why we're here and how we arrived at where we are, I thought I would just give a little bit of background. Some of you, obviously, have heard this, and many of the SSC members are directly involved in leading various aspects of this project, and so they're very familiar with that, and, also, what I thought I would do today is really give the SSC somewhat of a preview.

We're wrapping up the final report, which will be out this month, and it will be followed by a whole variety of outreach and engagement activities and that sort of thing, but, in the meantime, obviously, this group has to evaluate the study, but it's more than what can be done in a short presentation like this, and so you'll kind of get a feel for what it is, and maybe there will be some input, if there's various aspects of the

study you would like to hear from the particular PI that was leading that component or something, but you will kind of see -- You will get the overview of that here today.

What was the overall goal? Well, obviously, there was concern about what the status of that population is like, in terms of absolute abundance versus index of abundance, and I probably don't need to tell anyone around this virtual table that, once you have an absolute abundance estimate, you can do very different management than you can off of indices of abundance that, theoretically, would help improve the management of this fishery.

That was recognized by a variety, including NOAA, but it was funded by Congress, and so it was a $12 million study, total, and it was about nine-and-a-half million of federal dollars, through NOAA Sea Grant, is how the money was handled, as well as through NOAA, and then we had to match the rest, in terms of the investigators involved, bringing that $12 million, and so there's twenty-one of us that are involved in the project, and they are leading scientists from around the Gulf that have spent decades, if not much longer, studying red snapper, as well as others even beyond particularly bringing in a variety of analytical expertise, and those are represented by twelve institutions around the Gulf as well.

The big point there, obviously, is it was an expensive study, and a really unprecedented amount, but it allowed us to do some things that I think will really set the stage or model how we can do some of these other similar studies that are hopefully going to be ongoing soon, or at least proposed, and so, to do a study like this, unfortunately, it just costs a lot of money, with ship time and those sorts of things. For those of you that are involved, you know exactly what I'm talking about.

How was it estimated? Well, we used a suite of methods, and, unfortunately, there's not a method that just works perfect for the diversity of habitats and visibility and all the constraints we have throughout the Gulf of Mexico, and so we had to use a variety of methods, but it first started with habitat classification.

We were specifically charged not to do any mapping. In other words, we couldn't spend money to map habitats, one just because of the expense and time associated with that, and so we had to use what was available, and so we spent a lot of time doing habitat classification, but we relied on direct visual counts, where we could, and we had the visibility to do that and the

ability to access the habitats where the snapper was occurring with those gear.

Where we couldn't do that, or didn't have the visibility, we used acoustic, specifically hydroacoustics or bioacoustics, and then, in some areas, we used depletion surveys, and then a contingency of the request for proposals is that we conducted also a Gulf-wide tagging program, and we probably would have felt, early going into it, that that money could have been better served focusing on direct count methods, but it turned out that this tagging program generated some very, very valuable information that I will tell you about in just a little while, as well as just tremendous angler buy-in with the program, and so that was a huge benefit, and so I have the feeling that the SSC probably would like to hear more than I will have time today to talk about this tagging program, because it gave us some really interesting information regarding exploitation rates.

Who was involved? I don't have time to talk about all twenty-one investigators, and I think everyone probably knows most of these people, and the Harte Institute, our program, led it. Jay Rooker at A&M Galveston led the Texas region. Jim Cowan at LSU led the Louisiana.

Sean headed up the Alabama component, and Will headed up Florida, and Steve Murawski worked in really all the regions, with his C-BASS, that you will see in a little while, and he was mainly involved in estimating the abundance of fish along pipelines, as well as some of these deeper areas, and, in particular, the unclassified or uncharacterized bottom, where his systems and their vessels could cover large expanses of water in a very efficient way.

We also tapped the expertise of Matt Catalano at Auburn, particularly for our tagging exploitation piece, and many of you probably know Matt, and that's his area of expertise, and that's what I meant earlier, and you will probably want to hear more from Matt, in terms of the exploitation.

Marcus Drymon, who many of you know, and who was formerly linked with the SSC, is a red snapper ecologist in his own right, but he also is leading primarily a lot of the engagement and outreach pieces that you will be seeing soon. Rob Ahrens, at the time, was at the University of Florida with Will, but he has since taken a job with NOAA in Hawaii, but he has still remained a lead analyst, helping us work, initially, through the design, but also the final analysis as well, along with Lynn Stokes played a major role in the analytical piece.

John Hoenig worked closely with Sean and his group, particularly for some of the depletion studies that I will talk about, and so this was pretty much the leadership team, and then a lot of these other folks, and all of these groups have teams of post-docs and students and staff scientists and that kind of thing, and so it was quite a tremendous effort to really pull this off.

This is where everyone was from, and I think everyone will recognize the institutes here, but I just want to make sure we kind of get the feel for it was a very broad study, where I really spent a lot of time trying to select the best possible group we could to really pull off a study of this magnitude.

The project was guided through a steering committee, largely led by Clay Porch and others, but Sea Grant was involved, and NOAA's Science Center was involved, and a whole bunch of groups, and we worked together to develop really what are the five milestones of the project.

The first one was data mining and habitat characterization. We needed to find out what was out there and how much of it, at least the best we could with the maps we had available. The other was calibrating and validating our gear, having to use multiple gear types, and that's important, for obvious reasons.

The lion's share of the work, obviously, goes into the actual sampling on the water and counting the fish, and then probably just as much time is back at the lab and sorting through video profiles or hydroacoustic profiles or all sorts of information that comes back, and so that takes a lot of time to work through all that.

Then where we are now, in this last major milestone, is the final estimation, which we have done, which you will hear about today, and we're completing the report, and we were required to do congressional briefings, which has occurred, and we briefed the Gulf Council late last year, and then we'll be having a public and agency kind of stakeholder engagement component that you'll be hearing about a lot more really soon, and I will show you a brief plan for what that is later in the presentation.

In developing the design, that first step of data mining, we just pulled whatever we could -- That we had available at our hands of red snapper occurrence, really presence/absence of red snapper in the Gulf of Mexico, and any type of habitat mapping we could clearly characterize, and everything else went into this unclassified, where we knew that snapper occurred, but we

just didn't know what was there, because we were lacking in mapping or something like that.

To give you the overall sampling design, and it's a little more complex than this, but I think this will set the stage, and that is we were tasked to do a regional abundance, at least the east/west, and we actually broke it down into four regions, and then each region had a shallow, mid, and deep depths that we could further stratify.

The habitats we were asked to look at were artificial reefs, natural reefs, and then a habitat that I really want to spend a little time talking about, and that's the uncharacterized bottom, or what we've been calling it now, and probably a more appropriate term, is unclassified bottom, where it's not just mud and sand, although that's a large component of it, but it's interspersed with structures and features, shipwrecks and all sorts of things that we just don't know about, and it's unclassified.

We suspected, and NOAA and others, and I'm sure that Clay will comment on this at some point, but we suspected, from anecdotal reports of fishermen, that there were a lot of fish over these areas that wouldn't really be traditionally fished or considered snapper banks or snapper habitat.

We also broke up artificial reefs into large and small. In fact, we've even done it a little more, but, for today, it's really just large and small, because you have things like the artificial reef program off of Alabama that's characterized by many small reef structures, and a lot of that is in Florida, obviously, as well, small reef pyramids and reef balls and that sort of thing, and, as you get out into the western Gulf and on our side of the river, there are much larger oil and gas platforms, things the size of large buildings and that kind of thing, and so that presents some sampling challenges as well, where literally you can see one field of view in an ROV, where in another you're just seeing a very tiny component, and how you assess that matters.

To give you an idea of what that design looked like across the Gulf of Mexico, this is just a really simple plot, where we've done an ROV survey, a hydroacoustic, where we've tagged fish, where we've done sort of tow, some type of sampling has occurred along all these regions.

It represents, just to give everyone an idea, a lot of effort, where you have 1,500-plus sampling sites, and you have hundreds

of hours of ROV video and C-BASS acoustic transects, which I will show you what that is in just a minute, as well as hydroacoustic profiles in all of our tagging, and that takes a lot of time to go through, and, of course, we've got all that data available and archived and that sort of thing, because we're not only capturing just red snapper with this information, but we're capturing the whole suite of species of reef fish that are using these areas, and so that probably will become valuable for other studies and other things down the line, and so, in other words, I think what we're seeing from this study is a lot of ancillary benefits and unanticipated things in a very good way that are coming out of it that will probably be very valuable to this group and many others in the future.

On to the direct sampling, and so, when we could see the fish, that's what we preferred, and hopefully everybody here is pretty familiar with ROVs, and it's very similar to the top two pictures that you see in the top-right and left, and, essentially, they are just miniature submarines, surface driven, that we can send down and observe.

They are geo-referenced, so we can calculate the transect or distance covered with a field of view, and that allows us to estimate density abundances and that sort of thing. We can talk a lot about that later, if you're interested, in terms of how that was done.

The two gear on the bottom are towed gears, and the C-BASS is what Steve Murawski developed, and, of course, all of this equipment is outfitted with sonar and all sorts of sophisticated echosounders and that kind of thing, in addition to the camera and lights and the traditional things you might find on an ROV. We also have lasers that we can scale and measure the fish, so we get an estimate of size, but the two along the bottom -- The one on the left is called the TARAS, and the one on the right is called the C-BASS, but, essentially, they are towed behind a vessel, non-stop, collecting video imagery as well as acoustic imagery, that is fed back ship-side, and therefore covering these large expanses of unclassified bottom or, in many cases, along pipelines, which run for many kilometers in the Gulf of Mexico.

To give you an idea of what this looks like and some of our challenges, if you just look at the different images, the image on the left might be a good example of what some smaller artificial reefs might look like off of Alabama. The image below it is blown-up and zoomed-in.

The top-right is a reef pyramid. Typically, those are smaller, and you can see, in a general field of view, you can really capture most of the fish that are on that habitat, unlike what you might see in the bottom-right, which is just one leg of many times, often, four-pile or eight-pile, or these very, very massive structures, and you're just seeing a very tiny fraction of that, and so we have to sub-sample some of those larger structures, and, of course, the difference with the larger structures -- Typically, the snapper on these smaller structures are associated with the demersal feature on or near the bottom, but, on these bigger oil and gas platforms, they can be distributed throughout the water column, and so that presents some different sampling challenges and things as well, but the point here being that there's very different habitats that we have to sample that we have to account for across the Gulf.

To give you an idea of what this might look like, we're descending down a rig leg, and I'm about to play this video. Joe, if for some reason it doesn't play -- I haven't clicked it yet, but, if for some reason, it doesn't play, let me know, and, of course, you see amberjack and a bunch of other species, but this would be kind of an average visibility day, not too great and not too bad.

As you descend down, you will see some lasers in a second, hitting the fish, and they're a fixed distance apart, so we can estimate -- If the fish is oriented in the right way, we can estimate the length of those fish, but that kind of gives you an idea of what we might see on one of these rig surveys.

To give you another example of why we had to use hydroacoustics, in many situations, is, when you go from the western Gulf to the eastern Gulf, in general, you go from turbid conditions to clear conditions. Even when it's very clear at the surface, in the western Gulf, we get a nepheloid layer that develops, which is essentially a fog or murky, silty layer at the bottom, where you go from forty or fifty-foot visibility, often, to zero visibility, and we know there is snapper in there, from our other surveys and vertical line surveys, and so that presents a problem.

The video playing on the left kind of shows you what a typical survey might look like in the western Gulf of Mexico, and those two pieces of weighted PVC that you see there -- A way that we zoom-in with the ROV and then back away, to calibrate our visibility and our field of view and that sort of thing, but what you see there is clearly there's red snapper, but how many snapper are behind them, and they kind of come and go, and we

have a little bit of trouble -- We don't feel real confident about our visual assessments in conditions like that, compared to maybe a condition over on the right, which would be very typical of maybe a bank that's out in very deep water, where you don't get a nepheloid layer, or out in Florida, where you can really have some really good visibility, where we have much confidence in our visual abilities off of Florida and Alabama than we do in some of the other regions of the Gulf.

These, you can still see that, in many of our sites with high abundance of red snapper, there is zero visibility, and you can't really see anything, and so, for that, we use other methods, which I will show you in a second.

To give you an idea of what the sea bass might look like, it's the same thing. It's going from very turbid to clear, and so we might have to use hydroacoustics on the left, and visibility on the right, but, in the Gulf of Mexico, with all the oil and gas infrastructure, there's about 42,000 miles of pipeline.

In many instances, that's required to be buried, and in many instances not, depending on the depth and other regulatory issues, but, oftentimes, they get scoured out. In fact, it's pretty common for them to be available and useable as a habitat, and so not only did the C-BASS and TARAS, these towed gears, account for this unclassified habitat, but we also looked at pipelines.

To give you an idea of what that might be, I put together a short clip here of the C-BASS moving along a pipeline, along natural bottom, and then across just open, unclassified bottom, and you will see a variety of fish, and I will go ahead and play it here, and, obviously, you're moving along the pipeline, and you see grouper and snappers, and then red snapper, and this would be just kind of on some unclassified bottom, and this is some natural bottom features, and you can see our lasers there, of course, and you see some red snapper.

Then, many times, it's just clear, open mud and sand and algal flat kind of things in the Gulf, and so that -- We have just hours and hours of this sort of video that we had to work through and estimate the abundance over these habitat types.

As I mentioned, many times you can't see anything, and so we rely on hydroacoustics or bioacoustics, and this technique involves using sophisticated sound returns to give us an estimate of how many fish are there, and it's really no different than the bottom machines on most fishing boats, except

you can archive, and it's more fancy, and we can really customize it to what we're trying to do.

To orient you to what you're looking at here, this is a cutoff oil and gas platform. Typically, in rigs to reef programs, we want to retain the habitat, and so this piece on the right would have been on top of this, sticking up out of the water, and it's cut off at a safe navigable distance of about eighty feet and then toppled or set next to it or whatever, and so this was once one piece that's been cut in half.

What you see here are these sort of upside-down, banana-shaped returns are the fish, and we can generate species composition, so we know what percentage of those and which of those are red snapper, and, using some software, through these returns, we can generate an estimate of red snapper abundance, and similar to the structure that you see over to the left, and those returns are red snapper.

Why do we need it? Here on the left, if you look at this video, you can see this is a toppled oil and gas platform that's been converted to artificial reef, and it's on its side. Obviously, there is red snapper and triggerfish and other things there, but, when you look further down, we know there is snapper there. If you dropped a vertical longline, you would top out in seconds of fish, and you can really see that nepheloid layer that doesn't allow us to have the visibility we need, and that's actually still pretty good visibility, or you might have something like this video that's playing over to the right. Just off in the distance, you can barely see -- We're down in the nepheloid now, and you see the snapper, but you just don't feel good about assigning a good visual estimate to something like that.

How this hydroacoustic works, I will play a calibration image of a real image up top of what it looks like visually, and, along the bottom, you will see the echogram. It's probably going to get choppy, because trying to broadcast this over the internet -- It's pretty heavy images, but I think you'll get the point here, and it will stop in a minute, but that's what it really looks like. We wouldn't do this in situations where we could see, obviously, but, to calibrate our gear, we're doing that, and you're generating a profile that you see on the bottom, and that's those same fish, and that's the cutoff oil and gas platform that's down at the bottom that those fish are associated with.

So how it works is that we have some sophisticated logarithm

software that allows us to clip out what we know are not structure or feature, or maybe fish way up at the top of the water column that, through our species composition, we know are not red snapper, or at least a very tiny percentage of them, and we can clip out those pieces that are fish, and then, from that, we can calculate a total red snapper abundance.

Kevin Boswell led a bunch of this for all the teams, and trained different teams in different regions to be able to do this, and that sounds very simple and straightforward, but it's very, very complex and time consuming to go through all these profiles and pick out all these individual fish and that sort of thing, but, in areas where we don't have any visibility, this is pretty much what -- It's the only method that we could rely on to generate an abundance estimate.

Then, finally, Sean Powers, off of Alabama, did a bunch of successful work with depletion studies, and you will probably want to hear more about that, and, of course, I'm sure Sean is happy to -- Maybe now, if we have time, or for sure in a future meeting to go into detail about this, but, in general, it involves you do an ROV ahead of time, and you deplete the site, which means you fish it, and you remove a large number of fish, and then you do another ROV survey, and that relationship between what was there before you depleted the fish and what's there after can provide a very successful abundance estimate of the number of fish that are there.

That is a very brief explanation of how it works, and John Hoenig is an expert at this, and so Sean and his team are experts at doing the work, and working with John from the analytical, and his student there, and it allowed us to generate these depletion abundance estimates.

Those were the main methods that we used to calculate the abundance estimate, but we did have this tagging piece that I was telling you about that turned out to be extremely valuable, but we did not necessarily use that to calculate the abundance estimates that I am going to present today, and we used it for exploitation and other reasons, but you still could use this data for capture-recapture and that sort of thing.

Matt Catalano led our tagging piece, and he literally tagged thousands of fish Gulf-wide, and you see this snapper here with two tags. We tagged them with one or two tags, and that gave us an estimate of tag shedding rate, which it turns out was very, very low for the study.

All of these fish were descended with a SeaQualizer, and you can barely see this small SeaQualizer in the clip there, but they are descending devices to descend it back down to the bottom to reduce the effects of barotrauma. Obviously, a tagging study, where you're relying on returns, in a fish like reef fish, which experiences high barotrauma, can be very problematic, and so we were concerned about that.

Also, we were precluded from doing genetic studies for this study, but not collecting samples, and so collecting these thousands of fish allowed us to get a very nice genetic sample to be used for future studies across the Gulf, and Eric Salient and David Portnoy were in charge of archiving those samples, which we have, but the other thing was we experienced a phenomenal return rate that I will tell you about in just a minute, and the angler engagement was just phenomenal. We were able to do all sorts of really neat things.

I think this study really solved that you can catch and release red snapper by using these descending devices, when many folks were out capturing these fish that we had caught not too long before and tagged and returned, and it was a clear demonstration that obviously someone had handled that fish before, and it obviously survived to be caught another day.

We'll talk a lot more about this, I'm sure, at a future meeting, but this gives you an idea of the general tagging locations. We relied on scientifically tagging and not angler, commercial or recreational, tagging, although we relied on them for the returns.

We wanted to make sure they were tagged properly, and we knew exactly the lengths and sizes and where and that sort of thing, and that they were descended properly, and we had an idea of that post-release mortality, and so it was a high-reward study, and so we paid $250 to $500 per fish, depending on if it was single or double tagged.

Matt Catalano's models rely on the fact that, if a fish is captured, it is returned, and I can tell you that they were returned. Typically, if you're looking at a 6 percent return rate in a mark-and-recapture study, that is great, and that's very high, and so we're pretty good at budgeting, from all the grants and things we work on, all of us with the team, and so we thought, okay, we'll budget a 10 percent return rate and calculate the money needed for that, and then I doubled that, and we still didn't have near enough money, because we just couldn't believe the amount of return rates that we were getting

back.

We tagged this right before the recreational season, but, also, we got many, many recaptures from, obviously, recreational anglers, but commercial anglers as well, and we had a return rate of 30 percent, which is just astonishing that we would have something that high. Obviously, there are some implications there for exploitation, and we have regional exploitation rates, and where this occurred and that sort of thing, but 30 percent, obviously, sends a clear message that these fish are surviving catch and release.

I should say that we did truncate this study to relatively shallow depths, and, I mean, it wasn't extremely shallow, but we -- Essentially, about 180 feet and back was the depth that we used, but, still, 180 feet is deep, where most of the fishery is occurring, and so we paid out well over $100,000 in reward money, and, just this morning, we got another tagged snapper back, and so they're still coming in, and so I'm sure that our return rate will be well above 30 percent for each region, by the time it's all said and done.

The interesting thing is that it really showed that the exploitation rate for these fish is over artificial reefs, and that will become very important in a minute, when I tell you why and we start talking about where the abundance, or really where the mother loads, of red snapper are occurring, and it's not on artificial reefs.

They are certainly fished, a lot of them, on artificial reef, but the vast abundance of red snapper in the Gulf are not on artificial reefs, and so that is an interesting management aspect, in the sense that you're not fishing the main abundance of your fishery, which is interesting, and something, obviously, this committee will probably take up at some point.

I will explain that a little bit more in just a minute, because I'm sure you're wanting to hear what did we really find, and then, finally, what you'll be hearing from, in literally just a few weeks, is you have probably seen, and we have put out a lot of videos, short, more publicly layman-type videos, that were part of a requirement of the study, that we communicate to the public what it's about and what we're doing and what are the findings.

Well, we have the last one done, and Dr. Drymon is pretty much ready to go on that, as soon as -- We want to wait until the final report is complete, so we can reference that, and there

will be -- All along, we've put out different fact sheets, and these are all available at snappercount.org, and we have one final fact sheet, which will summarize the study and talk about implications and meaning and next steps and that sort of thing.

Mainly, these are for legislative types and the general public, and they're not for SSC types, and we'll have a final report for you guys, a lot of peer-reviewed publications and that sort of thing, to evaluate on that more rigorous scientific level, but that's a little too heavy and too much for the general public to get just a general idea of the study and the overall findings.

Probably what you're waiting for is what's the big deal, and what did you find, and so I will go through this, and, of course, we can break this down by depth, by region, and I'm going to give it a little high level, just to show you what we have.

If you recall, we broke the Gulf into four regions, and it just turns out that -- We didn't just arbitrarily break them into state regions, but we looked at really ecoregions, but it turns out that they follow parallel state lines pretty well, and so that makes it nice, from the regional aspects of this fishery that we're involved with and that sort of thing right now, but it also is very ecologically similar.

I will give the estimate by each region, and each region has either natural reefs, which are well-known natural, what we would call snapper banks, most people would, artificial reefs, which was the charge of the funding, to really assess the abundance on artificial reef, and then the uncharacterized, or unclassified, bottom.

To give you an idea, I will start with Texas, and so we've got about -- I have just rounded off to the nearest hundred thousand, and, I mean, there are so many fish that we have to really talk in millions, or it just gets too cumbersome, and so 5.8, or really about six, million fish on natural reefs in Texas, and these are numbers of fish.

I should point out that these are numbers of age-two-plus fish, and so these are fish that have recruited to the fishery and are exploitable, and have experienced exploitation and discard and all that sort of thing. These aren't young-of-the-year, newly-recruited fish or something like that.

We've got about 1.3 million fish on artificial reefs, and then, interestingly, fifteen million fish over this uncharacterized,

or unclassified, bottom, which was very, very surprising. I think you'll see this pattern -- Well, I don't think, and I know you'll see this pattern throughout the other regions, bringing that to about twenty-three million fish in Texas, but the idea is that the bulk of the fish are on this uncharacterized bottom, and, just to be very clear, again, to reiterate, these aren't fish evenly distributed across mud flats or sandy bottom, and they are patchy.

They are reef fish, obviously, and so they're holding to some type of structure, but it's just structures that we don't know about, and they're unmapped, and we don't know what -- Well, now that we sort of know, we can go back and recharacterize, but, at the time, it was just lumped into uncharacterized bottom. That really -- Many people have been saying there's a lot of fish out over these types of bottoms for a long time that haven't been exploited.

There's a similar pattern in Louisiana, about four million on natural reefs, and they've got a lot more artificial reefs than other regions, and so that makes sense that they have more fish on their artificial reefs, but the same story of eighteen million fish over that uncharacterized bottom, bringing them to about twenty-nine million fish in Louisiana.

Moving on to Mississippi/Alabama, of course, we could break this out, and that's the ecoregion of the area and how it was assessed, but we could break that out, for management purposes or whatever we needed to do, but, in that region, you've got about ten million fish. They have a lot more small natural reefs there, which is interesting, but still a lot of fish over this uncharacterized bottom, bringing that total to about -- Rounding up to about ten million fish.

Then Florida was done just a little bit different. As you move from Florida to the west, out into the western Gulf, Florida is characterized by a lot of hard bottom, and it's very abundant, and it's high in abundance, and you can design it so you have high confidence, and you can go out and find this sort of habitat. As you move over to the east and west of the river, they are very, very discrete natural features, and there is not a lot of them, like there may be in Florida, and so they did their estimate on natural bottom, and that natural bottom is broken up into unclassified, or just open, bottom and then different levels of relief, where that's not necessarily appropriate or available in other regions.

Over that natural bottom, which includes unclassified bottom,

there's about forty-eight million fish in Florida, and a relatively low number of fish on artificial reefs in Florida, and so bringing that number, again, to about forty-eight million fish in Florida.

If you put it all together, and you begin to look at what the number of fish is, that's about 110 million red snapper in the Gulf of Mexico, and we were charged with developing a variability about that number of 30 percent or less, and we're really happy to report an overall CV of 11 percent, and, in fact, we have CVs very low. Until you start really getting down into very small strata and very specific habitats does that CV jump up, and, in most cases, it's less than 30, even in that situation, and so we're really happy about the precision of what we have here with that estimate of 110 million snapper.

To put it in perspective, in terms of what the federal assessment, the last assessment, and, of course, this fishery has changed some since it was last done in 2018, but it's showing about thirty-six million fish, and so we're roughly tripling that federal estimate.

To give you sort of an example of how that's distributed, it's roughly 50/50, in terms of number, with a few more fish out in the eastern Gulf of Mexico. However, the biomass probably still -- The biomass still holds up when you begin to look at -- There is larger, bigger fish in the western Gulf, and that forty-eight million in Florida, for example, has a lot of small fish, that certainly makes sense from the ecological perspective, if you think about what has happened with that fishery and the recolonization and the things that we're seeing, and that fishery is still recovering, and there is opportunities and habitats for other smaller fish to exploit and that sort of thing.

When you put it into a real big perspective of like, okay, we're having all of these fights and things about red snapper, and that number is fifteen-and-a-half or whatever, and let's just say fifteen million pounds of fish that we're talking about, and we're looking now at 110 million fish, and that's not pounds, and so pick your six-pound average, or eight-pound average or whatever, and you're talking about 800 million pounds of fish, and so a lot more than we suspected, and I will explain some of the take-home messages here in just a minute, but that's looking at 110 million fish.

So what are the key takeaways? There's a lot more than I can present here, and, as you're probably seeing, this is a lot of

information, and, depending on how the SSC wants it, Joe, we're happy to come back and talk about specific components and talk in a lot more detail, and that's just -- You can't do it all, obviously, in one presentation kind of thing, and so this is sort of just the preview.

A key takeaway here is science is working, and we never set out to be competitive and disprove NOAA's assessment wrong or anything like that, and it was really a noncompetitive building process, and we suspected there was a lot of fish in that unconsolidated bottom that no one had really looked out there.

If you really looked at that thirty-six million number from the old assessment, and looked at where the exploitation occurs, which is, to some extent, natural bank, but especially artificial reefs, that number meshes probably pretty well.

If we only looked at those two habitats, and we didn't look at uncharacterized bottom, we probably would have come in with a number that was somewhat similar, and so I would heavily encourage other red snapper counts that are occurring, on the Atlantic here soon, to really take a hard look at uncharacterized bottom, which they hadn't necessarily intended to do in the beginning, and so that was something that we either got lucky or smart. As Clay will tell you, we suspected they were out there quite a bit, but those groups really need to pay attention to that unclassified habitat.

The fishery exploitation pattern is critically important, because it's occurring on habitats with the lowest abundance, and so I guess that's a good thing. Depending on you sort of have a reserve of fish out there, and you certainly can target the fish on the uncharacterized bottom, if you know where they are, but it's not as easy, and it's not as obvious, and so the fishery really takes place where you have these really easy-to-get-to and high-catch-per-unit-effort kinds of areas, and so that's really a good thing, in terms of managing that fishery.

Also, that high abundance over uncharacterized bottom likely explains this weak, or really no, stock-recruit relationship that we all have been struggling with for years of why was the spawning stock at all-time lows, and we have relatively really high recruitment, and so that is probably because we were not accounting for those fish over the uncharacterized bottom.

Obviously, we're going through all sorts of recalibration things going on right now, and I don't have to tell anyone here about it, but I think, when we do a new assessment, a new research

track assessment, or a benchmark assessment, that that thirty-six million number will probably go up, when we start taking into account these fish over uncharacterized bottom.

That 30 percent tagging rate, first, it just shows that discard mortality is much lower than maybe we suspected, or the catch-and-release worked, and that's, obviously, very, very timely, because of all the issues with incorporating these devices into the fishery, and the DESCEND Act passed late last year, and, in fact, it's on the President's desk right now, and it just passed through the Senate in late 2020, and so I don't think there's any problems with that, and that's awaiting a signature, and, in fact, it might have already been signed, and I'm not sure the exact details, but it's pretty much going to be in play here real soon.

Really, this is just the beginning. We have been in close communication with Clay and John and Shannon and everybody from the Science Center since the very beginning. In fact, they were on our steering committee, and so they knew what was happening, but we've bene in close contact with them all along, and they are well aware of the data and what we're finding.

We really just see this as the beginning of meeting with their team, to really get into this data, so we know what we have and what they can do, and it sounds like we're going to hear a little bit more about that after this overall presentation here in just a minute, and so that's good, but our team, obviously, many of them are SSC members, but we're more than willing, and more than happy, to work with the Science Center to really mine as much possible data as we can, so we can have the best management possible for this fishery.

Given that all of us have strong SSC or Gulf Council affiliations, that will facilitate this into direct management integration, and, obviously, a big next step is your committee evaluating this for the best science available and that sort of thing, and so that's the point that we're really at now, with this sort of intro, or preview.

Then, as I mentioned, we'll have extensive engagements with the stakeholders, and we really have already started that some last fall, but especially you'll be hearing a lot more about it here in just a few weeks.

Finally, just to end, and, Joe, I will be happy to answer questions, or you tell me how you want to work it, and, obviously, just some important acknowledgements that I have to

make is the Congress, who funded this study, and this was a big deal, and it was a lot of money. The good news is there's a lot of data here that can be used, and I hope it set the framework for some of these other studies and ways that -- We've got a lot of lessons learned and things we probably would do different if we knew what we do now, that we can share and that sort of thing.

Sea Grant and NOAA Fisheries, who facilitated the steering committees and the funding and shepherding of the money, and the last thing I want to bring up is Mississippi-Alabama Sea Grant, who had direct responsibility for this project, particularly LaDon Swann, who led that charge, and along with the steering committee that we worked closely and really helped guide us along the way.

I really underestimated the administrative workload that a project like this would take, but that's a good thing, but LaDon and his team, and his folks, were really great about that, even up to the very end here and helping us get what we need, so we could focus on the science and not be burdened with all of the administrative constraints. I think I will stop there, Joe, and I can end that, and I don't know if I need to stop sharing my screen or how that needs to work, and I'm happy to answer some questions, and I'm not sure what your timeline is.

CHAIRMAN POWERS: Thank you, Greg. That was very illuminating. I'm sure a lot of people will want to ask more technical questions, and, being the Chair, I am going to take my opportunity to ask mine first. First off, the depletion studies, what sort of timeframe were those done in? Was it like one week or one day or one month or something like that?

DR. STUNZ: More on the day to the week kind of thing. It was very quickly. It was sometimes the same -- I am looking here on the participant list to see if Sean is on, and he's the expert here, and so he could answer. I think he may have had to step away, and I can answer more, hopefully, but what I think, Joe, something to think about, or maybe I would recommend, and, obviously, I don't know, Carrie, and you can give us some guidance here.

This is a lot of information to take in, and that was like drinking out of a firehose there, probably, and we're more than happy to come in and have a lot of detailed discussions on depletion, or whatever components of the study that the SSC the might be interested in, and really get into the weeds kind of thing, but I am more than happy to answer broader questions,

too.

CHAIRMAN POWERS: Well, that's fine. This also relates to the tagging, and what I am leading to is what possibility some of this data has to actually estimate natural mortality rates, and the same thing goes with tagging. What sort of timeframe are we talking about, and did major fishing go on during that timeframe, and whether you might be able to discern something about natural mortality rate.

DR. STUNZ: I think we can, and that's certainly a discussion that we should bring Matt Catalano in, and he has got some very interesting work that we're working on, in terms of not only natural mortality, but exploitation and those sort of things, and, of course, discard mortality is folded in with that.

He would be someone that we need to bring in to discuss that, to specifically answer your question, and so those fish were tagged before the season, because we wanted them returned, obviously, and so there's some assumptions and things that we did about how that study was designed, and looking at distance from port and all those sorts of caveats that come with it.

Then the return is still ongoing, and we ended the study, the paid part, in December. One, we just ran out of our second infusion of money and didn't have money left, but, also, at some point, you just have to end it, but, in general, the anglers are still giving us all the information, and so we're collecting return rates, and literally as of just this morning we got one back, and so they're not overwhelmed, like they were in the beginning, but they're still coming in. They were tagged, and they were mixed probably for a week to months before the returns really started coming in.

CHAIRMAN POWERS: Then one last question I have is was there any sort of size differential about fish that were on the unclassified bottom versus other areas?

DR. STUNZ: We're working through that right now, Joe, and not really. It was more of a regional size thing, but there are generally larger fish on the uncharacterized bottom. The problem we have there, Joe, is that, the way we sample that uncharacterized bottom, is you're moving at, let's say, four to seven knots, and you see the fish and you're gone.

Other areas you're sampling, the traditional fishery has occurred there, and we have very good size estimates of what's there, and we need to -- I highly recommend that, through MARFIN

or other funding sources, we get a much better description of the fish that are over that uncharacterized bottom, and, of course, NOAA has been bottom longlining there for a while, and that gear is selective, certainly, but, generally, much bigger fish are over the uncharacterized bottom.

CHAIRMAN POWERS: What I'm leading to is, I think, essentially, the way the assessment process will probably work is that you're talking about a very different selectivity than you thought you had, and how that might relate to the sizes and things like that, and that's what I was interested in. We have a lot of people ready to ask questions, and so let me begin the list. Shannon.

DR. CALAY: Thank you, Joe. I will defer to the SSC first, if you prefer.

CHAIRMAN POWERS: Why? Are you going to say something --

DR. CALAY: No, and I just have two questions from the Science Center, but we can wait until the SSC members have had a chance to speak first.

CHAIRMAN POWERS: Okay. It doesn't matter to me, but all right. Kai.

DR. LORENZEN: Thanks, Greg, for that great presentation, and the whole team for their gargantuan effort, and I am sort of curious about your CV estimate, and I am wondering how that was arrived at and what uncertainties that accounts for, because -- So the CV, in that order, is what we often see with sort of relative abundance estimates derived from video surveys and so on, but then there are additional sources of uncertainty associated with actually deriving area-based absolutely abundance estimates, and also noting that a lot of the abundance seems to be in the uncharacterized bottom that's been sampled with that towed video system.

The CV seems extraordinarily low for the type of the study that you've done, applied to absolute abundance, and I was just wondering if you can illuminate us a bit more on how that was arrived at and what uncertainties it accounts for. Thank you.

DR. STUNZ: Also, for different aspects, I just want to mention too -- If Sean is there, and I know Will is there, and there's a lot of folks that can chime in, and so feel free, Joe, to call on some of other experts that are in the room here, but, Kai, to give you a general -- We can get a CV on every strata, every

habitat type, per region.

They are generally low. To give you an example, the CVs on that uncharacterized bottom might go from 16 in one region, 12 in another, and 30 in another, or maybe something like that, and, in the final report, it's not going to be just, well, here you go, and it's 11 percent. We'll have a table that has the CVs for every strata that we have.

If you're asking specifically how we came up with those CVs, the lowest level we have it is by region by habitat by depth, and we would have a CV, and, obviously, as you tend to reduce those strata, or become more refined, those CVs grow, based upon your sample size, but, in general, we're not looking at like an overall CV of 11 percent and then, in another habitat, it's 85 or something, and, in general, they are low.

DR. PATTERSON: Greg, I have a couple of things to add, if you don't mind.

DR. STUNZ: Yes, sure.

DR. PATTERSON: Kai, the original stratification for this was done with the random forest model, and so Rob had a suite of different fishery-dependent and fishery-independent data sources, which were utilized to predict the probability of finding a red snapper in a given cell, and I'm sitting here unable to capture the cell size in my brain, but maybe Greg has it.

Anyway, in the cells across the shelf, from ten meters out to 160, this random forest model was used to predict the probability of encountering red snapper, and the stratification was done based on three -- A middle third, a lower third, and an upper third of probability of capturing red snapper.

That is how the stratification was done to produce the design, the sample design. In Florida, we were able to follow that sample design explicitly, and there were 900 stations, and Rob gave us the numbers, and we sampled them.

In some of the other regions, they had to make adjustments, based on local considerations and issues with visibility, et cetera, but, after the fact, when the data came in and we had the habitat information associated with the data, there was a post-stratification process, which was performed by Rob, and that's where you come up with the different habitat and depth strata that Greg just mentioned. The CVs were produced for each

stratum, independently, and then the overall CV was produced by region and then Gulf-wide.

As far as the other sources of uncertainty, this is an important question. In the eastern Gulf, we tried to address issues of how red snapper react to ROV, which was our principal gear, as well as sonar, by doing a series of calibration experiments, where we used stereo cameras, similar to Somerton et al. 2017, and we used fine-scale three-dimensional acoustic telemetry, and we also used sonar, working with Kevin Boswell's group, and we put a multibeam sonar transducer on the bottom and focused in toward a series of reefs, where we did these experiments.

I won't get into all the details of the experiments, and we have a paper that we're about to submit on this that Steve Garner led, but the take-home from all of that is that red snapper don't show an overall behavioral pattern that is either positive or negative toward any of the mobile gears that we tested, and so we tested ROV, and we tested the towed camera vehicle, and we actually used the smaller vehicle that was predominantly used in the western Gulf, and not the C-BASS larger vehicle that Murawski uses, and we also tested the towed sonar sled that Boswell uses.

For none of those -- There was a gradient in reaction, but, overall, it was fairly neutral. For divers that we put in the water, there was a positive reaction to divers, where red snapper came over to check them out, and so we attempted to account for some of that potential bias in the video, and it's more problematic, or difficult, to do that with sonar, but I will let Greg talk about how they examined that in the west.

CHAIRMAN POWERS: Thank you, Will. Jim Tolan. Let's go ahead then, Paul Sammarco.

DR. SAMMARCO: Thank you, Mr. Chair. How are you doing, Greg? It's good to hear you talk. I just wanted to say that -- I just wanted to mention something, and then I've got a few questions for you.

That was a great study that you showed, and it was a very extensive survey across the northern Gulf, and you assembled a great team and presented some very valuable data, and it was certainly new to me, regarding the abundance of red snapper across the northern Gulf, and so that's great, excellent, and, by the way, very good presentation, and it was very understandable.

The first question is you were using a lot of video, and did you sample habitats, which were really pretty deep, and could your video -- Could your ROV reach those depths? I have had some experience with ROVs, and sometimes there is only so much cable available.

DR. STUNZ: Paul, yes, we did -- We were charged with sampling on the continental shelf and back, roughly about 300 meters and back, and our gear worked to those depths. Typically, Steve Murawski handled some of those deeper depths, because of the C-BASS and the gear needed to do that, but the other habitats -- The ROVs and the technology is advancing so rapidly, and it's pretty amazing what these small micro ROVs can do, and so the short answer is, yes, we have the cable, and, really, it turns into a power issue as much as cable, to be able to drag that much cable, but the short answer is, yes, we can get down to those habitats.

Just briefly, Will mentioned about the grid size for our random forest initial design, and that grid size was ninety-by-ninety meters, but the way.

DR. SAMMARCO: Very good. Thank you. Did you integrate your information with published or known data on habitat, which seems to be pretty extensive for the northern Gulf, for your bottom configuration, or in fact were your -- Where you said it's uncharacterized bottom or whatever, or were your sampling areas sort of too fine-scale, and was the information available on bottom configuration too broad?

DR. STUNZ: That's a very interesting question, Paul. I mean, we relied on known datasets that are out there, and, in short, they're not necessarily good enough. We could generate a lot better estimate if we had a lot better mapping information, with the exact size, and, the real known conspicuous features, those are mapped really well, and, I mean, obviously, your work in the Flower Gardens Banks and many of those, and we know those areas pretty well, but, as we all know, there's a lot of banks and things that we know about that aren't described very well.

Also, on the uncharacterized bottom, that's kind of, really, a catchall category that we just don't have enough information to really know what's out there, and so we had known -- I mean, artificial reefs were pretty well marked and known, and large conspicuous natural banks are pretty well known, but, beyond that, especially in the western Gulf, it's lumped into unclassified bottom, and, unfortunately, that's just what we're up against until we start getting a lot better maps.

Now, recently, what we've uncovered, through this study, is that BOEM is starting to release a lot of those surface features that was, at the time, proprietary with oil and gas, and they, obviously, don't care so much about the surface features as what's below it, and so there is ways to improve that mapping, and subsequently improve our estimate, but, currently, we just relied on what was available, and we did not generate any new mapping, and what you see there -- There will be a lot more figures of maps in the final report, and those are from known datasets that are available to anyone out there.

DR. SAMMARCO: Right.

DR. PATTERSON: I will just add, Paul, that we tried to actually use the existing mapping data and known features, and then use the bathymetry data that NOAA has published throughout the Gulf, to try to characterize areas that hadn't been mapped, and Vince Lecours, here at UF, led that effort.

Unfortunately, there were a lot of artifacts in the multibeam data where that existed, but also in the bathymetry data in general, so that it was providing a false image of what was on the seabed, and he pretty quickly found that the artifacts in those datasets just wouldn't enable us to stratify based on habitat, and that's why Rob used the approach of the random forest of using this diversity of data to predict the probability of encountering red snapper, instead of stratifying based simply on habitat.

DR. SAMMARCO: Excellent. It sounds like you've got data, and you don't have missing points, or many, for your fish data versus your habitat data, and so that's really good. One more question. This is an old controversy, and you will probably reel back in your chair, but there has been a controversy, for decades, on attraction versus production on those platforms, and some of it has been focused on red snapper.

I have my own -- Having done a lot of work on platforms, I have my own thoughts about this, for sure, but, with respect to that species, has this ever been resolved in the literature, that you're aware of, or in your work?

DR. STUNZ: Well, Paul, I think that may depend on who you talk to. In my mind, yes. Well, one, what this study showed, in our tagging, is the fish didn't really move much. They were pretty much returned on the area they were tagged. Now, of course, that wasn't years of time and gradual movement and storms and

that kind of thing that we think happens, but some of our work -- - Dr. Streich and Dr. Curtis, who was instrumental in this project, that is, obviously, on the call here, on the SSC, and work that we've done here has clearly shown production coming from these artificial reefs, for red snapper in particular.

I think where the field has progressed, and I'm sure we could have a whole other debate on this, is that there's really not attraction or production, and both are probably occurring. There is some level of attraction, and there is some level of production, and that's sort of where that debate has ended. I mean, I could go on, Joe, but I will kind of stop there.

CHAIRMAN POWERS: On that subject, stop, because it's unresolvable, I think, at this point.

DR. PATTERSON: At this point, but I think what's needed to address that, and it becomes more important now, and Greg mentioned some of the new importance that have been revealed from this work, and it becomes more important to know how fish move from natural bottom to artificial reefs. Do they simply show up there as two-year-olds, as they are leaving the low-relief natural habitat, or do they come in later, as five or six-year-olds or older, and what's that dynamic?

There really hasn't been any work done on that. There's a study currently being done that's led by Sue Barbieri, and I'm involved with, on the West Florida Shelf, that's attempting to address that, how fish -- Do fish move from natural bottom onto artificial reefs, and, obviously, this issue of vulnerability and where the fishery occurs, versus where the population biomass is, those type of studies, in different regions of the Gulf, I think are going to become increasingly more important.

DR. SAMMARCO: It has been a -- The red snapper has been a red herring in that area, I think, but I have done -- I have spent an awful lot of time diving on these platforms, and you can see firsthand -- You get a feel firsthand for what's going on, and it's purely observational and ad hoc, but it's kind of interesting, but I won't drag you through that at the moment, and I will just say thank you very much for your comments, and I really enjoyed your talk, and, Mr. Chair, I'm sorry I took up so much time.

CHAIRMAN POWERS: Thank you. Let me return to Jim Tolan. Are you back?

DR. TOLAN: Thanks, Greg. That was a really good presentation,

and I think you hit the nail on the head when you said the tagging information could provide a new wealth of data for this particular species, and I am just astounded by the 30 percent tag return rate, and that's incredible for as large of a spatial area as covered.

The question that I have, and I think I know the answer to this already, as it relates to what Paul was talking about with the platforms, but was the lack of tagging off of south Louisiana just a function of access points, because I noticed on the map that there was hardly anything reaching out past Sabine and out there, and so that's all I had, and I think that was a great presentation. Thank you, Greg.

DR. STUNZ: Thanks, Jim, and Dr. Curtis there is in charge of this tagging operation, and so he can tell you a lot more about details. In general, that 30 percent return rate was pretty consistent across the region, and so, in other words, it wasn't like all coming from Texas and nothing from Florida. They are all hovering probably in the low thirties right now, all the regions.

The short answer to your question on Louisiana is, yes, that region and that shelf -- There's a lot of fish there, and it's hard to access and get out there, and that simply was just a lack of tagging in that region, and we'll explain that a little more in the report, but the tagging effort, for a variety of reasons, was limited in that region.

CHAIRMAN POWERS: Thank you. Ken Roberts.

DR. ROBERTS: Thank you, Mr. Chairman. I've got two comments, and one of them was really covered by Will, and that was an excellent question there and a good response, and the question I've got between the SEDAR 52 of thirty-six million fish and the Great Count of 110 million, most of that appears to be related to uncharacterized bottom, and is that correct?

DR. STUNZ: Yes

DR. ROBERTS: Then the question I have in relationship to that is that's the most difficult area, probably because of depth and visibility and access, et cetera, to sample, and would that be correct?

DR. STUNZ: Yes, and as well as fish as well, exploit that area.

DR. ROBERTS: Is the video method suitable there, or is it

basically acoustic?

DR. STUNZ: It's a combination of both, just depending upon if you're doing it closer to shore, with the visibility and there's a lot of suspension of sediments and that kind of thing, and the the acoustics works better, further offshore, in different regions, and so it's just a major challenge that we have with the study, that the Gulf of Mexico isn't a nice, homogenous, beautifully clear place to work all the time, and so we have to use different gears. We used video where we could, but, many times, you can't, in the shallow western Gulf regions, in particular.

DR. ROBERTS: Just by means of making the relationship between the acoustic readings and the video observations, did you ever pull the acoustic gear in association with video, to see what sort of relationship is there? To me, that would be important in the uncharacterized areas in the future, to have knowledge of.

DR. STUNZ: Yes, and that's very important, and a very interesting point to bring up, and that will be summarized in our final report, in terms of calibration, and we did those calibrations to account for any differences in assumptions that we make about the different gear efficiency and catchability, is kind of what you're referring to there, and so that will be summarized.

Dr. Rooker led a lot of that effort in some of those studies, and he did those in the western Gulf, and Will briefly talked about some of the gear avoidance calibrations, and so all of those will be summarized, and, Joe, that's a good example of a lot of just little details on a study like this that's hard to capture in one short presentation, and so, if there are specific aspects the SSC would like us to address, we can certainly do that.

While I'm on that topic, just something that -- We, obviously -- In any study, there are certain caveats and assumptions that you've got to make to generate your estimate, and hindsight is 20/20. Certainly, in a study of this magnitude, we would do things different if we knew what we do today. We would spent a heck of a lot more time out on that unconsolidated bottom, or uncharacterized bottom, but I want to mention that, while no study is perfect, we took conservative turns in every case.

In other words, you might have a situation where you've got to decide what is the cutoff of the age-two red snapper, for

example, or whatever, and we took -- If anything, this is a very conservative estimate, versus adding fish in, where we could have, and we took the conservative approach.

MR. ROBERTS: Thank you very much. You referred to your presentation as brief, but I will refer to it as memorable, and I congratulate you and your team. It's a very good presentation, and it's going to pay a lot of dividends in the future. Thank you so much for your work.

DR. STUNZ: All right. Thank you.

CHAIRMAN POWERS: Thank you. Next up is Luiz and then Walter Keithly.

DR. BARBIERI: Thank you, Joe. Thank you, Greg, for the great summary presentation. Obviously, this is a massive study, and it's very comprehensive, and you did a great job summarizing the main points for us, all the different components, and so I appreciate that.

I think I am going to keep my more technical questions for later, for some other time, when we kind of have the opportunity to get more in the weeds, to be discussing all the different more technical components of the study, and so what I wanted to ask today is you said that the report is going to be released later this month, and can you give us an idea of the extent of the report? I'm sure that it's massive, but the extent of detail that the report is going to include, including like supporting documentation and working papers.

I'm thinking about, for something of this magnitude, Greg, we're going to need to kind of look at all the different components, all the technical details, how all of this is integrated, to generate that one estimate, because, in looking at that CV, I have to say that I'm kind of blown away that we did a count of all the red snapper, age-two and older, in the Gulf of Mexico and that we know the number at that level of precision. It's a little counterintuitive, but I'm not saying that you guys are wrong, but it's just it would be nice to see more of those details that led to those numbers.

DR. STUNZ: That will be captured, to a large extent, in the final report. Now, will the final report have everything? Probably not. I mean, it's going to be a pretty intense document, with especially a lot of appendices and that sort of thing, and it's just very difficult -- Probably, I'm guessing, there will dozens of peer-reviewed papers which will result from

this eventually, and so it's a lot.

Now, for your CV, keep in mind that, one, yes, I am very floored at an 11 percent CV as well, but that's on that overall number across the whole Gulf, across all the habitats. Obviously, as you expand that out, that CV gets less and less, and so, for example, if you were to look at the CV around artificial reefs in Alabama, or let's say natural banks, and I'm trying to remember, that's probably more like 21 or 29 or something like that, and that's higher.

As you start drilling down to specific regions and specific habitats, that CV grows, but, from an overall perspective in the Gulf, on one number that's not necessarily related to habitat, the 110 million number, that CV is in fact 11 percent, and we're pretty confident with that, Luiz. I mean, we feel good about that, and it's definitely much lower than I think any of us anticipated, but, for example, probably what the report will really boil down to is a table that has regions and habitats and abundance and a CV associated with each one of those.

Those CVs will be much higher, and they're not going to be out of control. I don't think any of them are above 40, but it gets higher as you begin to look at more detailed aspects of the study.

DR. BARBIERI: Right, and then something else about the process. Considering the magnitude of this study, sort of the novelty of the approach being used, and the fact that our goal is to really review this for integration into management, has the team, NOAA Fisheries and the council, discussed the possibility of having this be reviewed by CIE before it comes to the SSC?

I am thinking about something similar to our research assessment track now, or what used to be our benchmark, that we would develop a model and it would go to the CIE before it came to the SSC, and has this been discussed?

DR. STUNZ: Very loosely, Luiz, and I don't know that any decisions have been made. To give you an idea of what the products will really look like, and I'm hoping that Will will jump in here in a minute, because Will has, I think, the best grasp and is really going to lead this integration piece that you're talking about, and so, Will, in a minute, feel free to jump in.

The three general products we see, Luiz, are the overall report, and there might be things in there that we didn't capture as

well as others would like, and we can expand on that or something, and that will, obviously, result in a peer-reviewed paper that describes the study's implications and future -- More very much like what you heard today, and then, of course, the final report will be much more detailed.

Then a separate piece of that is sort of this tagging and exploitation and mortality rate kind of piece that Joe was talking about before, and that's kind of a stand-out piece, and it will be in the final report, but there's much more to develop, even beyond a final report from that.

Really, what you're talking about is really this third piece, which is what we're calling kind of the integration of how do you -- Number one, this is going to be -- It will sort of set the groundwork, because, obviously, there's a greater amberjack count, and there's a great red snapper count on the South Atlantic side, and so sort of a lessons learned, but also how do you integrate these kind of things into management.

My preference, and, obviously, I think we did a great job, and this should be the way things go, in terms of absolute abundance, is moving fisheries management forward and that sort of thing, and so I think we're going to spend a lot of time with the whole team, and Will has agreed to lead this, where we talk about how do you integrate this into management, because that's -- Our job was not to integrate this into management.

Our job is to give you the estimate, but we feel compelled that we don't want to just leave it hanging there on the cliff, and so what that looks like -- I think that would involve folks like Shannon and John and Clay with the Science Center, and it would involve key folks from the red snapper team, and probably people from the SSC, of what does this look like, at the end of the day, kind of what we're talking about here, and how do you really integrate it, and how do you review it and that sort of thing, but, Luiz, those are bridges we largely haven't crossed yet.

DR. BARBIERI: That makes sense.

CHAIRMAN POWERS: Thank you. We need to move on. Ryan, you sort of jumped the line here, and do you have a procedural thing you wanted to say?

MR. RINDONE: I do, Mr. Chair. I was just going to gently remind the SSC that this is a preview of this project and that there will be much, much time afforded for digging as deep into

the weeds as you guys care to go in the future.

CHAIRMAN POWERS: Thank you. We're also getting close to lunch, and let me continue on a little bit. I would like to hear what Shannon has to say. If we don't mind, for the four people that are on the list, can we go to Shannon now?

DR. CALAY: I am ready, if the group is willing.

CHAIRMAN POWERS: Yes.

DR. CALAY: Thank you. I have a few questions, which are directly related to how we would implement this information within the interim assessment framework, and so one question is that Dr. Stunz has said that the uncharacterized bottom is not only mud, but also pockets of structure, and we would like to know if most of the fish -- Basically, how was that extrapolated? If most of the fish observed are actually in these pockets, is there a chance that, in the extrapolation, there is an overestimate of the abundance in the uncharacterized bottom?

DR. STUNZ: Well, I can't answer that question for you right now, Shannon. The way we designed it would account for that, any chance of overestimation, but we would need to go back and look at the patterns of how those were distributed among that area.

If you're randomly selecting sections of uncharacterized bottom, and there's a certain amount of structured features there that are holding the snapper, and maybe they're ephemeral, and maybe they're sunken ships, that they're much more around for longer periods of time, and we don't know that. That would be some post-hoc analysis that we would have to do to go back and really characterize what was it they were holding on and what did that distribution look like when we saw them and that sort of thing, but you would hope that the randomness in the design would account for any type of overestimation issues.

DR. CALAY: Okay. Thank you. Then a second question is, in order to understand the abundance estimates and their uncertainty, we would like to see the methodology used to estimate the overall CV, and we note that, in specific habitats, such as natural reef, for example, the estimated CV is much higher, and it's about 38 percent, than in the uncharacterized bottom, which it looks like the CV might be around 16 percent, and then the overall CV is even lower.

We need to understand how that CV was constructed, so that we can understand the uncertainty of that estimate if we're going to apply it to create management advice. I think I'm basically -- The statistics that I just gave were for Texas only, and they weren't necessarily overall, and my apologies, but the point remains that, to create the management advice, it would be important for us to understand the uncertainty around that estimate. Will a detailed description of the methodology be available to us in March?

DR. STUNZ: Yes, and it should be sooner than that. I mean, it should be in the final report, or not should be, but it will be in the final report. Now, if it's at a level you need, or more, and, obviously, we can have that discussion. If you need more details than what is there, we can involve Rob Ahrens and Lynn Stokes, who are primarily involved with calculating and the methods behind that, but we're happy to discuss it further, so you guys feel good about how we arrived at those CVs.

DR. PATTERSON: I will just add that the stratification that was done -- Rob can present the details of the post-stratification, and I know that's kind of a word that make some people a little bit twitchy, or a term, and so Rob can present those details, and hopefully he can make the meeting, when we have this peer review process in front of the SSC or wherever, but one thing that Greg I don't think quite mentioned is that Lynn Stokes and Rob worked independently and with the same raw data, and so the same data from among the various regions, and their estimates were nearly identical, and their CVs were very close.

The CV that Greg has presented here comes from Rob's work, but Lynn produced an estimate that was nearly identical, and so we were surprised by how low the CV, overall CV, was, but we also were surprised by the stratum-specific CVs and how tight they were.

The other component of uncertainty though is bias, right, and so we're talking about precision here, but then there's also bias, and we have tried to address that in some ways, but there are some other ways, I think, in our methodology across the Gulf where people may want to ask some questions about the implications of different approaches, or the implications of assumptions, like Greg just mentioned.

Our intent here is to be fully transparent, and, as a group, we completely understand how fundamental the change could be, based on the results, even in their preliminary form, that have been presented here, and, because of that -- You know, we talked

yesterday about the amberjack data from LGL and Benny's research and the need for peer review and to make sure that the SSC is fully aware of all the different caveats and assumptions and information that went into it, and I expect a similar process, obviously, here for red snapper.

Anyway, I'm kind of droning on here, but I just think it's important that that idea of uncertainty -- That we not only focus on what the precision estimates are, but also the potential sources of bias in those estimates.

CHAIRMAN POWERS: Thank you. I think this discussion could go on a long time, and one thing I would mention, and this is sort of my own little bias, after forty years of doing -- Well, more than forty years of doing stock assessments, but that is the goal of the stock assessment is to estimate annual productivity, and the abundance trends are useful, but you view them more as trends.

I know that sounds like a copout, particularly to the layperson, but what it all boils down to is the annual productivity that you're looking for, and the absolute abundance is not the only thing that drives what the scientific advice for management is.

With that comment, we have four people on there, and I think, at this point, what I would like to do is break for lunch, and I don't mind returning to this after lunch. We have four people on the list, and hopefully we can get through that fairly quickly, but, if that's okay with people, then we can bring for lunch now, for like forty-five minutes, and then return to the four people when we get back. Thank you. We'll come back in forty-five minutes.

(Whereupon, the meeting recessed for lunch on January 6, 2021.)

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January 6, 2021

WEDNESDAY AFTERNOON SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees reconvened via webinar on Wednesday afternoon, January 6, 2021, and was called to order by Chairman Joe Powers.

CHAIRMAN POWERS: When we adjourned, we had four people waiting in line to talk, and that was Walter Keithly, Judd Curtis, Ken Roberts, and Kai Lorenzen. When we finish with those, we also -- There's a very short presentation given by the Center about how to integrate some of this information in over the short term, which I believe will be presented by Dr. Cass-Calay, Shannon. When we get finished with our discussion, we'll move right into that. Let's begin then on the list with Walter Keithly.

DR. KEITHLY: Thank you, Mr. Chairman. Greg, thank you for a very informative presentation. Some questions that have already been asked have helped me out to understand some of the concepts of the study, but one thing I am trying to wrap my head around is the tagging study.

You mentioned the 30 percent recapture rate seems high, and I know Jim Tolan also mentioned that, and do you have any information, first of all, on the average time between when the fish are tagged and they were recaptured?

DR. STUNZ: Hi, Walter. Yes, we do. Dr. Curtis, on your committee, as I mentioned, is leading that component of the study, and we know exactly when they were initially tagged and when they were returned and what the fate of that fish was, if they were returned back or all sorts of things.

We typically have good information on their movement, if there was any, and that sort of thing, and, obviously, I didn't have time to really get into that or present it today, and I would recommend that the SSC -- That we talk about that whole component more, because there's a lot of information there, and have Dr. Catalano come in and present some of that, along with Dr. Curtis.

DR. KEITHLY: Okay. In that case, this may be the same as a couple other questions I had, and I will make it quick, since it sounds like we're going to be going into it in a lot more detail, but, out of curiosity, do you know, or does anybody on the panel know, or did you collect information, on the percent of recaptured fish that were retained versus those that were released?

DR. STUNZ: We asked that question, but I don't have that data right at hand. Nearly 100 percent of the tags were removed, because, to collect the reward, part of the deal was you had to have the fish. I would venture to guess that most of those fish

were retained, Walter, but I don't know where we -- We would have that information, and I just don't know what that is, off the top of my head.

DR, KEITHLY: I understand, and somebody else had that part of the project and was in charge of that.

DR. PATTERSON: But that information was collected and utilized in the model that Matt produced.

DR. KEITHLY: Okay. Did you try to glean, from the tagging study, what that might indicate, in terms of the fishing pressure on the stock, and, if that 30 percent -- If the average time between tagging recapture is short, and there's a 30 percent recapture rate, it just sounds to me like that would indicate a very high amount of fishing pressure, but it sounds like this is questions that need to be asked in a more detailed discussion of this subject. Thank you very much for a very interesting presentation.

DR. STUNZ: Just briefly to that, Joe, Matt Catalano would have a lot more to share with that. There is quite a bit of assumptions with the study, you know that you got all your fish returned back and all those sorts of things. Where the fish were tagged plays into that, and they weren't randomly distributed across the Gulf. We wanted to get recovery rates, and they were tagged varying distances from port, and that was part of that design that I didn't have time to talk about.

You could make some of those assumptions, Walter, but some of them may or may not be violated, based just upon the design of the study, and so I would recommend that we -- We will have that captured much better in some manuscripts, as well as the final report, and then we can give a separate presentation specifically on the tagging pieces of this study.

DR. KEITHLY: That would be great, and you did mention, in your presentation, that it was not necessarily random and that you only tagged fish out to 180 feet or whatever, but the 30 percent still intrigues, and I would like to learn more.

DR. STUNZ: Exactly.

DR. KEITHLY: Thank you.

CHAIRMAN POWERS: Thank you. Judd Curtis is next, and he may want to comment on this subject as well.

DR. CURTIS: Thanks, Mr. Chair. I just wanted to chime in, and a lot of those questions that both Walter and Ken asked both Greg and Will have kind of responded to, but, basically, to respond to Jim's question about the tagging off of Louisiana, part of the model parameters for the mark-recapture modeling that we did had some specifications in it, such as depth, and we would tag up to a certain depth, and then a certain distance to inlet model.

A lot of those areas out in kind of remote western Louisiana didn't just quite make it, because, as Greg mentioned too, we wanted to have a pretty avid response from the angling community, as far as being able to recapture these things, because a lot of those sites out in the Louisiana area just didn't quite fit the model parameters.

Then, Walter, thanks for the comments there too, and there's a lot of additional information, as Greg mentioned, that we're just beginning to uncover at this point, and, primarily, we were just looking at exploitation rates, but we've found a lot of additional important information from this mark-recapture, such as the movement and various discard mortality rates using descender devices.

Then, just to answer some of your questions, like pretty much nearly 100 percent of the fish were retained, and I was just going through some of the recapture data, and there was just a handful of fish that were released, and then the angler snipped the tag and mailed them in, but just about 100 percent of the fish were retained.

Then, time-wise, that 30 percent recapture rate, which is remarkably high, that's the last estimate as of the end of December, when we completed the study, and, obviously, the longer the study is occurring, the higher your recapture rate is going to be, because more fish get returned, and so we can model that as well, to see, over time, what the return rates are, until that final estimate. Thank you.

DR. KEITHLY: Can I ask you one question, while you're on? Do you have the information readily available and what percentage of the tags were returned by the commercial fleet versus the recreational?

DR. CURTIS: We do have an estimate, and I don't know it off the top of my head, but the majority was from the recreational fleet. There was very few coming back from the commercial sector.

DR. KEITHLY: Okay. Thank you.

CHAIRMAN POWERS: Thank you. Ken Roberts.

DR. ROBERTS: Thank you, Mr. Chairman. My question is regarding the timeline for the stakeholder meetings, number one, and, number two, is it going to be synchronized out of LaDon's office, or is each individual participating state going to do their own timing and use of stakeholder interaction? So, in general, the timeline, and who is responsible for the stakeholder meetings? Thank you.

DR. STUNZ: Well, it will be synchronized and run out of LaDon's Mississippi-Alabama Sea Grant, and so there won't be something happening from each state. However, I'm sure the different Sea Grant programs and other things within each state will follow in with that and share the information and that sort of thing.

We don't plan -- Originally, we had planned for in-person stakeholder meetings, and that, obviously, didn't go, for a variety of reasons, and not just COVID, but, even prior to COVID, the attendance at those sort of meetings was just very, very poor, and not necessarily our meetings, but just the meetings in general, and so we moved to a much more online social media type model and other ways to get the word out.

It will mainly be through press releases and information sheets and social media and that sort of thing. There is not going to be any real formal outreach meetings to groups, unless somebody asks us to present and that sort of thing, which has already occurred and is happening, but there's no formal sort of like public hearing type meetings scheduled or anything like that.

DR. ROBERTS: Very good. Thank you. I appreciate that answer.

CHAIRMAN POWERS: Thank you. Kai.

DR. LORENZEN: I have been sort of taking a step back a little, and I'm thinking about how we discharge our duty to conduct a thorough independent and transparent peer review of this information that will -- That is set to enter into management fairly quickly, and, following on from Luiz's comments, I do note that this is a very complex study, and so the red snapper count title makes it seem a lot more straightforward than it really is.

It's a very complex study of methods and calibrations and

assumptions and so on, and some of those have been brought out, and so it's the sort of thing that I think we need to review to a higher and more detail than is really possible within the setting of the SSC meeting.

If this was a new assessment, with new methods and so on and so forth, we would put this through a panel review involving SSC members and CIE reviewers and so on, and I do think that the nature of this study really calls for a panel review of this sort, and I also want to add that there are several other factors here that, in particular, point in that direction.

One is the fact that multiple SSC members have been very involved with this study, and that's great, because we can ask them those questions and so on, but it also creates a little bit of a conflict of interest, but, basically, we have essentially the analysts reviewing their own work, and so I think that adds to a need for independent peer review.

I also note the high level of political expectations surrounding this project and the use of the information and the fact that, of course, many of our fisheries stakeholders take very different views on this project, depending partly on what sector of the fishery they associate with.

Where this gets me is that I think we have a duty to be very, very rigorous and very transparent and very independent in our review, and I think that a panel review involving CIE reviewers, and perhaps members of the SSC who were not involved directly with the study would help us do that appropriately. Thank you.

CHAIRMAN POWERS: Thank you. This is somewhat of a concern of mine, and I think it's sort of implied by some of the comments that Shannon made, and that is that, basically, we're talking about what has been called an interim analysis, which isn't really interim, because this is a whole new set of data, some ninety days from now, and we haven't -- We the SSC, and also the Center, haven't seen that, and so it seems like this is on a fast track, and I think we all understand the overriding drivers about why it is, and that may be something we have to live with, but, nevertheless, I agree with Kai that we need to be very careful about being able to have documentation of our vetting of the whole process. Maybe Carrie could comment on that, or anything else.

EXECUTIVE DIRECTOR SIMMONS: I think thank you, Mr. Chair. We're struggling with this ourselves, and we have -- We've had a couple of meetings with the Science Center. We've had a couple

of meetings with the Science Center and the Regional Office to figure out the best way, and with Dr. Stunz, to think about how this process would roll out.

I think, right now, the idea is it would be a multiple-day SSC meeting, going through the results of the study, and then have the Science Center ready to follow that up with how they've been able to incorporate these high-level pieces of information that are pertinent in quick turnaround that could help the council in management after that.

It would be, essentially, or potentially, a long meeting. That being said, we do have the funds, if the council concurs, to seek outside assistance for review, if this body wants to recommend that, and that's also a possibility, but I know everyone is anxious to get this into management, but I understand there is just a lot of questions, because the final report is just not out yet, and so I think we could tackle it from a lot of different ways. I think we have a lot of different options available, but I do think time is of the essence, and so, the sooner we can kind of pin some of that down, the better.

CHAIRMAN POWERS: I guess one of the things that one worries about is rushing to judgment, and it kind of limits your options later on, if you want to revisit some of these things, and so, if we can have, like I said, some sort of vetted process in the interim, but there isn't much time, because, as I said, we're talking about ninety days before a, quote, unquote, interim analysis is produced, and the report isn't available yet to even begin that. I agree with Kai, and I think perhaps some outside reviewers might be a good idea in this process as well. Will.

DR. PATTERSON: Thanks, Joe. I just have a couple of things. As far as the tagging and the high return rates, I think it's really important to remember that these fish -- The tags had a $250 reward. The purpose of the high-reward tags was to try to get as high of a return rate, and assuming 100 percent based on that, and some of the fish were double tagged, and so there were $500 rewards offered for those fish, and the double tagging was to estimate tag loss, and so tag loss was also a parameter in the model.

The exploitation rates themselves that were estimated among the different regions range from about 30 to 40 percent per year, which is consistent with the Fs that come out of the assessment for both the eastern and western Gulf in the recreational fishery.

When we start to think about what's the exploited population and what's the population being modeled in the assessment, versus this other biomass of fish that are away from exploited habitats, I think that starts to shed some light on the fact that the assessment, given that the assessment estimates of mortality are similar to what the tagging was and most of the recreational fishery is targeted on those shallow artificial reefs.

As far as Kai's comments about the panel review, I think that's going to be really important, and I have already talked to some of the folks at the Center about this issue of having SSC folks as members of this, and I think there is that benefit of being able to really get into the details and describe things, because we were part of the process, but there are details from other regions that I am not aware of fully, and I do think it's important to have independent peer review of what we produce here.

Then, lastly, Joe's comment here about how quickly this is proceeding, I know that politically-charged species like red snapper and the initial presentations that Congress was requesting happen back in the fall with these preliminary estimates, and we haven't really pulled the curtain back yet and gone into the details of how the estimates were produced and what assumptions were tested and which ones weren't and how all of that was put together, but there's still all this pressure to incorporate this into management, and I think we can have two processes.

There can be a process, moving forward, for how to potentially incorporate these new estimates of biomass and population size into an interim analysis, or thinking ahead to how this may be incorporated into the assessment, while, at the same time, pursuing this peer review process, to fully vet and examine the work that was done.

I think both of those things can happen at the same time, and I think, getting back to some of what Joe said here, this is going to be a model for the region, and it's going to be a model for the country, and we should think more broadly than just what's happening right here with this one fish that gets so much of our attention in the Gulf of Mexico and do this right, so that we can use the information to its fullest capability, in this case and potentially as a model for other species.

As far as this reconciliation process, I think it's also

important to recall that the 2018 assessment was done with 2016 data, and that was before the MRIP-FES recalibration, and the stock has continued to recover, in the east and the west, and so there is some trajectory there that needs to be incorporated.

Higher biomass and abundance would be estimated with the FES numbers, because of the greater number of removals, and then, also, there's been more recent work done on discard mortality, both in the eastern Gulf and the western Gulf, that would also, if those are thought to be more realistic, which I've been a part of some of that, and I think they are, then that would also estimate -- That would produce estimates of higher removals, which would then, again, produce a higher estimate of population size.

There's a lot of reconciliation that needs to be done here, not only to incorporate this into management, but also to examine where in the current assessment, if in fact there's this large difference that, at the end of this review, is apparent, and then we need to not only think about what this number is, but also what did the assessment miss, and is it anything more than just not effectively sampling a cryptic biomass, or an underexploited biomass, that's farther than most recreational fishermen can typically pursue fish.

CHAIRMAN POWERS: Thank you. I mean, a lot of those issues that you brought up are something that would have to be considered in an assessment and not in the interim analysis, and that's where I think we're getting the pressure, in the sense that it's essentially the Center is being asked to integrate something into a best estimate of ABC without knowing, at this point anyway, the details of the inputs. Carrie.

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. My question relates to the next agenda item, kind of a carryover to the greater amberjack count, and so I will let Kai go first.

CHAIRMAN POWERS: Okay, and, also, relative to what Will just brought up, we do have a short presentation that Shannon is going to give about their thinking about how one might integrate it in for the short-term analysis. Kai.

DR. LORENZEN: This is going to be very quick, and I think I wanted to add to Will's list of considerations with the assessment the natural mortality rate, which we assume is extremely low for red snapper, possibly somewhat unrealistically low, and I wanted to point out that even a slight upward adjustment of the natural mortality rate, as might happen with

the next assessment, would generate quite a lot more fish in the sea.

I think one has to be careful about saying there is three-times as much red snapper as in the assessment, because it's an old assessment and there are many assumptions that go into the assessment that affect the estimate that the assessment makes of the abundance of fish, more so than the management references points, or the catch advice, that necessarily comes from that model, and so I think we need to bear that in mind as we look at those differences. Thanks.

CHAIRMAN POWERS: All right. Thank you. At this point, what I have heard, from Carrie and others, is apparently there's already been discussions about perhaps setting up a multi-day SSC meeting, and I think I'm not hearing any disagreement with that, and also that it would be wise to bring in outside reviewers into that process, and I think that's one of the conclusions that we've had from this discussion, if I'm correct. Are there any other things that we want to go into before we get into Shannon's presentation about integrating the ABC?

EXECUTIVE DIRECTOR SIMMONS: Mr. Chair, I just had one other question for Greg and his team. It kind of relates to the next call for proposals for greater amberjack, and my question is have the PIs been able to quantify enough of the video from the uncharacterized bottom in the Gulf to determine if it's worth focusing on those habitats, or those deep areas, for greater amberjack? Is that really a high priority? Do we have enough information from this study that's been quantified that we would consider it in the next call for proposals for greater amberjack? Thank you.

DR. STUNZ: Carrie, the short answer to that is we would need to look at it more for amberjack, but I would be very cautious not to include it, because the story is sort of similar, from especially the commercial fishery, about a lot of amberjack out over these areas that are not classified well.

Now, there are some differences, because amberjack tend to be in much higher abundance on artificial reefs, for example, based upon other studies and some of Dr. Gallaway's work and other things, and so it's a little bit different situation, but, given what we've found, I would encourage at least some effort to occur in that unclassified bottom for amberjack.

CHAIRMAN POWERS: Thank you. I am trying to shut this down and move on to Shannon. Will, can you be conclusive in your

comments?

DR. PATTERSON: I will just say that we have a little different situation in Florida, because we used ROV, and then we have about two-thirds coverage with sonar, and so the amberjack question is a little easier to pull out of the data at-hand immediately, and we've been working to do that, as well as a few other species, to estimate their abundance and habitat-specific.

One of the issues I will just point out is that this idea of uncharacterized -- Some people hear unconsolidated, and that's been used to describe that habitat stratum, in some cases, and the terms shouldn't be used interchangeably, and so there could be uncharacterized habitat that we don't have -- That we don't know what's there, and it ends up being a ledge or a higher-profile reef, and so, if it's uncharacterized, it just means that we didn't know ahead of time what the habitat was.

Then there's also this unconsolidated habitat, and I think, for amberjack, the unconsolidated habitat is probably less of a worry than for red snapper, but it's this uncharacterized habitat that is still a concern, because there can be reef structure there that amberjack are attracted to.

CHAIRMAN POWERS: Thank you. All right. Let's move on. Shannon, you had a short presentation about the thinking, relative to a short-term integration of this?

DR. CALAY: I do. Thank you. I was wondering if --

CHAIRMAN POWERS: I'm sorry. You cut out. Can you repeat yourself?

DR. CALAY: Sure. I was wondering if I could ask the council staff to show the presentation on their screen, and it's only five slides. Thank you.

We have been asked to put together an interim assessment that incorporates the information received from the Great Red Snapper Count, in preparation for the April council meeting, and so we intend to present results, using one of these approaches, in March, or whenever the SSC meeting is, and I believe it's March.

I am going to show you two approaches that we are confident that we have the information to populate. The first approach is the simplest, and we would be producing a new ABC recommendation, using a product of the fishing mortality at-age from the SEDAR 52 assessment and the numbers at-age from the Great Red Snapper

Count, and I want to be clear that the fishing mortality at-age that we are talking about is from the SEDAR 52 rebuilding projection, and so it's that catch recommendation from the rebuilding projections that we would be modifying.

The numbers at-age that come from the Great Red Snapper Count are the estimates of age-two-plus abundance, and we also have composition data that are available from the Great Red Snapper Count and other sources, and so I want to point out, right away, that this IA, or interim assessment, differs from what this SSC has seen in the past. It is a new approach, because we are not deriving the new ABC estimates from the old ABC estimates directly, by, for example, scaling it to the increase or decrease in a relevant index, and so this is a new methodology.

Moving on to the second variant, in the second variant, we actually do try to break up into the strata that you see here, and so, essentially, we look at the natural reef habitat, the artificial reef habitat, and the uncharacterized bottom, and we calculate the ABC new, using the fishing mortality at-age, the numbers at-age, and the catch at-age matrices. This way, we'll more appropriately capture the fishery impact on the population if that composition data varies by habitat.

CHAIRMAN POWERS: A quick question.

DR. CALAY: Go ahead.

CHAIRMAN POWERS: The F at-age for each one of those three categories, do you actually have F at-age for artificial reefs and natural reefs and uncharacterized?

DR. CALAY: No, we do not, and so this is an approach that requires some thought, and, if we chose to produce information from this approach, it would be up to the SSC to review our proposal, to see if they felt they could support it, but, no, we don't have that information by these habitats. It would take a little mathematical manipulation to get here.

CHAIRMAN POWERS: Thank you, I think.

DR. PATTERSON: Shannon, would you be relying on size composition data from those various habitats to get to the age composition to estimate mortality?

DR. CALAY: Yes. Yes, we would.

DR. PATTERSON: I don't think that exists in our data for the

whole Gulf.

DR. CALAY: I would not be surprised to hear that, and so it may be that, without making assumptions that are difficult to defend, the only possibility, at this time, is to go with the first variant, because, basically, we would need to use proxies and assumptions to use Variant 2.

That being said, the SSC does -- Sorry. The Science Center does intend to produce a number of explorations, or sensitivity runs, to try to evaluate kind of the effects of incorporating the new Great Red Snapper Count information, and so the first set is that we would consider different types of analyses to produce a new estimate of ABC, using either all the numbers at-age information, the numbers at-age from structure, from the Great Red Snapper Count's numbers on artificial and natural bottom, and the numbers at-age from structure plus the uncharacterized bottom habitats, and so we would see how those ABCs differ between those various components.

We also propose to test the implications of the Great Red Snapper Count results using a few sensitivity runs, which we have based on SEDAR 52 assessment model results, and so one thing that we propose to do is to evaluate the effect on the stock assessment catch recommendations of fitting to that Great Red Snapper Count abundance estimate inside the stock assessment model, just to get at a new ABC recommendation from the existing stock assessment framework and assumptions.

The second sensitivity we propose is to demonstrate what effect fishing at that new ABC recommendation from the interim assessment would have on the stock biomass trajectories under our current SEDAR 52 modeling assumptions, and so, basically, if we fished at that new ABC recommendation, what do we think the biomass trajectories would look like east and west of the Gulf of Mexico?

Then, for reasons which will appear in the next slide, we also would like to look at an exploration of the effect of a presumed higher reference point, such as SPR 40, and I will get at that conversation here in a moment.

We have a number of concerns and caveats that we would like to bring up to the SSC now for their consideration, and one, of course, we've already touched on, which is that comprehensive documentation of the Great Red Snapper Count methods and assumptions is not yet available to us, and, when we present this information, we are likely to be using those Great Red

Snapper Count estimates at face value, and so we won't really have the information we need at the Science Center to be certain that we couldn't have used a different -- The approach that we're offering is the best possible approach, and let's put it that way.

You have heard, now, that the Great Red Snapper Count suggests that the abundance of red snapper is about three-times higher than our SEDAR 52 estimates. I do want to point out that the estimates from the stock assessment and from the Great Red Snapper Count are actually quite similar on high relief and structure, and that is where the bulk of the data that goes into the SEDAR 52 assessment -- That's where they're from, and so those estimates are actually quite similar.

Where the Great Red Snapper Count differs is that it suggests a very large amount of the cryptic biomass of red snapper are on these unclassified, uncharacterized bottoms, and I apologize for using the incorrect terminology here, but, presumably, that large, cryptic biomass has always been out there, and it's not a new feature of the population, and so, basically, the Great Red Snapper Count would suggest that we have chronically underestimated the biomass of red snapper, because our data do not extend to these areas with the unclassified bottom.

In addition, we have a complicating factor, which is that the historic removals are also under evaluation, and it's very likely that they are higher than previously assumed, because, for example, we'll be moving from the SEDAR 52 estimates, which use the Coastal Household Telephone Survey, to the FES estimates, or possibly, in the future, to state survey estimates, and so we have a number of factors here, which may change our perceptions about the productivity of this stock in future stock assessments.

For example, if a much higher standing biomass of red snapper produces similar amounts of recruits, perhaps the productivity of the stock is less than we had previously assumed, in which case we might need to reevaluate the choice of the reference point, which right now is SPR 26.

We also want to point out that the biomass on this uncharacterized bottom may be substantially less accessible to fishing, and, therefore, increasing an ABC using the approach that we are proposing here, while it could be sustainable, in that it won't cause overfishing of the stock, could lead to localized depletion in the areas on high-relief habitat that are heavily fished, and so that's kind of the intention of one of

our sensitivity runs, is to examine how likely it is that we would start to see some changes in the abundance of fish in the east, for example, where they focus more -- Well, let's just say that, in the east.

We do have a way forward, which would require us to use, essentially, the numbers of fish produced by the Great Red Snapper Count and the fishing mortality from the SEDAR 52 stock assessment. It would require us to essentially use those numbers at essentially face value, and so that's what we can do, and that's what will be available for your consideration in March, and now I will open the floor to questions.

CHAIRMAN POWERS: Thank you, and so the upshot of this is that we, the SSC, would make a determination in March of that ABC for some specified year is the best available data or not.

DR. CALAY: That's correct, and so this -- Basically, we are willing, and we have been asked, to produce these results, and we will. We have the methodology, but we will not know, at that point -- We won't have a recommendation yet for best available science. I mean, that's going to have to come from a simultaneous review of the Great Red Snapper Count information itself as well as our methodology, and I suppose that burden right now is on the SSC.

CHAIRMAN POWERS: Thank you. Any comments or questions?

DR. LORENZEN: Thanks, Shannon. I have sort of really, really major concerns about the Variant 1, and I want to discuss that a little bit, and, firstly, I think it's important to realize that the fishing mortality at-age pattern from SEDAR 52, of course, is conditional on the biomass estimates in SEDAR 52, and so, in my mind, one can't just take that mortality rate, fishing mortality rate, and apply it to a totally different biomass estimate, because, basically, what that mortality is is it tells us how the catches relate to the estimated biomass.

Basically, if you apply this to a biomass estimate three-times as large, that would, for a start, suggest that our current catches should also be about three-times as large, which they clearly aren't.

If we apply this going forward, it would give us a level of exploitation on the sort of available biomass, and, if I stick with that idea of a cryptic biomass in the uncharacterized bottom and a small really exploited biomass around structure, it would mean that we would basically subject the biomass around

structure to three-times -- Which is really the available biomass, to three-times the fishing mortality rate that we have at the moment, and I think that takes us back to the sort of level of exploitation that we have last seen at the time of the great depletion of the red snapper stock in the 1970s and 1980s, and so it seems, to me, an extraordinarily risky proposition to go that way.

The other thing that I think we need to think about is whether what we are looking at is really this biomass on structure and the large cryptic biomass elsewhere, because, from what I can gather from the information we have from the bottom longline surveys, the biomass in the uncharacterized bottom hasn't been constant, but it was very low at the time of the depletion of red snapper, and so it doesn't seem to be as independent from the rest of the biomass as may be perceived, based on this idea of the largely unavailable cryptic biomass.

Lastly, I do want to come back to the issue that there are other reasons why we might be seeing this difference, and our natural mortality rate estimate is one of those, and so, basically, I am very, very uncomfortable with Variant 1. Thank you.

CHAIRMAN POWERS: Thank you. Luiz.

DR. BARBIERI: Thank you, Joe, and Kai has already brought up a lot of the points and questions that I was going to ask, and so I will try to keep it short, but I have to say that I am also very, very uncomfortable with this process, with what is being proposed here. I just am feeling that this process is being rushed, and it's being put through an accelerated pace, and it may not be well aligned with the degree of scientific rigor and the review that something of this magnitude actually deserves.

I understand the political implications, and I understand that this study came up due to an appropriation generated by Congress and that everybody is happy with the good news, and so am I. I mean, I think all of us are very happy with the outcome, if the outcome is correct, but understanding all of this I think will take quite a bit of evaluation and review and inspection, and to think that we're going to be conducting an interim assessment by April of this year, or anytime this spring, or even summer of this year, without us even at this point that we are in January, not having had a chance to look at the report and to review everything carefully, and I know that we're going to be scheduling that multiday SSC meeting dedicated to this review, but my guess is that there will be a number of questions that are going to be generated in that meeting that are going to

require further evaluation and further discussion of a number of issues and preparation of additional products to come before the SSC.

I am not trying to exaggerate the amount of review that we would expect for something like this, because, when you consider how much we discuss, the level of detail that we discuss, each and every one of the stock assessments that come before us, I mean even the standard assessments or the updates, and all the detailed questions, because, I mean, just this morning, having the understanding of the significance of that different estimation of the landings from the assessment to the landings that shows up in the ACL tracking database, and how using just the different conversion factors from lengths to weight may be causing some of those differences in the CVs that are used to fit to landings in the assessment -- All of those things matter, and they can impact the outcome of an assessment, to a great degree.

I think that a study of this significance and importance, and hopefully with excellent news for us, highlights, really, the need for us to be extremely careful and transparent and thorough in the way that we view this process. Thank you.

CHAIRMAN POWERS: Thank you. One of my worries, of course, is that, if we were to go this route, and you make a recommendation for ABC, and it gets approved, then what do you do the next year? Things are likely to change, and how much, and there needs to be some stability in how we operate, and I think that's essentially what we're talking about, is the normal stability that we go through. Doug Gregory.

MR. GREGORY: Thank you, Mr. Chair. I concur with the previous comments that we need consistency, and this, by no means, is an interim analysis. You might call it an exploratory analysis, and it's a lot of work for the Center to go through and run the risk of us, or you all, finding something at the last minute that's off, but we can do whatever you want and bring it, and I certainly wouldn't call it interim, given as much grief as we've gotten over the years of not calling a stock assessment its appropriate category of benchmark, standard, update, operational, and this really pushes the limit, calling it an interim, but, regardless of that, I do want to point out also that -- I think it's still on books, but, in 1990, the Gulf Council prohibited the use of vertical longlines and bottom longlines inshore fifty fathoms west of Cape San Blas.

That measure put a number of Louisiana fishermen out of business

that were using vertical and bottom longlines to catch large red snapper. Now, I assume there were fishing on this uncharacterized bottom, particularly the vertical longlines that were drifting, and, at the time, I asked Phil Goodyear, who was the stock assessment analyst, what effect that may have on the stock assessment by the large fish no longer coming into the fishery and being counted.

I think he said it would be covered by selectivity estimates, but it could easily be referred to as higher mortality estimates too, or interpreted that way, but I wanted to point out that there is this segment of the Gulf that's been prohibited for vertical longlines and bottom longline gear since 1990, and that leads to your idea of local depletion in other areas, but, in general, I just think this seems premature, to jump and do all of this at this time, when we haven't even seen the data from the Great Red Snapper Count. Thank you very much.

CHAIRMAN POWERS: Thank you. Harry.

MR. BLANCHET: Thank you. A lot of what I was going to say has already been said by everybody else, and I just had one thought. While the Southeast Fisheries Science Center is developing this, and I don't know if this is possible, but talking about localized depletions, and one of the things that we're going to be seeing also with this is, if you increase an ABC, there's going to be a change in your, to put it simply, yield per recruit, so that what we have seen in the last several years, at least in the western Gulf, has been an increase in the size of the average fish, up to a seven or eight-pound average, and also an increase in the age structure.

What we have demonstrated, as Kai pointed out, is we have demonstrated the ability to pretty much limit that to ages under five in the past, and so there will be some implications, in terms of the size of the individual fish being harvested, if you increase the ABCs, and so depletion is one thing, but also yield per recruit, and, because we're talking about -- You know, we're talking about a lot of these factors that go into the local, such as how close are you to port, what's the water depth, what's the local wind conditions, et cetera, and trying to fish in south Texas is a very different situation than fishing in the Big Bend.

It may not be possible to tease that out in this brief time, but I think that, at some point, looking at what do you expect to see, in terms of your size structure of your harvest and your availability of fish to an angler or to a commercial harvester

is something that should be part of that report-out.

CHAIRMAN POWERS: Thank you, Harry. David Chagaris.

DR. CHAGARIS: Thank you. I mean, we have two competing estimates here. I mean, we have 110 million on one hand and thirty-six million on the other, but I feel like we haven't really stopped to ask why they are so different.

We sort of assume, or maybe I get the intuition that we assume, that one is superior to the other, but that's not really the question we should be asking, and, if we're always going to be tied to some stock assessment model, or some stock assessment process, that would be the next step, before we use these estimates for any type of management advice, would be to really explore the effect of this estimate within the model and try to understand what happens --

You know, what are the tradeoffs and fit to the other data when you force the model to fit through this estimate, because that would allow us to then make adjustments to the stock assessment model moving forward, which I think we're still going to have to rely on, unless this survey is going to be repeated on an almost an annual basis. I think we need to use this opportunity to really improve the stock assessment and try to understand where the discrepancies are. Thank you.

CHAIRMAN POWERS: My immediate reaction was -- Taking the results at face value, you immediately start thinking about how you would restructure the stock assessments spatially, and perhaps temporally, and what kind of movement from one area to another and so on and so forth, which is not a trivial task, and so, like I said, even if one accepts, at face value, what these results are, how one incorporates that into an assessment -- There is multiple ways of kind of looking at it. Kai.

DR. LORENZEN: The easiest way to make three-times as much red snapper in the model is to increase the natural mortality rate just a little bit, but I wanted to come back to Harry's comment, and I think what he said was very important, because, if we do move to a more spatialized representation, which I think we should, it's important to think about the fact that management also becomes more complicated, because we could have the situation where we are good in terms of the overall spawning biomass depletion, but it could be the sort of head-in-the-oven and feet-in-the-freezer type of good average, where we would end up with very depleted, very poor quality fishing on structures and a big biomass that will maintain recruitment, but not sort

of good fishing quality in those heavily-exploited areas.

I think we need to be aware of this, and we may need more complex management targets, if we go that way, because the localized depletion of biomass and the changes and structure and so on can be quite different from the population average or the situation in the less exploited areas. Thanks.

CHAIRMAN POWERS: Thank you. We have Doug Gregory, Jim Tolan, and Will Patterson. Doug.

MR. GREGORY: I will be quick. I would be quite comfortable if this was put forward as an exploratory analysis, because then it wouldn't be something we would be expected to take and run with it, and, also, to the SSC, if we want an independent review, we probably should put that in a motion. Thank you.

CHAIRMAN POWERS: Thank you. Before we move to that direction, let me get Jim Tolan and Will Patterson. Jim.

DR. TOLAN: I will be quick too, Mr. Chairman. Thank you. I just want to say thanks to Shannon for offering up something to try and -- The first thing that sort of jumps into my mind after the Great Red Snapper Count presentation, and going down this route of giving a new ABC, is that state-water allocations -- If that could be revisited, given what we've just found out about this really important area of this uncharacterized bottom, especially on the --

CHAIRMAN POWERS: Thank you. Will.

DR. PATTERSON: I fully understand the Center's moving toward trying to develop a process here, because the council has already asked them to start to do that, and, obviously, various SSC members have injected concern and tried to caution with that, and so the review and vetting of the report that is still in production will be critically important, but I just want to reiterate, or agree, with Dave Chagaris' commentary from before, and Greg and Sean and Judd on the call have heard me say this within our group, that there needs to be this process of reconciliation.

Recently, I talked to Shannon about this as well, and what we know is -- What we'll have are two estimates, one from the assessment, whether that's updated or not with the new information that we talked about earlier or whether it's still the 2018 assessment with 2016 data, and then we'll have an estimate of abundance that comes from the snapper study, and so

we know the second thing is that both of those estimates are wrong.

Neither of them will bias free, and neither of them will be as precise as we want them to be, and so both of them are wrong, and I think it's important, in the review process, to ask, well, how can this count that's been produced independent of the stock assessment be wrong, you know kick its tires and really critically examine where potential biases exist and whether the variance in the data is believable, but also then to look at the assessment and say, okay, well, if the count is more correct than the assessment, where in the assessment can there be a reconciliation, whereby the information isn't as wrong as we think it is, but perhaps an assumption here -- You know, Kai has mentioned natural mortality, and we talked about release mortality, and, obviously, the recreational harvest estimates have changed with FES, which the SSC has accepted as the best science available.

I think it's important, and I just wanted to agree wholeheartedly with Dave Chagaris' commentary about examining the assessment at the same time, or shortly after, the critical review of the report for the Snapper Count study, so that we can go through this process of reconciliation and improve, right?

I mean, most of us have worked in some aspect of fisheries management, or fisheries biology, where we have challenged, through our work, the assumptions and information that go into stock assessments. You know, that's what we do as scientists. We improve the process, and we improve the information and we move forward, and so I think that's going to be critically important component of this.

You know, obviously, there is a lot of attention being paid here to what's going to happen in the interim, or not, approach, but that reconciliation process is going to be important, and I hope it doesn't wait, or have to wait, until three or four or however many more years pass and there is time to do a research track assessment for red snapper. I think this is too important to fall victim of the assessment process, and not the process, but the scheduling issue. I think we need to speed that one up.

CHAIRMAN POWERS: Thank you. One of the things -- Well, what Doug Gregory had mentioned is that our consensus, I believe anyway, consensus about recommending a review process with outside review, that that should probably be put in the form of a motion, and I would ask -- Doug, do you have perhaps a draft of such a motion?

MR. GREGORY: Not really, and I don't recall who initially suggested that.

DR. LORENZEN: I have a draft.

CHAIRMAN POWERS: Okay. Go ahead.

DR. LORENZEN: The SSC moves to request a review of the Great Red Snapper Count results by an independent panel, including SSC representatives and CIE independent reviewers.

CHAIRMAN POWERS: All right. By Kai Lorenzen, this is a motion. Is there a second?

MR. GILL: Seconded.

CHAIRMAN POWERS: Second by Bob Gill. Is there any other discussion? We've been discussing this for some time, but not the specifics of the wording here. Sean.

DR. POWERS: I'm in favor of the motion, and, obviously, I was a PI on the count, one of the co-PIs, but the thing that gives me some pause is the CIE reviewers, just because I think that that might slow the process down a fair amount, and it's a very different type of study than the CIE reviewers usually do, and it's not an assessment, and it's the synthesis of a study, and so I think that an independent panel, including SSC representatives, would be fine, but to not include CIE reviewers specifically, and just let the council, or council staff, choose appropriate fishery scientists from the country.

CHAIRMAN POWERS: I would note that the CIE has actually done things like reviews of bluefin tuna aerial surveys, and so they are fairly broad, but I can still see your point of not being specific about CIE.

DR. LORENZEN: If I could just add to that, and so I was thinking of CIE reviewers that specialize in those types of surveys, and so it wouldn't be necessarily the people we usually have to look at stock assessments, but people who have expertise in this particular area. Thanks.

CHAIRMAN POWERS: In terms of Sean's comments, Kai, do you suggest changing the wording about CIE or other independent reviewers?

DR. LORENZEN: I guess it could be or other -- I do think it

would be good to have reviewers that are from outside the region and have good expertise in those sorts of survey methodologies, and CIE seemed, to me, to be a good mechanism for that, but I am good with CIE or other, but I wouldn't want to take CIE out.

CHAIRMAN POWERS: Okay. Thank you. Ken Roberts. Ryan, do you have a quick comment, while Ken is unmuting?

MR. RINDONE: I'm here, Joe. Sorry. We're chatting at each other here in the office. As far as recommendations for representatives and/or other people, the latter part of that, the other independent reviewers, have been doing the SEDAR reviews and the SEDAR work now for about ten years, and I've got a pretty decent list of people I can think of that would be appropriate for taking a poke at this, and so I think that, between that and the expertise of the SSC, and just the fisheries science community as a whole that the council works with on a regular basis, I think finding independent reviewers should not be the difficult part of this task, and so I have good confidence there that we would be able to find some people to help with this. That's all.

CHAIRMAN POWERS: Ken, are you back yet?

DR. ROBERTS: The only comment I have here, and maybe it doesn't have to be in the motion, but perhaps in a bit of discussion, and it has been mentioned that there is a timeline involved in all of this, and it might be worthwhile to have some discussion or entrance into the motion that this be completed by a certain period of time, a certain date, but that's my comment. Thank you.

CHAIRMAN POWERS: Thank you. It stuck me too, and whether we put it in the motion or not, but there's an expectation here, I believe, that this would happen before it gets presented to the council. I'm not sure if that can happen, given that the report isn't actually available yet. Jim Nance.

DR. NANCE: In thinking here, other independent reviewers, you've got the National Academy of Science, and I think they would be appropriate, and I think the key is just to get some outside the region independent reviewers, and that's my input.

CHAIRMAN POWERS: My experience with the National Academy of Science is that the timeline of that would be hard to do within a six-month period even, but I'm not sure about that.

DR. NANCE: I'm not either, Joe.

CHAIRMAN POWERS: Luiz.

DR. BARBIERI: Thank you, Joe. I want to go back, if I may, to Shannon's presentation, or the outcome of her presentation there, and ask a question in the context of this motion. Shannon, I know this is a hard question, and you may not have a response right off the top of your head, but, I mean, looking at this presentation, the variants and the exploratory runs that you presented here, the Center has been investigating ways to get this interim assessment completed, but it hasn't really been able to converge towards what will be a more definite process, or analytical process, to get this done. Do you have any idea if you would estimate having that better defined by the spring?

DR. CALAY: There's been a challenge with the timing, because the Great Red Snapper report is not due until a little bit later in this process, and so we've been working collaboratively to get some of the preliminary estimates from the team, and, to date, the full data and estimates are not available to us, nor is the documentation, and so we have a limited set of data in front of us, and so we've been able to only hypothesize about approaches that could be useful. If we had the full suite of data, with the full documentation, and it had been peer reviewed, there might be additional approaches that could be explored.

DR. BARBIERI: Right. Yes. Thank you.

CHAIRMAN POWERS: Kai and then Jack Isaacs.

DR. LORENZEN: This was actually -- I don't know if my hand was still up, but I don't have anything to add.

CHAIRMAN POWERS: Jack Isaacs. While we're waiting, Bob Gill, unless you're trying to call the question.

MR. GILL: No, Mr. Chairman, I'm not.

CHAIRMAN POWERS: Okay. Jack Isaacs, and then we'll get to Bob Gill.

DR. ISAACS: I was just wondering if the motion should include something about trying to find reviewers outside of the region or if it's sufficient as-is.

MR. RINDONE: Staff understands, if that's what it's a matter of.

CHAIRMAN POWERS: We have developed a record of what our desires are, through our discussion.

DR. ISAACS: All right. Very good. Then we don't need to go that route. Thanks very much.

CHAIRMAN POWERS: Bob Gill.

MR. GILL: Thank you, Mr. Chairman. **I agree with Ken Roberts' comment, and I wonder if we could accommodate that, Kai, by a friendly, by changing "request to review" to "requesting an expedited review".**

DR. LORENZEN: I am good with that. I would add, also, that I think Will Patterson suggested to me a friendly amendment that would add "independent reviewers with expertise in the methodologies used", and so this makes it explicit that we're looking for people.

CHAIRMAN POWERS: Thank you. Sean and then Carrie, and then let's vote on this after that. Sean.

DR. POWERS: I just wanted to bring up the point of do we want this review to include what the Science Center is going to do in their proposed methodology, because it does have the actual review of the Red Snapper Count, but, in some ways, speaking as one who is familiar with the count, I also would love to get input from outside on some ideas on what to do with -- Whether this reconciliation, for lack of a better word, the Science Center plans is a good idea or not. It might be a good idea to just comment on the methodology they propose.

CHAIRMAN POWERS: I would not want that in this motion. To me, that's --

DR. LORENZEN: No, and, I mean, Sean, I struggled with the same, and I think we are looking at both, but I think this should be a stand-alone thing, and anything that the Science Center might do in the short term I think would probably be -- Let's say sort of simple enough that we could deal with that in an SSC review, where, here, we're talking about a very in-depth review of this major piece of research. Thanks.

CHAIRMAN POWERS: Thank you. Carrie, did you want to say something before we vote?

EXECUTIVE DIRECTOR SIMMONS: Thank you, Mr. Chair. I think we

understand this needs to be expedited, and the council has been asking about this. We were generally aware of the methodologies that have been presented in the presentation, but, I mean, I would ask again. When will the final report be available for us to look at and try to organize this, because this is -- We need to get that information to get this organized.

CHAIRMAN POWERS: Yes, and that needs to be decided very quickly. When you're talking about the final report, you mean the final report of the Great Red Snapper Count?

EXECUTIVE DIRECTOR SIMMONS: Yes, and so I guess that's to Dr. Stunz and his team.

CHAIRMAN POWERS: All right. Greg, do you want to mention a date, or should we sort of -- I mean, is there a date where we can all be reasonably assured that we can look at this?

DR. STUNZ: I don't have a specific date, Joe, when it will be available. We're working on it as fast as we can. I mean, I'm projected to have it done here in just the next few weeks, or by the end of the month, but, you know, I can't -- I don't know that our team can be pinned down to a specific date at this point.

CHAIRMAN POWERS: All right. We have the motion on the board, and we've discussed it thoroughly. **Is there any objection to this motion?**

DR. PATTERSON: Joe, I don't object, but I abstain from this.

CHAIRMAN POWERS: Okay. Thank you. **With that, the motion carries with one abstention.** All right. One of the things I think we, the SSC, has to be prepared for, with or without this review, is that the Center will be directed to do something like one of the renditions that Shannon has presented.

That will be brought back to us, the SSC, and we will have to make a determination about what that ABC is for some period of time, and so I think all of us should be prepared to have the background to make our decisions relative to that and be prepared to actually make that decision, up or down. Luiz.

DR. BARBIERI: Thank you. Just to clarify, Joe, I thought that Shannon had mentioned that the Center is in the process of working on these proposals and developing more detail on the proposed approaches and that a proposal, a comprehensive proposal, explaining what they have in mind in more detail would

be brought back to the SSC for review and approval, and is that correct?

CHAIRMAN POWERS: I am not sure.

DR. CALAY: Luiz, we are limited to the data that we have received to-date, and so the approaches that have been outlined -- Really only the first can be done without making additional assumptions and using proxies, and so we intend to bring to the SSC in March -- We are obligated to bring, because we have a council request in place, one of those methodologies with any concerns or caveats that might be associated with it.

In addition, we've talked a little bit with Clay and John, and we are also prepared to bring, as a contrast, the standard interim assessment approach, which just uses an index of abundance to adjust the previous assessment result, but, given the time constraints, that's all that we can do at this time, and so the more comprehensive examination that you're referring to could continue, but, until that peer review has been conducted, we can't really make substantial progress.

DR. BARBIERI: Got it. Thank you, Shannon.

DR. CALAY: Thank you.

CHAIRMAN POWERS: Thank you. Ryan.

MR. RINDONE: Thank you, Mr. Chair. I have been asked by a couple of folks to try and elucidate a little bit about the current timing, and so, right now, we have a tentative SSC meeting on the books for March 23 to 25, which was the meeting for which I think the Science Center was aiming for being able to provide this interim analysis, and the council meeting is a couple of weeks after that.

It may be possible to fiddle with the date of that SSC meeting a little bit and maybe push it back a week, but, if the goal is to meet that April 12 to 15 council meeting, like others have said, it is really putting a lot of assumptions on when things will be delivered and whether or not certain things will be possible, and adding a formal review of this nature in the time window that we're talking about, between now and then, and getting people together and getting them all the materials -- It just -- I am not saying that -- I don't know whether that's going to be possible, and so I'm just asking you guys to consider those sorts of things, about the timing and whatnot, as we're moving through this and thinking about all of this.

CHAIRMAN POWERS: I am skeptical about all of these pieces falling into place, which is why I made my comment that we, as individual SSC members, should be prepared for something less than optimal and that we should be prepared to individually justify our own positions relative to what an ABC might be based on on the Red Snapper Count. Thank you.

Can we move to amberjack? The next agenda item -- I forgot what the number was, but it was basically the amberjack research discussion that Dr. Lorenzen, Kai, was going to present us, I believe, and can we go ahead and move into that?

DR. LORENZEN: It's the last item for today, right?

CHAIRMAN POWERS: Unless we can -- We can't move anything from tomorrow up to today, can we, Ryan? I was thinking of the overage discussion.

MR. RINDONE: That is still scheduled for tomorrow. You mean the carryover thing? That's still for tomorrow. Dr. Stephen is scheduled to present that to you guys tomorrow. We already moved the mutton thing up, and we dealt with that. Dr. Murawski and Dr. Barbieri are both also tomorrow, with their presentations.

CHAIRMAN POWERS: We also have to deal with the ABC for amberjack.

MR. RINDONE: Which is also tomorrow, and so, yes, today, we just have Kai's discussion of the Sea Grant and NMFS greater amberjack research program, and then that ties us off for today.

CHAIRMAN POWERS: Okay. Kai, you have the floor until we get tired of listening to you.

DISCUSSION OF SEA GRANT/NMFS GREATER AMBERJACK RESEARCH PROGRAM

DR. LORENZEN: Okay. Do you want to -- You have brought the presentation up, and I am happy to go with that, if you want to show it.

MS. MATOS: It's up to you. Do you want control, or do you want me to keep it?

DR. LORENZEN: No, I think it's fine, and there is nothing fancy. I will just tell you when to advance. Let me start by saying that we -- When we put this on the agenda, it was sort of

a little unclear whether the RFP would have been released before now, and it was due to be released on the 4th, and I believe it's now due to be released on the 8th, and so what I wanted to do here is to give you a bit of background on the visioning for this program.

The reason we moved it to now, after we have had the discussion about the Great Red Snapper Count and the incorporation of the Great Red Snapper Count into assessments is that this is sort of really, in a sense, the follow-up of the Great Red Snapper Count, focused on greater amberjack, and I think moving it to this spot has been very useful, because you now know what the starting point here is, and I think we may be able to distill some additional recommendations for the amberjack research program from this discussion.

A quick overview of the greater amberjack research program, and it's a $10 million sort of multiyear research program implemented by the National Sea Grant Office and NMFS. It's managed by the seven Sea Grant programs from Virginia to Texas, with Mississippi-Alabama Sea Grant as the overall lead, and Florida Sea Grant was asked to do a regional visioning process for this program.

The goal, overall, of this program is to develop additional data sources, assessment approaches, and knowledge to improve agency and agency-independent estimates of the abundance of greater amberjack throughout its range. Range here should be read as range within the continental U.S., and so it covers the Gulf and the South Atlantic, but it doesn't cover the Caribbean or the oceanic islands or anything.

The research program is divided into three phases, and there was a visioning phase that is just about to conclude, and then there is the implementing phase, where basically a request for proposals will be issued and research done, and then there's a documenting phase, where the research results will be documented and passed off into use and assessment and management.

For the upcoming implementation and documenting phases, the Mississippi-Alabama Sea Grant is in charge, and, for the visioning phase, Florida Sea Grant took the lead on that, and there is a steering committee that acts throughout that whole program, and so, among the people we have on the call here, Carrie Simmons is part of the steering committee, for instance, and so she may be able to answer any questions that pertain specifically to the steering committee.

I participated in the steering committee calls, but I'm not technically part of it, and so we're having a bit of a separation of church and state here, and the visioning feeds into this process, but the steering committee is ultimately in charge.

For the visioning phase, we identified recommendations from several sources, and one of those was the congressional intent, review of existing information, a situation assessment, and, basically, we conducted stakeholder interviews throughout the region, asking people about their perceptions of the state of the fishery, the management, the use of science, and so on, and so we did this very broad situation assessment.

We then developed a set of research recommendations that we too took to regional listening sessions for feedback and eventually derived a set of core recommendations that are really a reflection, partly, of the very broad-based information gathering from stakeholders that we did and review of existing information and partly a result of what was understood to be the congressional intent of this program, because the intent of the program wasn't to spend $10 million on anything that makes sense in the context of greater amberjack, but it was understood to place a strong emphasis on obtaining an absolute abundance estimate and building on the methods developed for the Red Snapper Count.

We accommodated that by essentially combining the information we gathered from stakeholder interviews and reviews and on so with the understanding of that intent, and so what we have ended up with is a set of recommendations that essentially set out -- Recommendations for how this program should be structured or what it should address, in a sense as an adaptation of what was done for the Great Red Snapper Count.

This slide just gives you the regional listening sessions that were held, and I do want to say that we did interview a number of SSC members from our SSC and the South Atlantic SSC as part of the original stakeholder interviews, and other members participated in some of the listening sessions, and so there has been some interaction with SSC members throughout this process.

Now what I want to give you is the big-picture recommendations that we provided to the steering committee, and number one is what we call the big three, to estimate absolute abundance and characterize distribution and movements throughout the continental range of the greater amberjack, and so this does emphasize absolute abundance, but, at the same level, it

emphasizes understanding distribution and movements.

The rationale for that was that greater amberjack stock components show extensive seasonal movements, which must be accounted for when interpreting local abundance estimates, and, also, the distribution and movement information will help address stakeholder concerns about different regional conditions and more regionalized management.

Regional exploitation rates can be estimated alongside movement, for example in tagging studies, and will provide further important information, and that an integrated suite of visual and acoustic survey methods and tagging programs can address these three.

I think, when you think over the discussions we are having now about how to utilize the information that is coming out of the Great Red Snapper Count, you see that understanding of distribution movement and exploitation rates is really central to making sense of the absolute abundance estimate and how that information can be used in management, and so our recommendation here reflects that, and, effectively, it asks for the distribution and movement and exploitation rate components of that research to be upweighted somewhat relative to the absolute abundance estimate, rather than having that as the one main thing, and it's those several things that have to be tackled together.

The second is that there were a number of issues brought up to do with surveying greater amberjack that are somewhat different from issues encountered with red snapper, and so we're saying here that it's important to address those issues, and that includes difficulties differentiating greater amberjack from similar-looking species, behavioral responses to survey equipment, which seem to be much more pronounced in greater amberjack than in red snapper, use of the full water column, and accounting for these issues clearly is critical in developing survey approaches. Also, there was a suggestion to include some routine eDNA sampling with the survey, just as sort of an independent check on estimates and species identification and so on.

Then the suggestion was that the applicants for funding under this program should be tasked with designing the specifics of an approach to address the big three, and so the abundance, the distribution, and movement that is appropriate to greater amberjack, and the rationale for that was that estimating abundance and characterizing distribution and movements

appropriately poses some challenges, given that we have more limited a priori information on stock structure and movements, and the known challenges that we have for red snapper, for example, and, basically, it's saying that, rather than specifying this down to the smallest detail in the RFP, the applicants should be tasked with developing approaches that will address these challenges and provide appropriate justification.

Overall, the approach should build on what was done in the Great Red Snapper Count, but it also needs to allow for modifications that account for important differences between red snapper and greater amberjack.

Then we encouraged auxiliary sampling for life history information and age composition and future genetic studies, because the information on greater amberjack life history reproductive parameters, like growth, natural mortality, and age composition are comparatively poor, and improving life history and age composition data has been identified in many SEDAR and council research recommendations.

Samples of fin clips can easily be collected for future genetic studies, and so, of course, is this similar to what was done, as I understand, in the Great Red Snapper Count, and moderate funding allocations for auxiliary sampling can help address some of those long-standing recommendations.

Then we encouraged synergies with other and existing efforts, and so there are many related ongoing survey and sampling efforts, as well as parallel, and so there is the South Atlantic red snapper count on the same timeframe, and there is previous information, for example, from the red snapper count in the Gulf and the Louisiana reef survey and the BOEM survey that have information on greater amberjack, and applicants should be encouraged to explore and leverage such synergistic efforts, to basically enhance returns to investment.

Then there were a number of things that came up that were sort of more distinct studies that were brought up by stakeholders in our consultations, and so one of those was discard mortality, which was frequently mentioned, and it was subject to very different perceptions, and so some people felt there was very little discard mortality in greater amberjack, and others felt that there was a really major issue, and it seems that depends on where you fish and how, and so that was flagged as a priority.

It was also a priority, I think, in some of the research

recommendations from SEDARs, and recent increases in shark depredation were frequently mentioned, and there were suggestions to include that in some studies, and, also, identification of spawning aggregations in space and time, with respect to management, was brought up.

Where we are is we made these recommendations to the steering committee in December, and, in fact, we gave them this same presentation, and we also actually basically edited an initial RFP document, with these recommendations in mind, and then handed them back to the steering committee, and I will say I do not know what the steering committee has done subsequently, and so you will probably see some of those recommendations implemented in the upcoming RFP, but not all of them.

We are still working on more detailed reports on some of those outputs, and that will include information on additional research priorities and management issues that are deemed outside the scope of the greater amberjack research program, but we don't want those things to be lost, because, for example, those interviews, which we conducted with close to ninety stakeholders across the region, provided a lot of useful information that we don't want to be lost.

The visioning team will continue to monitor the SSC review of the Great Red Snapper Count, as we're doing right now, and its use in interim management advice and to identify possible lessons for the greater amberjack research program, and this is really, perhaps, a question that I want to pose back to the SSC here. Are there things that, having looked at the previous presentation and discussions, are there things that we should add as recommendations here for the greater amberjack research program?

I think that concludes it, and this just shows the visioning team, and you can see there is a bunch of us from Florida Sea Grant at UF, and then there were Sea Grant people from throughout the regions who did the interviews and the listening sessions and so on. This is just gives you the reference to the visioning page, where the remaining products will turn up, in due course. Thank you.

CHAIRMAN POWERS: Thank you. It sounds interesting. Are there questions? Luiz.

DR. BARBIERI: Thanks, Joe, and thanks for the presentation and review, Kai. Just out of curiosity, to understand how this ties into our regular process for fisheries assessment and management

in the southeastern U.S., are you aware of the reasons behind this study? I mean, what is it trying to achieve on a bigger-picture scale, meaning we know we just reviewed the stock assessment for greater amberjack, Gulf greater amberjack, this week, and we know that we have a species that has a lot of data needs, data gaps, that need to be filled.

Were those things -- Do you know if those things were taken into account, or this is a lack of trust on the current assessment results and a way to try and bring a separate number, kind of similar to what happened with the Great Red Snapper Count?

DR. LORENZEN: All of the above. When we started this process, we started out with a very broad look at research recommendations and so on, and I think, if I can give you the lowdown on the really where this is coming from, it's sort of a continuation of the quasi-earmark that was there for the Great Red Snapper Count, and it's sort of using basically the same mechanism and applying that to a different species.

I don't know how they came up with greater amberjack, and, in fact, some of the stakeholders we interviewed sort of expressed a bit of a surprise, and it was, well, I don't understand why anyone would spend $10 million on greater amberjack, quote, unquote, but one of the reasons is to do with the fact that the stock has been overfished and undergoing overfishing for a long time in the Gulf, and it was extended into the South Atlantic, where the situation is very different, and so the South Atlantic stock is less heavily exploited.

I think the -- I did mention, and it was made very clear to us, by both the National Sea Grant office and the NMFS leadership, that the intent was similar to the Great Red Snapper Count, in the sense that Congress wanted an independent estimate of numbers, and that's where the big emphasis on an absolute abundance estimate that can be compared to the stock assessment comes from, but, also, that would contribute to information to future assessments, and we have done our best here to emphasize that research recommendations that were highlighted in the SEDARs, for example, and in council priorities should be worked into this program, and so that's -- Most of those were to do with things like maturity, and possibly estimating natural mortality, and things like that.

Those recommendations, of course, did not ask for an absolute abundance estimate, and they were more biological information, akin to the information that we typically incorporate into stock assessments, and requests for more extensive monitoring, long-

term monitoring, data, which is somewhat outside of the temporal scope of this very short program.

DR. BARBIERI: Right. Okay. Thank you so much, Kai.

CHAIRMAN POWERS: Thank you. Bob Gill. Then Will Patterson.

MR. GILL: Thank you, Mr. Chairman. Thank you, Kai, and I may have missed it, but would you talk about the participation in the workshops, the range of participants in all those workshops, and was it high or low? How was it?

DR. LORENZEN: In the -- I don't remember all the exact numbers, but I would say, in the final listening sessions, it was not super high in range, from a handful to about twenty, but I do want to emphasize that we did do in-depth interviews with close to ninety individual stakeholders, and I'm talking about hour-long, or longer, interviews, and that was fairly evenly distributed throughout the region, and it had about thirty each of commercial and private recreational and charter stakeholders in the fishery, as well as some researchers and managers, and so there was quite a lot of input from that side.

MR. GILL: Excellent. Thank you, Kai.

CHAIRMAN POWERS: Thank you. Will.

DR. PATTERSON: When Kai mentioned the big three here, and the number-one being an estimate of greater amberjack abundance, when I read the early materials on this from Congress, and then from Sea Grant, when they were soliciting proposals from the various state Sea Grants about who might lead this, given it went from North Carolina to Texas, I didn't see that idea of abundance being sort of the central issue.

I was encouraged by that, because greater amberjack is not red snapper. There have been more studies and more work done on red snapper than maybe any fish in the world, and there could be another one out there, like Atlantic cod, or bluefin tuna, maybe, but, anyway, we just have a multitude of studies and information on red snapper, and we have an incredibly data rich, highly-parameterized stock assessment for red snapper.

As I look at this, I think about greater amberjack, and, on the one hand, we just reviewed an assessment that there was quite a bit of uncertainty that we discussed, and we had debates about best available science and what's going on with amberjack and why are we always on this same loop, it seems, like Groundhog

Day, with greater amberjack assessments.

Maybe, in that context, an independent assessment of abundance would be quite useful, and the red snapper project was twelve-and-a-half-million dollars, and this amberjack project is supposed to be -- It's funded for $10, with some of that money already removed for this visioning process, and it also is 50 percent greater shelf, including the U.S. Atlantic coast from North Carolina to Florida.

I mean, it's going to be tough to pull off an abundance study on amberjack, for the behavioral issues and lots of other things, but it's also -- You know, there's so much unknown about their biology and their migratory patterns, and I don't know. Just putting those into the category of other information that could be collected, it seems to me that that should be the focus of this, is the biology of the fish and trying to estimate some of these basic biological parameters that we don't have, and that could have a much greater impact on the assessment and the management of amberjack, and that's what I read in the material that I saw, was improving the assessment and management of amberjack, but maybe I just missed what the ultimate goal of this was, or is.

DR. LORENZEN: Well, I don't disagree with that view, and I think we really upweighted the movement and migration aspect here, and so remember that is part of what we call the big three, and that, I think, is something that really came out of the visioning as a much greater priority than was perhaps anticipated originally.

We did have multiple calls with Sea Grant leadership and with the Science Center and so on, and it was made very clear that the read of both of those on this request was that an absolute abundance estimate was sort of the highest priority, and I don't necessarily personally agree with that, but what it made clear to us, I think, is that we had to work as much of those other identified priorities into this program that basically came out with a very strong prior on producing an absolute abundance estimate, and I think we have done that, to the extent possible.

As I said, there is emphasis particularly on movement, and there is emphasis on bringing that basic biological information in, and I would say, also, that we did have quite a broad range of priorities for biological information, and there was not one particular thing that stood out, and so it wasn't like, well, we have identified this and this and this as really much more important than getting an absolute abundance estimate also, but

there was quite a broad range of things that we don't know well, and we have sort of aimed to combine as much of that as possible with this major thrust to have an absolute abundance estimate.

I think it's a bit of a compromise between the congressional intent and the other considerations and priorities that were previously identified, but I do think that the overall recommendations here will serve to give us a good amount of useful information.

DR. PATTERSON: Thanks, Kai.

CHAIRMAN POWERS: Thank you. Any other questions or comments?

DR. LORENZEN: If I can add sort of one thing, and I think Luiz asked about how does this relate to our normal processes, and, of course, I have thought about that too, because this is a little bit outside the way we usually do things with requests from the SSC or the council to provide certain bits of information and so on, and this originates from a congressional request.

One thing that I think is clear, from looking at how the Great Red Snapper Count unfolded and the incorporation into management that we're discussing now, is that -- Maybe one of the lessons from that would be to say maybe there should be more involvement of the SSC, SSC members, outside the contractors or grantees here, in the design and analysis of the study, so that, instead of having the situation where, at the very end, we are presented with a report as-is, to bring this more into the usual process we have, with people being involved in multiple stages of an assessment.

This is not an assessment, because this is sort of really more of a data collection exercise, but it's a question I have been sort of struggling with a bit, is how we can bring this more into the normal process of doing things.

CHAIRMAN POWERS: Thank you. What congressional delegation was the driving force behind this?

DR. LORENZEN: I believe Alabama.

CHAIRMAN POWERS: Okay. You can kind of -- Judging that, you can kind of guess, in terms of what the expectations are in the overall objectives, and so I think it's important to know that.

DR. LORENZEN: I think Senator Shelby was the main protagonist.

CHAIRMAN POWERS: All right. Good. Any other questions about this?

DR. GALLAWAY: Joe, if I may ask a question.

CHAIRMAN POWERS: Sure.

DR. GALLAWAY: Kai, the Great Red Snapper Count pointed that that different methodologies were required in different regions, owing mainly to factors such as turbidity, et cetera. Will there be more of a regional context to this study, or will it still be managed as one large project with many participants working under a central management scheme?

DR. LORENZEN: That is -- So we did bring out those regional differences, and those were brought out within the Gulf, but also, in particular, between the Gulf and the South Atlantic, as you can imagine, and how -- In terms of the contracting, how that would be dealt with, I don't know, and that's something that is now up to the steering committee, and so we were not asked to examine that, and we were looking at what should be the science components of this.

I don't know how that -- What that will look like when the call comes out, and I think one could imagine a separate South Atlantic and Gulf team, or one could imagine something combined, and, also, I think there is a tension, obviously, between the need to coordinate, and not only coordinate, but to cross-calibrate and so on between regions with different characteristics and so on, and, at the same time, having approaches that are most suited for those places, and, in principle, I think that need is a little separate from how you organize it.

You could have the model of the Great Red Snapper Count was one big team, but there is actually a fair bit of regional variation, down to sub-teams, and, to my mind, one could do the same thing with a larger number of smaller teams that somehow have to coordinate, or one could do it with a big team that has sub-components, but that was left to the steering committee to consider, and so we didn't look at that aspect of how to organize it.

DR. GALLAWAY: The main reason for that question is it bears on the proportional cost that is dedicated to management versus science and how that is best approached to maximize the science, and so that was part of the reason for the question. If there's

one group managing, it's a pretty full-time job, I'm sure, and Greg could probably give another talk on that.

CHAIRMAN POWERS: All right. Thank you. Any other questions with this? If not, then I think we're done for the day, but, before we do, let me ask a question to either Dr. Siegfried, Katie, if you're on, or Shannon. Do we still have the expectation of getting the amberjack information first thing in the morning?

DR. SIEGFRIED: Yes, that's correct.

CHAIRMAN POWERS: What I would like to do is have it available for people first thing in the morning, and then, while the other talks are going on, we can multitask and kind of take a look at it before whatever presentation you make, just to kind of make -- - I am trying to get everybody -- To make sure we're up-to-speed as soon as you begin your presentation, and so if that's possible. Thank you.

With that, then we are done for the day, and tomorrow we have the remaining items, which were the Steve Murawski, the gag grouper, the amberjack, and the carryover. I believe we made the agreement to begin with the protogynous gag grouper presentation and Dr. Barbieri. Thank you, and so we'll meet again at nine o'clock in the morning. Thanks.

(Whereupon, the meeting recessed on January 6, 2021.)

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January 7, 2021

THURSDAY MORNING SESSION

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The Meeting of the Gulf of Mexico Fishery Management Council Standing and Special Reef Fish, Ecosystem, and Socioeconomic Scientific and Statistical Committees reconvened via webinar on Thursday morning, January 7, 2021, and was called to order by Chairman Joe Powers.

CHAIRMAN POWERS: Good morning, everybody. Welcome to the third day, final day, of the meeting. We have a number of things on the agenda today, and they are the presentation and discussion relative to gag grouper by Dr. Barbieri, the habitat research presentation and discussion by Dr. Murawski, discussion of

carryover presentation by Dr. Stephen, and then addressing the amberjack OFL and ABC, and public comment.

We're going to go until we're finished, and I wasn't planning on breaking for lunch or anything, and so we'll have appropriate ten-minute breaks, but we'll just go until we're finished. First off, have those projections been made for the amberjack?

MR. RINDONE: They have, and they should be up on the website, and I think Jess sent them around to everybody, or she's about to.

CHAIRMAN POWERS: If you could email them to me, because, while I'm talking, I don't want to be searching around the website.

MR. RINDONE: They will be on way momentarily.

CHAIRMAN POWERS: All right. Thank you. Then let's begin then with the Testing Assumptions about Sex Change and Spatial Management in the Protogynous Gag Grouper. First is the presentation, and then we'll get into discussion. Dr. Barbieri.

REVIEW: TESTING ASSUMPTIONS ABOUT SEX CHANGE AND SPATIAL MANAGEMENT IN THE PROTOGYNOUS GAG GROUPER, MYCTEROPERCA MICROLEPIS

DR. SUSAN LOWERRE-BARBIERI: Thank you. First, I would like to thank all of you for being willing to let me stick with this morning spot. Yesterday afternoon was overscheduled, and it did in fact blow up, and so it was really helpful that you guys were willing to do that. I will try and keep this as short and sweet, so there's time for discussion, as possible. I know you've got some extra things you're going to fit in today.

The bottom line is really looking at what are the drivers of sex change in gag, how many are out there, and so the sex ratio, male sex ratio, and does it matter.

A little background, and not so much about me, but my research, in terms of reproductive potential and putting it into this ecological concept of reproductive success and how babies are made in marine fish is really quite different, or at least in terms of the traits that impact population growth is quite different, than what you see in something like whitetail deer, and spatial and temporal traits can have a really big impact on reproductive success, basically where and when you spawn.

There have been a number of fairly recent papers coming out

highlighting that there may not be a really strong relationship between adult abundance and recruitment. I think anybody who has dealt with spawner-recruit relationships is already familiar with that, and genetics also supports this, that you have a lot of fish, adults -- You can have a large adult census abundance without necessarily having proportional numbers that actually produce offspring that survive.

This led to this concept of the reproductive resilience paradigm in a paper, or a couple of papers, but this paper that really targets this. I am working with some brilliant, much smarter than me, scientists to bring this together, and Claire Paris has done a lot with the early life history work, and Steve Cadrin has done a lot with modeling and the importance of spatially-explicit stock assessments and a geneticist.

The idea being, again, that there are these traits, in addition to fecundity, or adult abundance, that will have a major impact on reproductive success and population growth and that they need to be considered -- That they will be species-specific and that they need to be considered in some cases, with gag really being the poster child for this, in that they have a very complex spatial ecology, and they are also protogynous species, and so they start out as females, larger older fish turning into males, and there is some concern about low male sex ratios and sperm limitation.

The way I set up this talk, and, in all honesty, I was desperately trying to remember what I said in this talk this morning, before signing on, and so I'm going to refresh a little bit, or just review, the results of the 2014 assessment and what were considered knowns and known unknowns at that time, and then I will get into our study and what we found, and then some thoughts, in terms of putting this into perspective with other protogynous species and the need to integrate combined sexes to estimate reproductive potential in gag.

I think a lot of you, if not all of you, were involved or reviewed the 2014 gag grouper stock assessment. The big take-home message was that you got very different results, in terms of stock status, if you used female only or combined sexes as a measure of reproductive potential.

The combined sexes did not seem realistic, given that it suggests that gag have been overfished most of the whole time since the 1960s, and there were some estimates of only about 2 percent male sex ratios out there, including based on the ages and age at transition within the stock assessment, but the two

studies that were showing that had really low sample sizes, and so, taken all together, it just didn't seem like this was a realistic picture of what was going on, given that there have been MPAs put in place to protect gag spawning aggregations and the males, which are believed to stay out there year-round.

There were a number of uncertainties identified. One was that really rapid increase that was associated with two year classes, 2006 and 2007, and headboat indices, and there was some concern that maybe that was being overly weighted. Obviously, the female versus combined sex is SSB, and the video and catch-based indices did not show much agreement, and the stock-recruitment relationship for gag is fairly uninformative, and steepness was set at 0.85.

In terms of ecology and what was accepted at that time, as I mentioned, they are protogynous, and they are believed to aggregate to spawn at the shelf edge and that males remain in these deeper waters, where females migrate back to shallower water and undergo spawning migrations.

They are believed to form spawning aggregations from December to May, with peak spawning in February and March. They have a long pelagic larval duration, and it just seems crazy that they spawn at the shelf, but have nursery areas in the estuaries. It's a long distance, and a long time, and lots of time for their offspring to die in between.

Sex change is believed to occur only on the spawning grounds, or almost exclusively on the spawning grounds, and to be mediated by social interactions, male abundance or relative size of the fish within the aggregations, and that this would occur within the spawning season or just after it.

Once a fish had gotten the cue to transition to male, it would act like a male and remain on the spawning grounds. These were the concepts that led to the belief that forming marine protected areas, protecting the spawning aggregations, would have this excellent, excellent protection for reproductive potential, because not only would you be protecting females when they were spawning, but you would be protecting all the males, once they got the cue, within those areas, and so, based on that, some modeling efforts.

One by the Heppell suggested that MPAs would result in 15 percent male sex ratio, and then one with Joe and Robert Ellis integrated potential male density kind of feedback loops and suggested 5 percent as a potential increase in the MPA.

As you guys know, gag are highly regulated, and so they have a minimum size, and they have area closures, and they have spatial management and an IFQ for commercial fishermen. Certainly you would think that, with this amount of regulations, we would have a healthy stock, but some things that aren't known, or weren't known, anyway, were the efficacy of the MPAs to increase male sex ratios, and so models suggest this would be helpful, and at least the Heppell model suggested it would get them back to 15 percent, which is close to the historic level, but that hadn't been tested.

We really didn't have a good handle on sex ratio and whether we had improved the sex ratio since the 1990s, when there was concerns about sperm limitation. There is poor understanding of sex change in general, and not just gag, but all protogynous species, except for blue-headed wrasse, and what cues sex change, and, also, of course, the million-dollar question is what is the optimal male sex ratio for stock productivity.

MR. RINDONE: Sue, I think we lost you there. Are you still there?

DR. BARBIERI: I think she got disconnected from the Wi-Fi. The Wi-Fi probably blipped. I am actually in my separate home office in the garage, and I can go in there and kind of let her know, because she may not know, or notice.

MR. RINDONE: Thanks, Luiz. We'll just hold for station identification then.

DR. BARBIERI: Okay.

DR. LOWERRE-BARBIERI: Hello. Sorry about that brief interlude there. My internet went out, and I hope you guys got extra coffee. What was the last slide that people heard me talk about?

MR. RINDONE: The sex cues and poor understanding of sex change. You were talking about how most folks are probably familiar with the disconnect between the proportion of males and females and how gag spawn offshore and it's remarkable the great distances that they travel inshore as larvae into the estuaries, and then you were talking about the sex cues that they experience once they're offshore, related to their hermaphrodism.

CHAIRMAN POWERS: It was Slide 9.

DR. LOWERRE-BARBIERI: Okay. So moving on to Slide 10, and so to our actual study, which was from 2016 to 2018, and our objectives were to look at the spatial ecology.

MR. RINDONE: We can't see your presentation just yet.

DR. LOWERRE-BARBIERI: What do you see?

MR. RINDONE: We see Luiz confined to the garage for bad behavior. Now I see testing assumptions about sex change and spatial management, et cetera.

DR. LOWERRE-BARBIERI: Yes, and so I'm trying to get -- Because, on mine -- Do you see it now?

MR. RINDONE: No. If you would like, we can pull it up on our end, and you can ask Jess to advance the slides for you.

DR. LOWERRE-BARBIERI: That might be a good idea.

MR. RINDONE: Okay. We'll do that now then.

DR. LOWERRE-BARBIERI: Thanks, Jess. Sorry. This was working in the test, and I'm not sure what happened, but I guess that's the excitement of the digital age. Okay. So this is, finally, to our actual research and what our objectives were.

We wanted to assess the spatial ecology, specifically in terms of understanding pre-spawning aggregations that we had heard form in the fall and early winter, prior to females migrating to deepwater spawning sites, as well as this idea of males staying there year-round, while females leave after the spawning season.

Estimate the current male sex ratio and how it differs with spatial management, and what I mean by that is, obviously, the hypothesis was you would have higher sex ratios in the MPA, in Madison-Swanson, and presumably intermediate in the area closure, in the Edges to the south, which is closed for the spawning season from December through April, and the lowest in an open area, which we sampled to the northeast of Madison-Swanson.

Then we assessed where and when sex change occurs and its relationship with size and age, and then, to put it in context, the sex ratios we've seen with gag, with what was reported in prior studies, as well as other protogynous species.

I am not going to go into a lot of detail, in terms of the

methods, but the important thing to get from this slide is to the right, the map, and so, in this study, in this paper that you guy have in your packets, we used data from our three-year study, which, as I mentioned, was at the MPA and the Edges, and that's A and B, those little green dots, and data contributed from a fisherman that we collaborate with, and that's C, and that's the nearshore pre-spawning aggregations.

Then the other markers on that map are data that came from our fishery-independent monitoring survey, which we integrated into the study, and that was fish that they began to collect in 2009, and it gave us a much larger spatial distribution to put our results in context. We also had samples from the fishery-dependent monitoring sampling, but we didn't have locations for those.

The two methods we used for collecting data were videos, and we have what we fondly call the PICA video, which is a camera system with three cameras to give us a close to 360-degree view, and it's really more like a 300-degree view, to get abundance and behavior.

Then, for the capture-based samples, we took a wide range of biological data. For sex, we looked at pigments and took photos, as well as trying to macroscopically assign sex based on the gonads, which turns out to be impossible. Gonadal tissue for histology, blood for hormones, and then, obviously, size and age.

First, to our results, in the first hypothesis we wanted to test, it was about those pre-spawning aggregations. They do consistently form in shallow waters, at least based on what we've seen from our collaborative fishermen and some preliminary sampling we've done since, and so his site is where that little yellow star is, and he consistently captures high numbers of gag at those sites, starting in about November, and so as soon as the cold fronts start going through until about February, and then the catch drops off.

He reached out to us in 2016, and he was getting good catches, and we collaborated with him before, and we still collaborate with him, and asked if we would like to get some gonadal samples and look at development, which we did.

On that day, he caught 100 fish, 100 gag, and the largest ones we got gonadal samples from, and a number of those were beginning to develop, and they were all female, but, just to put it in comparison, his 100-catch day, the maximum catch we ever

had in Madison-Swanson was twenty-three, and that was with four fishermen, one of those being the deckhand, and we chartered a very highly-reputable fisherman to charter those trips, and they were multiday trips, and so we were out there all day fishing, and I have a number of really good fishermen within my lab, and so I'm sure fishing experience might have played some role, but not a four-fold role in those numbers. We've also done some preliminary sampling at those nearshore areas, and, yes, catch per unit effort is much higher there than in Madison-Swanson.

Another hypothesis was looking at do gag in fact spawn only in deepwater sites and this idea of sexual segregation, with males staying there and females migrating to and from the spawning sites, and you can see, in this graph, males on the left, and they're blue, and females are on the right, and they're red, and it's pretty conclusive that males do in fact use the deeper water and stay in the deeper water.

The results are a little more critical, in terms of females, and we do see females in those same areas, obviously, during the spawning season, and that's where actively-spawning females have been captured, and we determined the spawning season, and, actually, rather than December through May, we only saw active spawners from 1 February through 18 April, through mid-April, and only in these deeper depths, again, and so sixty-five to ninety-nine, and so, yes, they are spawning in deeper water.

The males do appear to stay in the deeper water year-round. Males were captured from forty-nine to 128 meters, and the spawning season is a little shorter than previously believed.

Do they form spawning aggregations? We didn't find any strong evidence of this, and, in fact, even the historic record suggests really small aggregations, never more than a hundred fish, and there were always more scamp than gag. I think, when many people think of spawning aggregations, we think of Nassau grouper and just these masses of fish, and you can see the picture below the Nassau grouper is the most gag we ever saw, and, in fact, there are three more in that frame, and you can see some of the special things that we saw through reviews to identify them, but you can see nine there, and I think twelve is the highest number of gag we ever saw on the video.

Looking at a couple of different indicators of changes in density with the spawning season versus outside of the spawning season, and so that's the table here at the bottom, and mean catch per unit effort in the spawning season is S, versus non-spawning season to the right, and you can see there's not a

whole lot of difference there, and it did not differ significantly, and that would be the best indicator that you actually have spawning aggregations.

Looking at maximum catch per unit effort in the spawning season, versus outside the spawning season, we did see increased levels with the spawning season, which makes sense if females are migrating there, and it looks like they are. In terms of the maximum number that were captured in a fishing event, we also saw increases with the spawning season, and that was in the Edges.

In terms of numbers on the video, gag are just really camera shy, and they're usually right on the edge of what you can see, and it's really interesting. A number of species, when you put your camera in, will just zoom right up to see if there's food involved, like greater amberjack and red snapper and porgy, and the gag just are very standoffish, and so it's hard to tell how well video estimates abundance of gag, but, at any rate, we did see an increase outside the spawning season in the open area, compared to within the spawning season, which was really cool.

Chris Koenig, who collaborated with us and shared all of his past expertise and knowledge, had said that this was a pre-spawning aggregation, and we didn't see fish there, or in any numbers anyway, until the third year, and then we saw these increased numbers.

Again, the spawning season, and it looks like I wrote it correctly here, was from February through mid-April, and there was consistently spawning activity in Madison-Swanson and at the Edges. I don't think spawning had been documented at the Edges before, but we did not have evidence of spawning aggregations.

Obviously, it would be really helpful, in terms of trying to estimate sex ratio and determining what months you get representative samples of both mature females and males, to better understand these migrations, and so, back to looking at females and whether they migrate, we looked at depth as an indicator of habitat and development state, to get an idea of whether they would in fact demonstrate what you would expect if you have all of your spawning offshore and fish are beginning to develop inshore and moving offshore to spawn and then returning.

In fact, our data did support that hypothesis, but one of the things that I want to point out is this regenerating, the box to the furthest right, of this huge range, and this is because we saw a really high number of regenerating females on the spawning

grounds as well, and so this idea of whether they all leave, probably not.

We did sample in June, July, and October, and 85 percent of the catch was female, but, without a way to electronically track individuals, we can't confirm for sure that those females stay there year-round, but it looks like they do, and this high percentage of regenerating is actually rather disturbing. 33 percent of the females during the spawning season were regenerating, and that suggests skipped spawning.

Just to further address this issue of female migrations, we wanted to look at the age distribution, to see if we could get an understanding of how many females might stay in the MPA, based on this first year of sampling, which you can see, over on the right in the bar graphs, the top graph, and you can see higher than what you would expect from a typical age distribution number of six-year-olds, and that would be the 2010 year class, but you can't follow that through in consequent years, and so, assuming that all ages classes have the same catchability, the decrease in this 2010 year class has to have come about because those fish left the MPA, assuming there wasn't exceptional poaching of that particular year class, and I'm assuming there wasn't.

It does look like female migration is the most common behavior, although you have some females that stay there, and then I just wanted to add that marker there, again, on the bar graphs for 2006, since those are supposed to be the high year classes, 2006 and 2007, and we didn't see anything, in terms of year class distribution, from the spawning grounds at any rate, that suggested that those were higher than expected, that there was higher than expected abundance in those year classes.

To the meat of what we were funded to estimate, and that is the sex ratio, and what did we find? Sex ratio varies with month, and we sampled from December through May, and you would expect that, right, if females are migrating to the spawning grounds.

Given our understanding of the spatial ecology of gag, and that females are migrating to the spawning grounds, the only time you can get a representative sample for sex ratios is going to be during the spawning season, and so the sex ratio in Madison-Swanson during that spawning season, and so from February through mid-April is 5 percent. Outside of the MPA, it was considerably lower than that, and I think that's one the next slide.

Anyone who hasn't seen a copper belly, the photograph on the left -- That's what the scales actually look like, and it can be easy for observers to think that a fish with a dark belly is a copper belly if they have never seen a copper belly, but the males actually do have these very distinct black pigmentation, and we did find that to be a very good indicator of sex, much better than macroscopically staging the gonads, although we have also found some males that do not have this pattern in our current study in more southern waters, and that's the sex ratios.

The bars that you can see, the top two are the Edges, and females on the left and males on the right, and then the bottom is Madison-Swanson. The take-home message is a lot more fish with better age distribution in Madison-Swanson, which is what you would hope with an MPA, and it does look like that in fact is working.

It's much lower in the Edges, but they still have some of the older fish, and no Category 4 fish, and so no fish sixteen-plus, but some fish up to fifteen years old, but then, when you look at the males, that one single male out there is pretty disturbing. In fact, our effective sex ratios for the Edges and the open area was zero percent, and, looking at the sex ratio in all of the fishery-independent samples, over multiple years, it was only 1 percent, and so this raises concern that in fact we do have very low male sex ratios.

If you have a population where the male component is increasing, as was expected with MPAs, you would expect both your male sex ratio and your age at 50 percent transition to increase, and what we found is that sex ratio did not increase, or at least not to historic levels, which were about 15 to 17 percent, but age at transition did, and so age at transition historically has been 10.9 years, and that's what has been used in the last several stock assessments, but, in Madison-Swanson, it was thirteen.

Looking at the size and age distributions of males and females, like previous studies, there were really significant differences in size and age, without a whole lot of overlap between the two, but we did find some small males, and so males as small as 623 millimeters, which suggests that there is not a physiological reason why younger males could not occur, but there's something else driving this lack of small males and the ability for the stock to adjust to age truncation.

As I mentioned in the beginning, the dogma was that sex change

only occurs on the spawning grounds, and it occurs primarily after the spawning season, and so April and May, and transitionals are extremely rare. Out of our thousand-plus samples, we only got eight, but what's really important about these eight is that they were distributed throughout this period of December through May, and they were distributed over space, including one collected from our collaborative fisherman there at D, and that one was 675 millimeters, and so what you can see there is that there probably is a feedback loop, in terms of size, what's driving the size of a male at transition, with the smallest occurring in female-only spawning aggregations, because those females are going to be smaller to start with.

Then, if you look at the Edges, we have the transitional at 845, but, in Madison-Swanson, it's 1,000, and so that makes sense, if there is a social component and a size-driven component of who transitions, but, again, the take-home important point here is that you can get transitions in these pre-spawning aggregations.

That changes our understanding of what drives transition, and we had thought that it would only occur in spawning aggregations with males there, this idea of sizing-up the sex ratio, but, in fact, that's not the case, and it may, even on the spawning grounds, be driven primarily by female-to-female interactions, aggressive interactions, and certainly, in pre-spawning aggregations, that's what we hypothesize is the case, is that the largest, most aggressive females are the ones that get the cue to change to male.

This has been done in some other protogynous species as well, and we think this will probably end up being something that is more commonly seen, once people start looking.

We do have some fish that transition on the spawning grounds, and, as shown in Ellis and Powers, the sex change there is going to be moderated by male abundance, and so you probably -- You may not get to the sex ratio that you need to, if that is just an enclosed area, and potentially you also aren't getting these smaller fish recruiting there.

Down at the bottom panel, you can see by sex and depth, right, and so nearshore, and these are females that have recently recruited to the fishable population, and they're mature. They're at fifteen to twenty-two meters, and you can get some transitionals.

Then you have mid-water foraging habitat for larger, older females, and this was shown really nicely in Caruthers, and you

do get these spawning migrations to deepwater spawning sites, where males stay.

In terms of sex change, it's not just going to be based on size and individual reproductive value going up when you're larger or older, but it's also being mediated by the mating group, and so what do I mean by that?

If you have something like red grouper, that are haremic, but they have widely distributed harems, fairly isolated from each other, if you take one, but take the male out, you have to have rapid transition, or else you lose a whole season of reproductive effort for that group, and that's what we see in blue-headed wrasse, which is the best understood protogynous species, and there's a very rapid transition.

If you have something where you have harems that are overlapping, and you can have a male that will just take over another male's territory, you don't need that rapid transition. If you have spawning aggregations, you don't need that rapid transition, because taking one male out won't have the same impact on reproductive output, and, if you have leks, you won't have the same situation.

Leks are something that happens commonly in terrestrial mating systems, and it's not as common in fish, although it's been reported for a couple of species, the idea being that males aggregate in a certain habitat and compete for females and to mate with them. In gag, although I think I have a slide that shows that later, but gag do appear to be peer spawners as well, which supports this hypothesis of a lek mating strategy.

Looping back to stock assessments and why any of this matters to stock assessments, in the 2016 updated report on gag, there was concern raised by fishermen, and others, in terms of those 2006/2007 year classes, and that might be unrealistic, and the continuity model, in fact, showed less of an increase.

There were some concerns about the data in the model and how much emphasis should be put on management advice from this model, and then one of the things that I think is a red flag and supports our idea that it looks like there's not a lot of gag out there is that commercial fishermen aren't meeting the quota.

Given the price per pound for gag, that seems like a really clear indicator that maybe that's because there aren't a lot of gag out there to catch, and so our results, again, we did not find aggregate behavior on the spawning grounds, but we did

increase spawning aggregations where fishing pressure is high, because it's closer to shore, and this is the population that is just recruiting to adulthood, ages three to six, including some males.

Spawning reserves do not fully protect the male recruitment process, and potentially a lot of the fish that would turn into males are being captured before they can get through the gauntlet to the spawning grounds. Madison-Swanson, the most productive spawning grounds in the Gulf, has a male sex ratio of about 5 percent. Outside of the reserve, it looks like it may be as low as 1 percent, and what we saw was not what we captured, but that's just in terms of the video versus capture-based sampling, and there was pretty poor agreement between those two, and, again, I think that has to do with gag behavior.

Can gag male sex ratios really be this low? So, since I didn't believe this the first go-round, before I started this research, I want to hammer home why I think they really are this low. Chris shared with me his reports from a similar study in 2011, and he got similar results, in terms of sex ratios in Madison-Swanson. The approximate 1 to 2 percent sex ratios that it looks like is occurring in unprotected areas is similar to the two studies that provided sex ratio data to the last assessment, and the stock assessment itself, just based on age and sex and age at transition, is estimated to be about 2 to 3 percent male.

That was with an age at 50 percent transition of about eleven years, and so this does in fact appear to be the case, and it looks like we have really low male sex ratios, and I think that should be of concern.

How does that compare to other species? We just recently finished assessing the reproductive data for scamp for the stock assessment for gag, the scamp assessment for the Gulf, and they have a sex ratio of 41 percent. They have a lot of overlap in male and female size, similar to what you can see on the top bar graph to the right for red grouper, with males being the dark-colored bars and the lighter color being females.

Red grouper, similarly, have a higher sex ratio, of about 14 percent male, based on our recent estimates, and hogfish, based on a paper by Angela, had about 12 to 17 percent, and so no one is coming even close. None of these other protogynous species are coming even close to 2 to 3 percent male, like what we're seeing in gag, and they all have more overlap between male and female sizes and ages and appear to be better at adapting to fishing pressure, or age truncation, than gag are.

This graph at the bottom is just to highlight that, in the 1970s, and so historic sex ratio, is about 15 percent. When we were really concerned that gag were overfished and undergoing overfishing in the 1990s, the male sex ratio was 2 percent, and it looks like that we're about at that place right now.

Again, just to highlight why it's so important to use combined sexes instead of female, just a really simple example. If you use the age at 50 percent transition of thirteen, compared to the one historically used, and you look at only female stock reproductive potential, you're going to get a much higher estimate, or you will get a higher estimate. It will look like there's more reproductive potential than there is, potentially at a time when we should be most concerned about what's going on with the males.

In addition, if you look at the 90th percentile of age, estimated at MSY currently, and Skyler looked this up for me, and thank you, Skyler, it's age-four. The youngest male we observed was age-seven. Pre-spawning aggregations -- I think, hopefully, we've made the point that these are potentially a bottleneck. You get high density there, and you may be getting hyperstability, and they may not be a very good indicator of true abundance, and they certainly may not be a very good indicator of abundance that makes it to the spawning grounds.

I think it's really important to take that holistic approach, given the complex spatial ecology of gag, and then, as I mentioned earlier, unlike Nassau grouper, gag are believed to peer spawn, and so, if you are an aggregate spawner, or even a group spawner, you usually have sperm competition, which needs to higher gonadosomatic indices. In gag, the maximum GSI we ever saw was 0.58, and, in fact, even during the spawning season, you can barely strip-spawn a male gag, compared to 16 percent for Nassau grouper, and so it's just a very different animal, in terms of their reproductive strategy and what elements of their reproductive potential we might need to protect.

Of course, the question is just how many males do you really need, and I've had many long discussions with Clay about this, and I can't give you -- I wish I had a way to quantify that. At this point, we don't really have the technology to get samples that can do that. Clay likes to bring up the fact that one male sheep can impregnate a hundred females, which led to me reading a number of papers on ungulates, but, in fact, in natural populations, the sex ratio is more like parity, and so this does

not seem to be a healthy sex ratio for an animal that needs resilience in a natural setting.

With the sex ratios we're seeing in gag, I think there is potential for sperm limitation. That doesn't mean that you won't still get some strong year classes, given the long pelagic larval duration, and there's a lot of impacts, in terms of current and weather, that are going to play a role there, but, again, I think 1 to 2 percent is clearly not what it was historically, which was 15 to 20, and I doubt it's what you need for decent productivity, and I think it might be where you actually should start getting scared, and, compared to an estimated virgin sex ratio, and, again, Skyler estimated this.

Skyler, I think, at the time, it was the day before I was supposed to give this talk, and I asked you to do it when you were really busy, and so I apologize for that, because you had plenty of time to do that, but it's actually 37 percent, and so, again, I'm not suggesting that we need to get to 50/50, because, even in the virgin sex ratio, it doesn't look like it was that, but, if you did like the equivalent of like a sex ratio SPR, and so 30 percent, you would be at about an 11 percent sex ratio, and we're simply not there.

Why so different in gag from most species? They are protogynous, and we know that it's important to have both sexes to have fertilization, and we just don't know how many males we need, but, when you put that in this larger perspective of their mating strategy, in terms of leks and peer spawning and then spatial ecology, there is a need to protect these vulnerable pre-spawning aggregations, where you have maturing females and males beginning to transition, and, currently, I think that's something that we need to take into consideration, the most important thing for the stock assessment being using the combined sexes, but maybe having a workshop or something in the future and thinking about protogynous species and spatial ecology as well, or mating strategies and what that means, in terms of coming up with the best measure of reproductive potential.

I would just like to acknowledge NOAA and MARFIN for their support and Sportfish Restoration and all the technicians and volunteers who have gone on these trips, and they all look really happy here, but I know that the eight-hour drive to Panama City, a five-day trip on a boat, twice a month for six months during the winter, got a little old.

There's a number of great captains that we worked with, and

Chris Koenig, whose willingness to share his expertise and years of work on this species really made a big difference, in terms of where we were starting and what we could try to understand, and, with that, I would be happy to take any questions.

CHAIRMAN POWERS: Thank you very much. Before we get into questions, just to remind me, because I can't remember, but what's the status of gag, and is it overfished and overfishing, and what was the criteria? What SPR criteria was there?

DR. LOWERRE-BARBIERI: Did you want me to answer that, or did you want somebody who is --

CHAIRMAN POWERS: No. Sorry. Probably Ryan.

MR. RINDONE: Not overfished and not undergoing overfishing, at present, based on an SSB using a female biomass only.

CHAIRMAN POWERS: Okay. It was roughly about a 30 percent SPR as the surrogate for MSY?

MR. RINDONE: 30 percent SPR. That's correct.

CHAIRMAN POWERS: All right. Thank you. Doug Gregory.

MR. GREGORY: Congratulations. That was a beautiful study and good analysis. My question is you said transitionals were rarely seen, and doesn't that imply that the transition occurs quickly? If it did have a two-month duration, wouldn't you expect to see a lot more than what you did see?

DR. LOWERRE-BARBIERI: So you have to think first what is the proportion that is transitioning, right, versus what proportion of that survives for us to sample, and so the majority of our samples came from deeper water. If in fact the shallow water is an important location for transition, a lot of those fish may have been killed before they ever made it to the deeper water, and so we only had fifty-nine samples from the shallow water, with 600-plus from our study in the deeper water, and another 300 or so from the FIM.

I think that's a great question, and I think that's exactly where we need to go, and, in fact, I have a proposal in for that, is to really understand what role these pre-spawning aggregations in shallow waters are playing, in terms of transition, and whether that in fact is driving transition rates, but, if you compare them to other species, and so I've looked at red grouper and scamp, you do get more transitionals

in both those species, but transitionals are still fairly rare, and we don't really understand the ecological process for that, and we don't understand if there's a, potentially, stress that goes on while your gonads are switching around, and maybe you don't feed as much, and we really don't know, and whether there's something that affects catchability during that time.

Transitions are always lower than you would expect, if you just looked at the male sex ratio and what you would expect to recruit in a given year, and you always see fewer transitions than that.

The reason we came up with a two-month time period for gag is that most of the fish undergoing transition don't have any signs of oocyte atresia anymore, and so, for that to happen, they have to have resorbed their developed oocytes, and that process, at these water temperatures, although I don't have this data for gag, and this is based on anchovies, takes about forty-five days, I believe it is, and so that's where we came up with that idea that it's taking between one month to two months to transition. Also, there's a really nice study done on rock hind in captivity, and they showed that those fish took two months to transition.

MR. GREGORY: Great. Thank you.

CHAIRMAN POWERS: Thank you. As I recall the assessment, the overall biomass dynamics are estimated reasonably well, or not well, but, I mean, they're typical of other things, but the issue here is how you define productivity, and that's why I asked the question about the SPR and that sort of thing, because it always seemed to me that maybe, in doing the stock assessment, perhaps you could -- Instead of having just an age at transition, have to have some sort of density-dependent model of transitions, and I'm not sure how that would work, and this is just sort of pie-in-the-sky kinds of things, but it's this kind of study, I think, that helps guide those sorts of decisions. Andrew Ropicki.

DR. ROPICKI: Thank you for the wonderful study. My question, or comment, isn't specific to the study itself, but I was just wondering -- Is there any preliminary analysis on that Something's Fishy that is currently ongoing with gag grouper that has all the responses? I mean, what are the fishermen saying, and this is just for anyone on the line that would know.

CHAIRMAN POWERS: Is Emily on? We haven't done gag grouper for Something's Fishy, have we?

MR. RINDONE: We don't have results for Something's Fishy yet for gag.

DR. LOWERRE-BARBIERI: Although I did -- I mean, I gave a talk on this study to the Reef Fish AP, and I did ask the fishermen, and a couple of them were really forthcoming and said that, yes, they had concerns about gag. Ryan, you would have been on that, right?

MR. RINDONE: Yes, and I was there also, and concerns were expressed about, like Dr. Barbieri said, about the commercial guys not landing the commercial ACL and there being concerns about being able to find them in certain parts of the year. The winter bite tends to be pretty hot, especially as they move in a little bit closer to shore, which can increase accessibility in the latter part of the calendar year for recreational fishermen, but it also makes the trips a little bit more economical for commercial fishermen.

Then the AP also talked a little bit about the effort that they have recommended to the council for modifying the regulations in the MPAs, specifically Madison-Swanson and Steamboat Lumps, and the council selected a preferred alternative that would close those areas to fishing, including surface trolling, year-round, and that was sent to NMFS for approval.

DR. ROPICKI: I just wanted to add that I was looking at the IFQ market data, and it points to issues there. If you look at the difference between what they're getting dockside and what the allocation price is -- I mean, the data I have from the IFQ annual report only goes through 2019, but, in 2015, that difference is $3.41.

In 2019, it's all the way up to $5.19, and we kind of saw the same thing with red grouper, with the problem, and, basically, what you're seeing is the market is telling you that there is no decrease in demand, and the dockside price is staying the same, but the fact that the allocation price is dropping, and that spread is getting bigger, is it's harder to catch, and so I am definitely interested in seeing what comes out of the Something's Fishy for grouper, because the IFQ market data does not look great.

CHAIRMAN POWERS: That's interesting. Will Patterson.

DR. PATTERSON: Thanks, Joe. Awesome stuff, Sue. Really fantastic, and you kind of alluded to this a bit in the middle

slides there, when you're talking about the assessment, and I guess, going back to the last benchmark, and I think it was the one that Jake Tetzloff led, as the analyst, for gag, and we were having to make this decision about to use output derived from female only or sexes combined. Could you go back to that slide, perhaps?

DR. LOWERRE-BARBIERI: The stock assessment from 2014, that's Slide Number 6, and I think that might be what you're talking about. The 2016, what I had in here was just that rapid increase on the -- From the 2006 and 2007 year classes got tamped down in the update, and so I think that's Slide 6.

DR. PATTERSON: As they're trying to locate that, you know, you mentioned -- Here we go. Here, we have the different scenarios, and you mentioned, when you started this work, that you were perhaps a bit skeptical whether gag male sex -- If the ratio, percent male, could be as low as 2 percent, and that you were a bit skeptical that that was actual reality, and so you did this comprehensive study.

My recollection of the discussion about utilizing combined sexes, or female only, was that, while there was a very different picture that resulted from that assumption, if we only used females, then it was fairly optimistic, and we were skeptical whether that was actually true, but, when we used the combined sexes, it was so pessimistic that I think we were hesitant to go there as well.

We didn't really have the information to inform that decision, and there was a lot of discussion about this in the room, and, obviously, that was quite a few years ago, and I am recalling this from memory that is probably flawed, but that was my recollection of that discussion.

From your work, and you kind of hinted at this, but do you think that was a bad assumption and that we should have used the combined sex approach, and that really would have been more accurate, with respect to the status of gag in reality?

DR. LOWERRE-BARBIERI: I think, given the gag reproductive strategy, you need to use something other than female only, your traditional stock assessment measure of reproductive potential. Whether it has to be combined sexes -- So, in terms of the last stock assessment, it looks like there were a combination of things, including some things within the model that may have led to the combined sexes results being lower than they should have been, and I talked to Skyler and folks to try and -- We're

trying to tease some of that out.

I think that may have led to this totally disparate two choices, one overly optimistic and one overly pessimistic, and so I think there's some things that probably can be improved in the model that would result in more reasonable combined sexes, or I think you can set the equivalent of an SPR for sex ratio, what you need that to be and what does it take to get there.

Now, that would be totally outside of what's been done, and so I don't necessarily expect anyone to do that this round, but those are the things that I have been talking about with Clay and Skyler and some of the others at the Southeast Fisheries Science Center.

More importantly, I think -- Maybe we should be thinking about this, and I know that Shannon supported this idea, of should we get together a workshop to discuss some of these issues, in terms of reproductive potential and how best to begin to look at some of the species that don't follow the standard reproductive potential, based on fecundity pattern, and that would be at the larger scale, and then, for gag, I do -- That's why I really wanted to come and present this to you guys now, because we're just starting the stock assessment.

My lab is helping the Panama City Lab, in terms of assessing the reproductive data for the Gulf, and I will be very engaged, but I think it's really important, and I know this wasn't really in the TORs, but I think it's really important that we make sure the results take into consideration that we have very low male sex ratios, and potentially low abundance, and, if we do female only, and I suggest something other than that, then maybe we need to look a little closer.

DR. PATTERSON: I think definitely those things are great suggestions. You know, Bill Enberg also is working on a manuscript from some of his artificial reef work that has some really compelling information that shows hyperstability in catch rates for gag, or hyperstability of the observations of gag, in different habitat types, and so he has experimental reef units, where some of them are just a few modules, and some of them are a much, much larger volume and higher-profile constructed reefs, and he shows, through different red tide events, that the gag clearly select for the more complex, higher-relief habitat.

If you then -- So those are experimental artificial reefs, but, if you carry that forward and extrapolate to natural bottom, then you can definitely see the potential for hyperstability in

catch rates, and this really gets back to the Something's Fishy, or comments from the AP.

If fishermen who target these animals, year in and year out, are starting to say that there are some real problems here, given the potential for hyperstability in catch rates, then, obviously, we should pay really close attention to what they're saying.

DR. LOWERRE-BARBIERI: I completely agree. They're the ones that are going to give the best feedback loops, and I think that, and the fact that they -- I have talked to Bill a lot, and I know he's been showing that, and this is where they're actually forming aggregations, and spawning aggregations often have hyperstability, and so it's not surprising that the pre-spawning aggregations have that, but I don't think we've really integrated that into our thinking about our abundance indices in the past.

CHAIRMAN POWERS: Thank you. We have a long list here, and so let's move on. John Mareska.

MR. MARESKA: Thank you, Sue. That was very interesting, and I've got two questions. You alluded to skip-spawning, and do you have any estimate of skip-spawning for the females?

DR. LOWERRE-BARBIERI: John, what I have is that samples from the spawning grounds during the spawning season, and 33 percent of those females were not developed, were not developed at all, and, since it takes about two months to develop oocytes, and given when those were sampled, it's doubtful that they would participate in that spawning season.

Now, that's really different than most understanding, in terms of skip-spawning, and so, typically, skip-spawning is believed to be energetically driven, and, if you undergo spawning migrations, and you're not -- If you're not going to contribute, and you're not going to participate in reproductive effort that year, you never make that migration, because you don't have the energetics to do that, and so, physiologically, you just don't meet that threshold.

With gag, something else seems to be going on, and I know there's a paper, with Chris and Felicia, suggesting that that may be due to sperm limitation, but, physiologically, I'm not quite sure how that would work, because it doesn't take a male for females to decide to develop, and so I'm not sure what's going on there, and I'm not sure if you have issues, in terms of

energetics, within Madison-Swanson, and it's certainly been interesting to see the huge numbers of red snapper and how that population has been increasing, and I don't know whether that's impacting competition, but, back to your question, in terms of skip-spawning, it looks like there's a high number of females that are not contributing eggs, at least in Madison-Swanson.

MR. MARESKA: All right. Thank you. My second question is information on spawning behavior, and so it sounds like sheep are not very particular in their spawning behavior, but is there any information that maybe the male gag grouper are more selective for the larger females that are already on the grounds, versus those that are migratory and coming in?

DR. LOWERRE-BARBIERI: That's a great question. Well, first, I think sheep -- So sheep, in natural populations, and if you think about any nature shows that you might have watched, like moose or other ungulates that are related to sheep, males are usually solitary, or elk, and elk is a good example.

They have large numbers of females, but the overall sex ratio in those populations is much closer to parity, and it's never 1 percent, and so my understanding of what the mating strategy of gag is, but that's based on, at best, taking this data and trying to put it together in puzzle pieces that seem to fit, as opposed to really having the data you would need, because nobody has actually been able to observe the behavior, and I'm super jealous of these people that study sequential hermaphrodites of reef fish that they snorkel over and watch them do their thing, but it looks like males come together, loosely come together, at specific sites.

In Madison-Swanson, there are some specific sites with higher relief, where it looks like males will distribute themselves, and it looks like there's some competition between males for those sites, and then those males spawn with females. Whether there's a selectivity on the male part -- For the most part, that's considered to be something that the females do.

They probably just don't have a whole lot of males to really be picky about right now, and we did some back-of-the-envelope calculations of just how many females each male would have to -- How many eggs each male would have to fertilize, given about a seventy-five-day spawning season and estimate spawning every four days, I think it is. It's literally millions of eggs.

Looking at how low the reserves are, I just don't think you have enough males to actually fertilize that number of eggs, and so

are the females choosing males? It doesn't look that way, and it does look like there is potentially male-to-male competition for the best spawning sites, and the females choose those sites.

MR. MARESKA: Thank you.

CHAIRMAN POWERS: Thank you. Judd Curtis.

DR. CURTIS: Hi, Sue. Thank you, Mr. Chair. Great presentation, Sue. Just looking at the sex-specific spatial ecology that you found in Madison-Swanson, and I know you guys have done a lot of acoustic telemetry work in that area as well, and have you been able to tag, acoustically tag, these gags, and have you gleaned any information on some of that spatial ecology and some of those behavioral patterns?

DR. LOWERRE-BARBIERI: Well, the short answer is no, and boy do I wish. We tried tagging several fish, to see if they would survive, but they are at depths where the barotrauma mortality is just too high, and I know Chris Koenig did some in situ tagging of fish, and I don't have a good idea of how many of those survived, but, given the amount of sharks we're seeing, I wouldn't feel comfortable with my people doing that, and so, at the spawning grounds, we can't really tag those, but we have just started a preliminary study, and, again, I have a proposal in to try and do more of that, to tag gag in these shallow-water aggregations.

Then we do have receivers out to pick them up. We have receivers in the estuary, to see when they leave the estuary, and we have receivers at near-shore areas, where they aggregate, and we have receivers on the Middle Grounds and receivers in Steamboat Lumps, and so I guess the jury is out. Hopefully, in a couple of years, we'll have a better idea, but it will take tagging these younger, shallow-water fish and then seeing if they survive long enough to get out there.

DR. CURTIS: Okay. Thank you.

CHAIRMAN POWERS: Thank you. Steve Murawski.

DR. STEVE MURAWSKI: Thanks for inviting me to participate. Just a quick question for Sue, and that was a great presentation, and I wonder, from the point of view of skipping ahead to management, whether anybody has taken a look at the potential for a slot limit to protect the males and whether or not the balance of bycatch mortality versus protection would actually be helpful.

DR. LOWERRE-BARBIERI: Is that a question for me, Steve, or would you like the larger group to weigh-in?

DR. MURAWSKI: I'm sure you're more than qualified.

DR. LOWERRE-BARBIERI: Well, so our hypothesis right now is that a lot -- That gag could adapt to age truncation and have males recruit at smaller sizes and younger ages if we better protected those pre-spawning aggregations.

If that is the case, you have such a wide size range of males, and so like our smallest male we saw is about 650 millimeters, and I am not quite sure how you would get a slot size, because they're the same size as a lot of the females that are maturing and recruiting to the population as well, is that three to six age group, but I think potentially having some level of decreased fishing in December can -- Thinking about potentially closed areas for commercial fishermen.

Again, I don't think that's where we're at right now, because I think we have to get the data to better demonstrate that in fact you are having a large proportion of males recruiting from that area. I think, for this assessment, the huge question is how are you going to measure reproductive potential, because female only is not going to reflect, I think, what's going on with this species.

CHAIRMAN POWERS: Thank you. Doug Gregory.

MR. GREGORY: I think you've already answered my question, in talking with John, and I was curious why you thought -- Because there were so many females with regenerating ova, that they were skip-spawning, but I think you said later that it's because the process is slow, and, if they had reproduced earlier in the season, you would see more, I guess, regressing and other activities in the gonads that indicated that spawning, and the fact that you didn't see it was the strong suggestion that they didn't spawn at all, and so thank you very much.

DR. LOWERRE-BARBIERI: Exactly.

CHAIRMAN POWERS: Thank you. Paul Sammarco.

DR. SAMMARCO: Good morning, and thank you very much for that excellent talk. It was great, and it was very interesting data, and it was very informative and complete. I have sort of a major question for you on top and then a couple of sub-questions

under that.

Looking at the graphs, and thinking about this population, or this species, I was wondering why you think that there's this highly-skewed sex ratio in this species, and is it at least partially natural, and do you think it might be due to differential catchability of the males versus the females, or differential behavior relating to catchability? In other words, are we seeing a natural process in these things, or, in fact, are we seeing a catch bias, which would skew the population?

DR. LOWERRE-BARBIERI: Let me break that down. Gag, I think a virgin population of gag would not have sex ratios of 50/50, and that does not seem to be their natural reproductive strategy, and that's why we looked at the estimate of what the sex ratio would be in the virgin population, and I think that was about 36 percent.

There is some issues, in terms of back-calculating those virgin populations from a fished population, but, that said, I am guessing that you always -- That it's natural for gag to have less than 50 percent male, and so that was the first question.

We actually looked at -- I know there was this question a while back and a belief that males were -- That there was an increased catchability of males and that they were more aggressive and apt to take the bait faster than females, and we actually looked at our sampling, to see -- Actually, I joked with somebody in my lab that they should give this talk, of what does it take to catch a male.

We did not actually see that. There was no evidence that males were the first to be caught in a fishing session or that they were disproportionately caught over the females in a fishing session, and so I don't think it's a catchability thing with males. I think it's literally we may have a problem with male recruitment.

We thought that males were protected, because they have this deepwater -- Once they become male, they're staying in this deep water, and so, if you have MPAs, that's really a huge impact, in terms of protecting those, and we can see, from data from Madison-Swanson, that, in fact, the MPA has completely changed the size and age distribution of that population and increased the sex ratio, but it's not enough for the whole population. What my research suggests, but, again, what I can unequivocally say is I would be worried at 2 percent male. I would be worried that fishermen are not meeting IFQ.

In terms of the process of sex change and what will it take to increase our male population, I'm guessing that's on the recruitment side, but we need to better understand that before I would want to impact anybody's livelihood or fishing.

DR. SAMMARCO: Thank you. That's pretty interesting. Thank you.

CHAIRMAN POWERS: Thank you. Actually, that's what Andrew Ropicki more or less is supporting, in terms of the fishermen's response to that, in terms of difficulty of catching and so on. Shannon, final word.

DR. CALAY: Thank you. I just wanted to remind everyone on the SSC, and those listening in, that the gag grouper stock assessment, which is SEDAR 72, is already underway. We have a working paper submission deadline of January 29, and a data assessment workshop, via webinar, on February 9 through 11, and any information that you have about gag grouper would be very welcome. We would very much like to see it, and the appropriate point of contacts are listed on the SEDAR 72 project schedule, which is online, and the lead analyst is Lisa Ailloud, and her email is listed there on the project schedule, and please also copy Kate Siegfried. Thank you very much, and this is very exciting work, and we hope to see it fully represented during the gag grouper stock assessment.

CHAIRMAN POWERS: Thank you. Leann.

MS. BOSARGE: Dr. Sue, that was an amazing presentation, and it was very interesting, and I learned a lot, most notably that Luiz is a very lucky man, and he better hang on to you.

In seriousness, I wanted to actually follow-up on something that was kind of secondary that you mentioned, and you mentioned that you really didn't want to put your people in the water, because of the sheer numbers of sharks that you were seeing, and, obviously, I mean, that's going to be a natural occurrence in this fishery, but I wonder. Did you happen to collect any, or record any, data on the types of sharks and numbers of sharks that you may have encountered during this year-long study?

I ask that because our fishermen, from all the different sectors, commercial, for-hire, and recreational, have been telling us, for years now really, that, look, we've got to do something about the sharks, and we've got just so many that the population has just blossomed, and that's anecdotal data, and

we're working on trying to collect that and aggregate that for the scientists, but I think maybe, if we started to collect some of that information in studies that are not for sharks, but for gag and for other things, so that maybe we could just kind of garner long-term trends, as you continue your gag studies over the years.

I think that would be very important to go along with some of the scientific information that we have on sharks now, and so I was just wondering. Did you happen to record any of that?

DR. LOWERRE-BARBIERI: Yes, and so, for this study, and we have an ongoing study that we're finishing up this year in Steamboat Lumps for gag, and so, in our video analysis, we track a number of species and their abundance, including the shark species. We see a lot fewer sharks in Steamboat Lumps than we do in Madison-Swanson, and I do think it's a very complex issue, in terms of the shark recovery and what is a healthy stock and how we all are adjusting to what is healthy for sharks, but we weren't used to.

That said, a study we did in the Keys on greater amberjack, at their spawning sites on the seamounts, we lost two fish to sharks for every one we landed, and so I think it's a really important question, and we do collect that data.

I mean, it's so expensive, and so much work goes into especially these deepwater studies, that we try to collect everything we can, and we do keep track of shark abundance, and species, as best we can on the video data, as well as any that get caught through bycatch.

MS. BOSARGE: Thank you. I appreciate that. You were ahead of me already. Thanks.

CHAIRMAN POWERS: Well, thank you, and I will remind you again what Shannon said about any contributions to the assessment process, and we would really appreciate that, not only in data, but in terms of assessment approaches and things like that. All right. Let's take a five-minute break, and then we're going to come back and Steve Murawski will talk about the habitat research, and so a five-minute break.

(Whereupon, a brief recess was taken.)

CHAIRMAN POWERS: Next, Steve Murawski will be presenting some research on habitat. I will give the floor to Steve.

HABITAT RESEARCH PRESENTATION

DR. MURAWSKI: Well, thank you, Dr. Powers. Again, I really appreciate the opportunity to speak with the SSC today. We had given a presentation on this work several years ago, and the bottom line there was come back when you finish the work, and so I hope you can see my screen now.

What we wanted to do was talk about a five-year program that we've been involved with, in terms of both doing bathymetric mapping and then associating that with fish densities, and so there are a few of my colleagues on the line, as well as myself, and this is a large effort that was funded primarily by the National Fish and Wildlife Foundation, through the Gulf benefits program, which was basically penalty money from Deepwater Horizon.

We had some really great collaborators on this, especially including Luiz's group at Florida Fish and Wildlife Research Institute, and as well NOAA, and, of course, the Florida Institute of Oceanography is our ride for many of the ship-based things that we've done.

I really have three objectives in presenting to you today. Number one, I wanted to describe, in more detail, our five-year program of mapping and how that group relates to the discovery of fish habitats and also how we actually link habitat to fish densities.

I wanted to outline some potential management-related actions, based on the information that we've been able to derive, and then I would really like to get some feedback on mapping and habitat priorities, primarily because, even though this large grant has sunsetted, we have another new program that is just starting up, and so we'll be in business for a while, and so trying to understand what the priorities for the council and this collection of scientists is is important to us.

I think the presentation that Greg Stunz and collaborators gave yesterday is a really good setup, because we too were involved in that program, in terms of the direct estimation of red snapper biomass, and a lot of the techniques that we developed during this program were actually -- We used that in part of the Great Red Snapper Count as well.

In terms of the scope of the problem that we're looking at, certainly we're interested in primarily the reef fishes and bottom-dwelling animals on the West Florida Shelf, and that

actually, as part of this project, included sea turtles as well, and so we were able to quantify that.

One of the problems, obviously, that we as fishery biologists have is that many of the traditional techniques that we utilize can't be used in hard bottom, and, obviously, there are a number of camera-based systems that are providing data, and they're primarily drop cameras. It's difficult to quantify the area that a drop camera actually selects from, in terms of estimating absolute densities, and so that becomes an issue.

One of the things that we wanted to do is try to adapt both camera technologies and the bathymetric mapping, to see if we could go for some direct estimates, not only for things like red snapper, but other animals in there as well, and so our target species were snappers and groupers, and some secondary targets were other reef fishes as well.

The objectives of this particular program were to provide about 2,400 square kilometers of new high-resolution bathymetry, and, right now, just in terms of the West Florida Shelf system, that's about 200,000 square kilometers, and so we have basically added about a percent-and-a-half to that, but, of course, not all habitat is created equal, and that is the rub here, is trying to assess what we would consider high-quality habitat, particularly for reef fishes.

We wanted to look at the relative and absolute abundance of fishes and turtles in those areas that we looked at, and we wanted to develop methods to re-process the existing multibeam bathymetry, so that we could make comparable habitat maps to the areas that already have been mapped previously, and that's part of the work that the folks at the University of South Florida and NOAA and others have been doing for a very long time, and that is can we actually make a cumulative map of things.

One of the challenges we have, of course, is that it's easy for us to mow the lawn with multibeam, but actually characterizing that, in terms of what habitats they are, is a problem, because you can get a wide bandwidth with multibeam, but any kind of visual system is going to, by necessity, only characterize a very small proportion, and, in fact, I will show you some examples of using about 1 percent of the area with eyes on it to extrapolate those maps, and that's been a major part of our program, and that is a robust extrapolation method to the habitats we're looking at.

We certainly wanted to provide the Gulf Council and NMFS with

information as they consider additional protections, and there's the ongoing issues about habitat areas of particular concern and MPAs, and so trying to add some information that might be helpful to that process was a major goal of this project, and certainly one of the things that -- One of the reasons why we're here today is to convey these messages and get some feedback.

Then, in this realm, technologies are developing very rapidly, and, actually, the cost of these things is going down, which is promising, and so the last thing we wanted to do is, based on the experiences that we've had, trying to map these areas, what have we learned about likely areas where we're going to find other important habitats for reef fishes, and how might that be used in the process of identifying future priorities.

Just a little bit about the eastern side of the Gulf of Mexico, and the graphic on the left-hand side represents the cumulative multibeam mapping that NCEI, which is the National Center for Environmental Information, has, and you can see that the West Florida Shelf is, historically, compared to some of the other parts of the Gulf, very unmapped.

The irony, interestingly, is that we have better maps for the deep part of the Gulf of Mexico than we necessarily have on the shelves, and part of that is related to BOEM's compilation, and they were able to work with the oil and gas industry to look at the bottom topography, from all the seismic work they've done, and so you see this very detailed map from the deep part, but, unfortunately, not the West Florida Shelf, which, compared to the rest of the Gulf, seems to be historically under-mapped, and that's ironic, because, of course, many of the things that we're talking about today relate to the importance of these areas of potential reef fish habitats.

This is a compilation of what we've been able to glean from the literature about existing mapped areas, and that includes the Madison-Swanson area that Susan talked about, Steamboat Lumps, and the Florida Middle Grounds, all three of which are HAPCs, and then there are other seasonal closed areas, things like the Edges, et cetera.

The background map here is a heat map based on the VMS information from reef fish fishers, and so we're able to utilize the VMS data, and this is a PhD program that I had with a past student, and strip off all the steaming area, and so we had this sort of hot spot right in the middle between Steamboat Lumps and the Florida Middle Grounds, and so, as we started our program, we thought, well, who better to know where the reef fish

habitats are than the reef fish fishermen, and so that was kind of our, if you will, the treasure map that we used to try to identify areas of high priority, and so this has actually been quite successful, in terms of locating areas where reef fish are likely to exist, but, of course, you see a lot of other heat on that map, and so, even though we tried to utilize what we would consider high utilization areas, where reef fish are likely to be found, there are a lot of other areas as well.

This little red outline are all the new areas that we have added to, and one of our strategies was to try to connect some of the existing HAPC areas that have been mapped and to look at a larger landscape, and the reason for this is that we're trying to look at the geological processes that likely resulted in these high-relief habitats, and so, if we can do something more broad-based to put these maps together, then maybe we can learn a little bit about the geological processes, and that might help us in any kind of future mapping arena, to actually identify high priorities.

Just a little bit of history here, and this was the mapping program that David Naar at the University of South Florida and Stan Locker and Dave Mallinson and Brian Donahue did, and it took them six years of NOAA funding to actually get this high-resolution map for the Florida Middle Grounds, and, of course, many of us who work in fisheries in the Gulf of Mexico know this map well.

One of the issues, of course, was that, even though there was funding, it wasn't a lot of funding, and so it was kind of catch as catch can, and it took a long time to do this, and so what we're trying to do is build on the legacy that we have for a number of these areas.

The sort of recipe for our project is this, and there are sort of three pieces to this. Number one is the multibeam echosounder information, and so we used the SeaBat multibeam echosounder, and we also used -- We towed a video system called C-BASS, and that's an acronym, and you can see it there, to provide the groundtruth for the habitat mapping, and then we also used a Simrad EK60 to do some water column sonars and near-bottom sonars, and this is really important, because, particularly for animals, reef fishes, that get up off the bottom and are above the camera view, getting a full rendition of the biomass means that we're going to have to extrapolate in the water column as well.

We were able to basically do a first-order analysis, which is

construct the bathymetry, and, of course, bathymetry is one data feed that we get from multibeam, and the other one is the backscatter, which is an index of the hardness of the bottom, which is really useful, and I will show you how that fits.

Basically, in the video, we were able to actually classify the habitats, and NOAA, and other government agencies, have a habitat classification scheme called CMECS, and the towed system also has environmental sensor data, temperature, salinity, et cetera, and then, also, from the video, we can analyze the abundance, and with some careful geometry, you can actually figure out the density of fish and turtles in the sea.

Cooking this down a little bit, interrelating these things to look at the benthic habitat maps and their characteristics, the fish and habitat relationships, and then combining these, of course, into biomass, and then the ultimate products from this are species habitat maps, that is what is where, and then stratified population estimates, and that is habitat-stratified density estimates extrapolated up to these physical sizes of the habitats, to provide an overall biomass estimate, and, of course, we weren't the first to emphasize the fact that, if we only had a really good universal habitat map, fishery biology would be a lot easier in the Gulf of Mexico, and we are trying to chip away on this, but also demonstrate the utility of this kind of approach in putting the maps together.

Our enabling technology is the two ships that the Florida Institute of Oceanography run, and both of these are equipped with the capabilities to run multibeam sonar, and we also used a third vessel that was retired from the fleet as well, and so both of these vessels are in current operation, and particularly the Hogarth is well suited for future mapping activities.

You can see the setups, and these are the lab setups onboard the ship for actually doing this, in the upper-right-hand column, and this is literally the control panel that one sees as we're doing the multibeam mapping. The interesting part about this is that you literally can fly not only the multibeam sensors, but also the camera systems, and so, in the lower-left, you actually see the scene from the camera being towed across the bathymetry, and so this gives you an opportunity to actually look at real-time data feeds, and then, of course, with the water column sonar as well, you can see a couple of things.

Number one, you can see whether or not there is bathymetry you need to hop, because the camera is towed behind the ship, at a fairly long distance, and so, if you have an obstruction coming

up, you can hopefully fly that camera up above it. That works most of the time.

The kinds of products that we're developing, this is an area called the Elbow, which is about 100 kilometers west of Tampa Bay, and you can see it's an interesting geological area, and it has a long north/south spine, which is a sea-level stand from about 12,000 years ago, and then there's quite a bit of sort of backwash, and this was a barrier island about 12,000 years ago, and it looks suspiciously like what Tampa Bay looks like right now, and you can see the back bays, et cetera. It has also transitioned with grouper holes and other transient bed forms, and, as well, there are a number of what we call cultural parts of this as well, shipwrecks, and just to the north is the Gulf Stream pipeline.

Just in terms of the overall part of this, certainly the idea of mowing the lawn with bathymetry is well known, and we also need to take into account vessel motion and the sound velocity, which changes with the salinity and temperature, and the tides, and these are all accounted for in the computer magic that allows one to extrapolate the maps.

I wanted to show you an example of -- This is an extension of the Florida Middle Grounds that we've completed, and you can see -- I hope you can see my cursor, but, basically, this is this long north/south ridge that originates in the Florida Middle Grounds and goes to the south, and I wanted to show you a little video clip, and the video clip starts at the edge and goes up to where the map joins, and so hopefully I can get this to run.

Basically, we're going up along this ridge, and you can see that it's a really interesting profile, and it's very much like what we would recognize as barrier islands, and there's a little bit of a cliff up there, and so you can see that it's a complex habitat, and there's a lot of reasons why we see a lot of fishing effort in this particular area, and the stripes that you see are basically an artifact of the multibeam mapping.

There are a bunch of challenges that we have, in terms of using the towed cameras to count the fish along these things, and the first, of course, is the attraction, or avoidance, of fish to camera systems, and my former student, who now is one of the major project scientists on this, Sarah Grasty, did a lot of work looking at the potential for attraction or avoidance of fish to cameras.

The interesting thing about this is that the cameras are towed

relatively quickly, about four knots, and, a lot of times, what happens is you come across the fish, and it isn't until they're very close to the camera that they actually show some kind of behavior, and so, generally speaking, except for a few species, it looks like, by and large, we see the fish before they actually sense the presence of the camera and avoid it.

We also know that some fish are attracted to this, and, in fact, in using a towed camera system and looking backwards, we attract a lot of barracuda, and we also attract a lot of things like amberjack, and so it's a new thing introduced in the system, and there's, obviously, a big scope for doing some of this attraction and avoidance work, and folks like Will Patterson and others have been doing some of this with red snapper, and, generally, I think their work buttresses this notion that particularly the snappers, or red snapper, seems to be somewhat neutral to the camera system.

Second, and probably one of the bigger issues in the Gulf of Mexico, is the visibility, and that is the detection probability of actually seeing a fish that's actually in the video pathway, and this is not so much an issue on the West Florida Shelf, but it's a major issue up around the Mississippi River mouth, and I will show you a little bit of this.

This is something that we have kind of poked into. If we're going to do a lot of this kind of work, I do think that we need to do some experiments looking at siting probability models, similar to what line transect sampling for marine mammals and turtles and other things would be, and that is distance off the track line and general visibility.

The third issue is the calibration of the view to estimate densities, and that is how do you actually know what the area swept of the video system is, and there are some first-order calculations that relate to the camera angle observed, as well as height off the bottom, but certainly those can improve. Again, the biggest issue is stratifying the habitats, and I will show you an example of this with the Elbow.

It's really important, because some of these high-resolution habitats, the ones that have a lot of vertical habitat, really can have a very much differential fish density, and so this is important. Generally speaking, out on the West Florida Shelf, it's mostly sand, and I think most of us know that, and the sand has density, and there's a lot of it, and so it contributes a certain quantity to the overall biomass, but it's these high-resolution habitats that seem to be the most important.

Certainly understanding water column and near-bottom abundance is important, and many of the fish species that we observe can stack over high-relief habitats, and so integrating both the water column and the near-bottom is important. One of the problems of just using acoustics is there's what is called a dead zone with surface acoustics right near the bottom, and that's where a lot of the animals that we're talking about congregate, and so combining camera systems and water-column acoustics is actually a pretty powerful combination of technologies.

One of the problems that we encountered with this is you can shoot a tremendous amount of imagery, and, in terms of the camera systems that we have, and we're looking at six simultaneous cameras, and we can wear out a lot of graduate students and technicians looking at a lot of data, and they do a tremendous job, but one of the issues that we wanted to try to address with this is advancing to auto-processing of the video imagery, and I think we've got some pretty exciting work on this that's happening.

Last, if we wanted to do something like a Great Red Snapper Count, what is our concept of operations? If we wanted to do these kinds of things routinely, as sort of a -- What could we do on the West Florida Shelf over a month surveying? What is the concept of operations, and that is how many samples at what density and over what habitats would you do, and so using this not as a one-off, like a $10 million one-off that we did with the Great Red Snapper Count, but integrate this into the routine sampling. You know, how would we scale this up to a population-level assessment, and that's a really important question.

Just, in terms of the leveraging of technologies, the schematic of the C-BASS camera is on the left, and you can see the sketch of how this actually works. In practice, the way we actually did this was we did the multibeam maps on a separate cruise, so that we would actually have the refined map before we towed the video over it, and so we would know, actually, if we were approaching some obstructions, and, with this particular system, it's not automated, in terms of flying at a constant level, and the flight near the bottom, at about two to four meters above the bottom, is controlled by the amount of cable you lay out and the speed at which the vessel occurs, and so understanding if there is obstructions in the path is really important.

As well, you can see, for most of the areas, we have the width of the multibeam spread is a lot wider than the video, and so

actually trying to locate where you are is not a trivial issue, and so estimating the layback, and that is the position of the camera relative to the position of the antenna, as you pass over it, is not a trivial aspect.

We've done quite a bit of work on this, to try to make sure that we can link up the map and the habitat with the actual video groundtruth that we've got, and so you can just see deployment of the video system, and it's actually quite easy to deploy.

One of the aspects that's really important is that this was developed using the CTD cable from the research vessel, and so the CTD cable is electrified, and so we actually not only can send power down to the system, and you can see it's got cameras and lights and whatnot, but also -- This was really clever engineering, but we can actually send the video image from any particular camera back up to the vessel in real-time, so you can actually see what the video is sampling, and that's pretty important, and here's just some imagery from the video, and this happens to be the Gulf Stream pipeline that comes out of Tampa Bay, and you can see the stacking up from the water column sonar.

This is an actual image, and I think the Dunkin Donuts coffee is important here. As you're flying along, you can actually get the video image from any of these particular cameras, and you've got a lot of real-time feedback, in terms of the environmental parameters, the water depth, et cetera, and so flying this is sometimes a white-knuckle thing, particularly if you like to hug the bottom, which is my problem, and so it's a real hands-on kind of operation.

The visibility spectrum in the Gulf of Mexico ranges from top-right, which is basically zero visibility, to bottom-left, which is nearing Florida-Keys-type visibility. With the three panels on the bottom, the good to excellent visibility, we can confidently count the number of fish in the scene.

In some of the marginal visibilities, you can see fish, and it's very likely that we're missing fish in those, and so understanding the operating window of a technology like this is really important and doing work on the visibility and siting, and, as you can see, it's going to be a really important aspect of this, and that's an issue that we ran into with the Great Red Snapper Count as well.

Just, in terms of visibility, we did some work on looking at the visibility in various parts of the Gulf, and what we found is

that, particularly up around the river, it's really difficult to work, particularly in shallow waters, with a camera system like this, but, once you're in deeper water, and certainly on the eastern part of the Gulf, it's a lot easier.

We were able to work pretty confidently also in the western part of the Gulf, away from the influence of the Mississippi River, and then so, if we're talking about actually doing consistent types of sampling, understanding the flow/outflow rates in the Mississippi River and trying to find timelines within the normal seasonal cycle is pretty important, and so you can see that the Mississippi River discharge varies quite a bit.

One of the things that I talked about before was this auto recognition, and so here is a scene that we've been able to utilize a software product that was developed by SRI International, and so what it's doing is it's going through these things, and this is a hands-on kind of thing, where it's trying to classify both the habitats and the fish, and one of the difficulties, of course, is tracking an individual fish over time in this, and so this is actually a technology that, in the future, will kind of revolutionize this kind of work, and so you can see it's very -- It's a trainable system, and so the idea is to basically figure out what these fish are.

It puts it in thumbnails, and then, basically, it fine-tunes it, and we found that two or three iterations through a scene really allows you to confidently figure out what's being seen, and so I think, as projects go on, this will be a really important aspect of this, and certainly this has applicability not only for towed systems like ours, but also even the drop camera systems that are out there as well, and so we hope that this can be part of a larger concept of operations.

In terms of the overall procedure of converting the multibeam maps into video, into both habitat maps and stratified abundance measures, it's really this. It's combining the towed underwater video and the multibeam sonar and estimating habitat-specific fish densities and extrapolating them based on the amount of area of each of the habitats and then basically doing the multiplication to get overall fish abundance estimates, and, of course, this is somewhat conditioned on things like our ability to detect the animals and the uncertainty of 100 percent identification, et cetera.

In terms of habitat, I wanted to kind of switch this a little bit. The CMECS, or the Coastal Marine Ecological Classification Standard, that NOAA and other federal agencies have adopted for

the federal government, has four basic components, and that is the water column component, what we're calling the geoform component, and that is the larger structural characteristics, and, most important for us, the substrate component and the biotic component, and that is what lives on a particular substrate.

One of the interesting things about the West Florida Shelf is that it's generally an underlayment of carbonate rock with sand on the top, and so sometimes you get a very thin sand overlayment, but you can tell it's rock there, because some of these attached components are actually there, and we know that some of the invertebrate species need to actually have a strong attachment point to a rock, and so we can actually infer what might be under the sand underlayment, based on the biotic component, and so, in particular, we focus on the substrate component and the biotic component, to basically classify something called a biotope.

I wanted to show you some of the video that we have for what we call our testbed, and that is this Elbow region west of Tampa Bay, and so you can see that the scene starts out, and it's mostly sand, but then you get into a harder carbonate rock surface, and what you notice is that you see a bunch of the attached invertebrates, but you also see this is where the fish are.

Not exclusively, of course, but, as we are going over the rock habitats, you can see that this is where fish diversity and fish abundance is high, and then, when you get back over to some of the sand habitats, you can see that the fish density is lower.

This is our challenge of having a spatial resolution that's sufficient to catch this detail, because sometimes these are fairly mixed habitats, in terms of where we are, and so having a map that is a very high scale of resolution isn't going to be helpful, in terms of identifying these things, and so, with multibeam, you can scale the maps from centimeters to kilometers, and so what is the right resolution for things with these interspersed habitats that you're trying to focus on?

This is a picture of the Elbow area, and this is about ninety-square kilometers of multibeam map, and so, in order to extrapolate the biomass, what we did was a did a series of transects with the towed camera system. As I said before, there's a strong north/south spine across here, and so we wanted to make sure that we sampled that relatively well, and so you can see a couple of the transects are right up the middle, but

we also wanted to sample the sand habitats as well, and so you see the zig-zag transects that are out there. Again, we have both the bathymetry and the backscatter that comes from the sampling here.

With the bathymetry and backscatter data that we have, there are a number of metrics that one can generate. From the bathymetry, of course, you get the absolute depth, but, also, you've got the curvature and the relative position, and that is the degree of slope, et cetera, and you can also generate the rugosity of that, and that's basically just the standard deviation of the bathymetry over a particular area, and then you've got the orientation, and that is the north/south and east/west orientation, and there are a number of slope derivatives that one could generate.

On the backscatter, backscatter is basically -- There are a number of classification schemes for backscatter, and it's based on these gray-level cooccurrence matrices, and that is how dark the particular backscatter is, and that means it's proportional to the hardness of the return, and also sort of the nearest neighbor, and that is the cooccurrence matrix of the particular grayscale that you've got, and so there are a number of different metrics that one can generate from both the bathymetry, and the backscatter as well.

The idea here, in looking at different areas, was to look at all these variables and see if we can extrapolate the habitat types that we see on the video from some of these derivatives, and this is really important, because, as I said before, we're only able to put eyes on, in this case, 1 percent of the actual habitat that we're looking at, and so can we use the backscatter and the bathymetry to actually extrapolate what the habitat should be, based on the other 99 percent, where you have the multibeam, but you do not have the video, and so it's interesting, in terms of using the basic bathymetry, the backscatter, and then the terrain attributes and the texture attributes.

On the right-hand side, you basically can see the results of some regression tree models that my student put together, in terms of the importance of different types of variables, in terms of their meaning in terms of explaining, or classifying, the habitats you're looking at, and so you can see, for example, in the Florida Middle Grounds, the bathymetry itself is really important, and, to a certain extent, the slope and some others.

In the Elbow, it's really the slope that's important, and the

rugosity as well, and so you can see that a variety of these metrics are important, in terms of reliably classifying the scene, but they differ, depending on the different types of habitat that you're looking at, and so that's important as well.

Based on these regression tree models, we're pretty confident that we can extrapolate the habitats for the larger scene that's indexed by the multibeam bathymetry, and so that's pretty important.

In terms of making habitat density estimates of the fishes, this is our ultimate map, is on the right-hand side, of the place called the Elbow, and it's very consistent with a map that the Florida Fish and Wildlife Research Institute did, based on side scan, and you can see that the hard-rock habitat is confined mostly to that north/south spine and there's another spine to the west, and then it's kind of interspersed, but, again, it's mostly sand.

In terms of looking at the density, and that is the number per square kilometer, you can look at all the fishes that were classified, both on rock and on sand habitat, and you can see that the average density of animals on the rock habitat is very much higher than on sand, and you can see, for different species, it's pretty consistent.

For things like sand tilefish, you have, obviously, a lot more higher proportion over the sand habitat, and, again, this little inset shows the area, and so you can see that the sand habitat represents nearly eighty-four square kilometers, whereas the rock is only 3.5, and so it's a really small proportion. The real question is, when you weight these all by the amount of habitat, what do you come up with?

That is exactly what has happened here. The important point here is that, because of the dominance of the sand habitat, even though you have a low density or are extrapolating it to a large area, and so the interesting thing is there's a substantial amount of fish on these low-relief habitats, and so, if you're doing an overall fish assessment, you need to account for it.

I recall the same thing happened when I was working in New England, and we had this issue about where do monkfish reside, and certainly the majority of them reside on a very narrow habitat, but you have to account for the low densities over the larger habitat. In this particular case, more than 50 percent of the fish in the Elbow area were on 4 percent of the habitat, and that is the rock habitat, and so this is sort of the

ultimate piece of information that one could generate, and hopefully use this over a larger area as well.

We have done this not only in the Elbow area, but we've also tried to extrapolate to what we call the Southwest Florida Middle Grounds, which is this large area adjacent both to the Steamboat Lumps and the Florida Middle Grounds, and as well as the Elbow region, and use training datasets.

We can also look at model validation, and that is how well the models of habitat extrapolation do, and so you have these more or less confusion matrices that we can generate, in terms of the predictions of rock and sand habitat, and the test statistic is this so called Kappa statistic, and, in most cases, the Kappa statistic indicates that we have a high degree of precision, in terms of doing this.

One of the issues, of course, is that we have such a dominant sand habitat that, even if the rock classification is poor, the overall accuracy is high, and so that's something that you have to pay attention to.

Again, what we've done is taken the extrapolation of the multibeam data, based on the video training sets, and extrapolated it to all the maps, including the existing maps of the Florida Middle Grounds and the Steamboat Lumps, which is in here, and so now you can get a much more integrated map of what's going on.

The other thing that we did was looked at sea turtles, and it's really interesting. We saw a total of nearly eighty turtles doing this really interesting thing, and that is the density of sea turtles that we saw on the Gulf Stream pipeline, which is, again, this pipeline that goes from Tampa Bay to Mobile. The density of sea turtles on that pipeline was thirty-seven-times higher than what we saw in terms of the density on natural habitats, and so this kind of begs the question about, if the pipeline is concentrating turtles, are we doing enough, in terms of conservation activities, recognizing that the pipeline is a heavily fished area.

It's heavily fished by sport fishers in areas, particularly off of Tampa Bay, and people will go out a hundred miles to fish on this pipeline, and, as well, we know that there is commercial fishing activities there as well, and so this kind of begs the question about, if the potential for interactions with takes of turtles, which can be non-lethal takes, is higher there, then what provisions are accounted for the in the management of

turtles that would reduce the potential for interactions there? This is really important.

In terms of the next steps for our program, we would -- We think that, by inference, from what we've been able to do, we need to extend the high-resolution mapping in the eastern Gulf to about 15,000 square kilometers, which would probably encompass most of the offshore reef fish areas of high importance for both sea turtles and fishes.

We also think that assessing the Gulf of Mexico Fishery Management Council's Amendment 9 HAPC nominations is also important, and classifying the habitats, and, again, this is a methodology that we've worked out. We think that the archives of data that NCEI holds, and FWRI holds as well, are important, and we certainly would like to keep engaging regulatory agencies, in terms of their priorities, and that's one of the reasons why we're here today.

One of the experiments that we have ongoing is to work with FWRI in the Elbow area to inter-calibrate both the towed video and the stationary video, to see if we can come up with some ways to extrapolate the stationary video cameras for densities, as opposed to relative indices, and then we would certainly like to create what we would call an enduring community of practice.

It took us years to get the people in place to do this and then derive all the technologies and get up to speed, and so doing this is not trivial. There are a number of groups, like Vince Lecours' group at UF and Will Patterson's group, that are doing density estimates, and we think there's a good community here, and one of the things that I wanted to emphasize, right at the end of my talk, is a new NOAA-funded mapping center that is headquartered at USF, and we will be in this business for a while.

One of the things that I mentioned before was that we thought there might be something like 15,000 square kilometers of important habitat, and that's based on a little bit of the geological understanding that we have of the region, and so this is the results from seismic surveys that we did both in the Southwest Florida Middle Grounds and also the Elbow.

These are not like the air guns that the oil exploration industry uses, and these are what USGS calls bubble guns, but we were able to actually understand the structure of a place like the Elbow, and you can see that these are lithified sea level stands, and so, basically, 12,000 years ago, or maybe a little

bit longer, and since then, the sand has turned to rock, and you can see this relatively shallow formation under the sand veneer, and so that's pretty important, in terms of understanding, and it's primarily important because you can see -- If you look at the areas where we've got the circles, these areas, like the Elbow, exist throughout the West Florida Shelf.

Like I said, these are probably areas that we should be mapping, because it's more than likely that they are high-abundance areas for things like reef fishes, and, also, there are a number of places where you've got mounds and pinnacles and banks, like the banks that we've talked about before, and, basically, drowned barrier islands as well, and so interpreting these and doing more habitat work is going to ultimately be pretty important for reef fishes and turtles.

Again, we talked a little bit about the council's Amendment 9 coral protection areas, and many of these have not been mapped. We did a re-map on Parker Bank, which was originally mapped by NOAA, and we actually found that the map was not particularly well registered previously, and so we think that new maps would be helpful to the council, in terms of these kinds of things.

The last thing I wanted to talk about was the new mapping center, and the acronym is COMIT, the Center for Ocean Mapping and Innovative Technologies. This is supported by the Office of Coast Survey at NOAA, and it's a five-year grant that we've got, and part of the reason for COMIT is to develop new technologies that are better, faster, and cheaper, and so we'll be looking at remote sensing technologies and the potential for a variety of autonomous vehicles to do this kind of work and doing some experiments out on the West Florida Shelf.

It's a partnership with NOAA, and one of our major partners is the University of New Hampshire, which also has a mapping center, and so we'll be looking at enhancing the local capabilities and partnerships that we can potentially generate, and so I would urge people to go to the website, or look at our Twitter account, in terms of some more information about it, but, basically, the new center has a number of major themes.

It's particularly looking at nearshore integration into unmanned systems, and that is it's difficult to run a research vessel in relatively shallow water, but a lot of these unmanned systems work well there. Enhancing geodetic observations, and that is a multibeam map only works if you have a really good understanding of what the water depth was when you were actually collecting the data, and so that's the notion of the geoid.

We're looking at disaster responses and how hydrography might help, using other remote sensing technologies and then doing some education and outreach programs, and one of the things that we're trying to think about is using what we would call crowdsource bathymetry, and that is using private vessels, commercial vessels, et cetera, to help develop these maps and to calibrate them, particularly in areas in the nearshore, where research vessels are expensive, because of the shallow beam spread, and where you've got a lot of vessel activity anyway, and certainly we know, on the West Florida Shelf, there's lots of vessel activity.

In terms of management thoughts, there is a number of things that I wanted to put on the table for sort of where we go from here. Some of these areas are potential candidates for additional HAPCs or other management areas, and so we've been able to discover some areas that look promising, and entering into that discussion about whether it's worthwhile to include some of these others as candidates is important.

As I said before, the Gulf Stream pipeline is an important sea turtle habitat, and the issue of are protections adequate, and it's likely that recreational fishers, for example, are much more likely to encounter a sea turtle on the pipeline than they would in some of the other natural habitats, even relatively close by. Have we done a good job of informing recreational people about safe hook release and other things? There are a variety of things that we could do.

The use of direct estimates of population size in stock assessments, I'm sure that was well covered yesterday by Greg's presentation, and I think this is the kind of ultimate prize in a lot of what we're doing, and certainly the kinds of methods that we've been able to develop here may lend to this larger discussion about this in the future.

The sort of notion of additional research on the visual methods for stock assessment, autorecognition, both in our line transect studies and then extrapolating those to some of the other camera systems, and siting probabilities will always be an issue.

We know that, with the scenes of both fish and their habitats, there is a lot of room for what we would call spatial ecology and the fractal geometry of fish and habitat relationships, and, also, the multispecies associations.

With normal lethal sampling that we do for fisheries, we tend to

aggregate over a large geography, and, for example, an individual trawl haul, we somehow have in our mind that each of these animals was associated with one another in the area that was swept. Well, actually, that's probably not true, that you have these microhabitats that hold different species, and so I think using video data to actually understand the scale of multispecies associations is helpful.

Then this dialogue about priority areas for additional mapping is really important, I think, and so I will just finish up and say, really, this is our crowd, many of whom are on the call today, and I want to thank them, and I want to thank the SSC and the council for allowing us to make this presentation, and I would be happy to answer any questions you all might have. Thank you.

CHAIRMAN POWERS: Thank you. That was very interesting. One of the things that comes to my mind is one of the things that I think ought to be investigated as well is what scale of sub-sampling might you need, so that, if you wanted to do this every three years or every five years or something like that, and perhaps use the information as a monitoring aspect for a particular species, in terms of densities and that kind of thing, and maybe even use it as part of a management procedure in an MSE context. That's the sort of thing that I think would be interesting, is can you scale this to a reasonable economic level to reproduce it on a semi-regular basis.

DR. MURAWSKI: Joe, that's a really compelling question, and that is, if you do a large regional assessment, you're going to find where the hotspots are, and so the question would be can you develop something that would be a subset that you would monitor over time.

Number one, if in fact half the fish are in 4 percent of the habitat, does that tell you a lot about what the changes in density are? Now, that can go both ways, and we've seen where high-density areas can be high-density areas until the stock collapses, and so I think some strategy that mixes monitoring on these high-value habitats and then some monitoring in the larger area is probably a strategy to guard against that, but I don't disagree with you that understanding where the fish are and what kind of habitats they prefer is a big leg up, in terms of sort of blind non-stratified sampling or using strata that aren't relevant to the animals.

CHAIRMAN POWERS: Thank you. Katie, did you have a question or a comment?

DR. SIEGFRIED: Thank you. Thank you for the presentation, and we just had a quick question for you. During any biomass extrapolations that the group has done, is there any attempt to make, or to differentiate, between the sand that's adjacent to rock and then sand that's in the middle of nowhere?

We're just thinking about this in terms of whether applying these density estimates from the adjacent -- Or rock near sand to all sand would potentially bias the sand estimates, and have you all thought about that?

DR. MURAWSKI: Yes, indeed, and so part of this is what's the optimal pixel size to make the extrapolation from, and, as you said, you have these mixed habitats, or ecotones, and, in fact, some of the work we've done in the Florida Middle Grounds, the highest densities are right at the edges, and, in some cases, the edges between habitats are distinct, and so certainly you have the highest biodiversity along the ecotones, which is sort of well-known in ecology, but one of the things that Alex Illich has done is actually blend some of the scenes before and after, to make sure that you're looking at a consistent habitat and not a mixed habitat. I think, actually, by having another classification that is these mixed habitats that are kind of the fringe areas around the hardbottom habitat is kind of the way to go there.

DR. SIEGFRIED: Okay. Thank you.

CHAIRMAN POWERS: Thank you. Paul Sammarco.

DR. SAMMARCO: Great presentation, and I enjoyed it, and this stuff is very close to my heart, actually, but it was very good information. It's clearly important for species distribution and abundance of fish and the geography of the bottom.

We have done a lot of work, very similar work, with my lab team on thirteen banks in the northern Gulf, and we have been able to show -- I mean, as you have, and you know that these data matrices are absolutely huge, and we had the same thing, and what we analyzed is we analyzed for a number of things, including species diversity and relationship to the bottom and relationship to the banks and so forth.

One of the things that fell out of it that was kind of interesting was we found a direct relationship between the diversity, or species richness, of benthic species, and I think fish were thrown in there as well, on these mesophotic reefs and

relief, and you're probably seen this as well, and I was thinking that you have these data as well, and these sorts of correlations can be done, but I would bet dollars to donuts that you have a high correlation between the amount of relief and your fish and your species diversity.

It's not an unknown relationship, and people have been looking at this on a smaller scale since probably the 1970s, or maybe earlier, but I was wondering if you have looked at that at all, or do you have an interest in or whatever?

DR. MURAWSKI: Well, thanks, Paul, and I appreciate your work on the banks in the northern Gulf of Mexico, and certainly those are really interesting habitats. They're sort of suspended in the mud and sand area around them as well.

You're exactly right. I mean, there are benthic species, like sponges and other things, that are part of this classification scheme that are predictive of the types of habitats, and certainly, all things being equal, they are going to be directly related to the quantity and diversity of near-bottom fishes and invertebrates as well, and so we haven't worked on a lot of that.

Part of our project was basically doing the mapping work, and I think there's a tremendous capacity for our graduate students to work with these data, now that they're up and running, and this is a point that my colleague, Chad Lembke, makes, that we're very happy to work with graduate students who might want to mine these data for these kinds of hypotheses about how things are interrelated, and we do classify the invertebrates that we see related to these as well, and so that's a really good point to make.

DR. SAMMARCO: We actually found that you could predict diversity from the relief. In other words, if you wanted to do that, you can scan. Once you have the relationship for this general region, you can actually scan for relief and then predict the diversity in a particular area, based on your numerics, and so it can be valuable. It can be pretty valuable.

DR. MURAWSKI: Well, that's right. I mean, the whole point of habitat areas of particular concern is finding locations that are relatively unique and understanding their characteristics, and this kind of gets back to Joe's point earlier about monitoring some of these places over time.

You know, will we have reductions in overall diversity with

things like climate change on the shelves and whatnot, and should these be sort of areas that you periodically monitor, not only for counting fish for fishery management purposes, but, generally, how does biodiversity change with all these different structures.

DR. SAMMARCO: Right. Well, thank you very much.

CHAIRMAN POWERS: Thank you. Before we go to Will Patterson, also, one of the things that struck me, when I was looking at this, is the scale of the density of lionfish, and they're pretty predominant there, and presumably that scale has increased over the last twenty or thirty years, and, prior to that, it probably was next to nothing, and so this has some implications, I think, in terms of interpreting what is happening to gag and red grouper and that sort of thing.

DR. MURAWSKI: You know, it's interesting. My colleague, Sarah Grasty, has done some work on the grouper holes out there, and, particularly in Steamboat Lumps, most of the grouper holes, particularly if you've got a red grouper in it, there are also actually lionfish in the depression, and so the lionfish have taken over a number of these grouper holes, and we know that they are competing for small demersals, which may include things like juvenile snappers and groupers, and so it's not only things like artificial reefs, and I'm sure Will will want to comment on that, but also these natural habitats.

They are ubiquitous at this point, and, of course, our project doesn't go back in time, for sort of the invasion of lionfish, but certainly they were found on all of these different habitats, and they're really a pretty amazing animal, in terms of the diversity of habitats they can actually occupy.

CHAIRMAN POWERS: That's interesting. Thank you. Will.

DR. PATTERSON: Thanks, Joe. Steve, you mentioned some of the issues about attraction and avoidance, and then visibility, that can affect the detection of animals when you're using the C-BASS, but one thing you didn't mention, and maybe you've done some work here, and so I'm curious, but, when you get into these more complex habitats, and fish have more places to hide, then detectability can be affected by that, and Holden Harris did some nice work here, looking at less-complex artificial reef habitats and more complex natural reef habitats and detectability of lionfish, using some depletion methods to examine that.

I'm curious if you've done any comparative work with smaller gear, like ROVs, that might be a little more nimble for this habitat, or even divers, technical divers, in some of these discrete habitats along the West Florida Shelf, and compared your density estimates among methods and tried to get a sense of whether the C-BASS is having similar issues with detectability or if it may be less or more, and any work done in that respect?

DR. MURAWSKI: That's a good issue, Will, and thanks for bringing it up. You know, there's a tradeoff here of working, for example, with the technologies that Will has, which are smaller ROVs, where you can basically work around a coral head or a habitat and kind of peer in, particularly if it's highly-diverse habitat, where there is overhangs, et cetera.

Our goal was to basically move along in a fairly rapid pace, and so one of the things that we've said is we're probably not good at detecting things under about fifteen centimeters, just because you're moving fast and they are small animals, and there's a tradeoff for how much habitat you can actually look at.

I do think that that's probably an issue in these extremely high-relief habitats, where you have boulder fields and crannies and whatnot, and a single pass is certainly not going to do that, and I think your point about doing more calibration work, in particularly those high-relief habitats, where you might actually be underestimating fish densities, is pretty important, and I know you've done a little bit of that work as well, and so this is one of the reasons why we're working with Ted's group to do an inter-calibration with the fixed cameras, but the Elbow really doesn't have a lot of that habitat, in terms of overhangs and whatnot. I think it's more the higher-relief habitats that are going to be problematic for that, but it's a good point, and maybe we should team up and do something together.

DR. PATTERSON: Sounds good.

CHAIRMAN POWERS: All right. Thank you. I think I will shut it off here. That was very interesting, and I hope to see how this progresses, because it certainly can be utilized in terms of developing assessment models and management advice associated with that.

We will move on then to the next agenda item on carryover, Agenda Item XIV, and Dr. Stephen is -- I think there's a couple of presentations, actually. Jessica, if you can begin there with the carryover, and what we're going to need to do is look

at the information that's presented here, in terms of the IFQ, and make some judgements about how to proceed based on that, and so if you'll go ahead then, Jessica.

CONSIDER CARRYOVER OF UNCAUGHT COMMERCIAL QUOTA FOR IFQ MANAGED SPECIES

DR. JESSICA STEPHEN: What I have today is some information about if the council decides to go through with a carryover, due to the pandemic impacts.

I just want everyone to keep in mind that the council is still considering whether to do a carryover provision for 2020. What I have for you are preliminary 2020 landings, and we'll do a little bit of comparisons to past years, so you can see how that's working in comparison.

What we're looking for from the SSC is advice needed prior to the carryover action, and so we're looking to have your thoughts or comments about how much carryover we should do by share category, if it needs to be done by all the share categories or not, and, of course, we need to consider, with the carryover, whether there will be negative impacts on the SSB or rebuilding timeframes, as well as the buffer between the ABC and the OFL. If we are going to exceed it, we would need approval to exceed the ABC for each share category.

Some of the things that might make carryover a little bit more complex in our consideration are the flexibility measures within the IFQ system and the multiuse considerations. Within the deepwater and shallow-water complexes, we have what are called flexibility measures, and we have three species, scamp, warsaw, and speckled hind, that can be landed under either category. There are rules for how they get landed under each category, and that is taken care of automatically within the online system, and those rules are that it must be landed under its first primary category, and only when all allocation within that category is exhausted for that shareholder can it then be landed under the other category.

When we get to red grouper and gag multiuse, it's a little bit more complex. For these categories, what we do is we take a percentage of the released quota and convert it into multiuse category, and so part of red grouper becomes red grouper multiuse, and part of gag becomes gag multiuse. The multiuse provisions are disallowed when under rebuilding plans.

For the gag and red grouper, the way we decide what proportion

of the quota goes over to multiuse is a formula that has been derived through the SSC in previous years, and this formula ensures that neither red grouper nor gag landed under either category would exceed the ACL for those species.

Again, the system does determine how this is used. For example, here, with gag, gag would first be landed under the gag category, and next it would be moved to the gag multiuse, which was originally generated from the gag category, and then, finally, it could be used under the red grouper multiuse category.

When we're thinking about carryover for these two species, one of the considerations, or thoughts, we would like to get from the SSC is whether we should carry it over all as a primary, and keep in mind we'll have some people that only have gag multiuse and not gag, and should that all just go over as primarily gag? Should we leave it as it is in the remaining accounts, which could contain both the primary and the multiuse, or should we take it all together and do a proportional formula, as we used for distributing the 2021 quota?

Now I want to get into some of our preliminary landings data, and keep in mind that we just migrated our system over, and so we were working within a new database, and we were a little bit last-minute grabbing these data, as it ended in 2020, on December 31.

Preliminary, we do have that, for red snapper, 99 percent of the quota has been landed. This is similar to past years. Red grouper landed around 79 percent, a little bit higher than some of the past years, but please keep in mind that the red grouper quota itself dramatically dropped between 2018 and 2019, from 7.78 million pounds to three million pounds.

Gag grouper was also similar in 2020, although slightly lower than previous years, at about 51 percent, and then we have the three remaining categories, and deepwater, shallow-water, and tilefish are all a little bit lower than what we've seen in past years, and deepwater grouper had 79 percent, roughly, although that has been shown in past years, but it is one of the lower amounts that we've seen landed. Shallow-water was at 31 percent, and shallow-water grouper, in general, the percentage of quota landed, fluctuates tremendously year-to-year. Then tilefish was lower, at 60 percent, compared to some of the past years.

I did that as percentage of the quota, and sometimes it's a

little bit easier to look at it in actual pounds, and so what I wanted to show you here was what the remaining 2020 pounds were within each category and what those percentages calculated out to.

Red snapper was around 67,000 pounds, and red grouper at 631,000 pounds, gag grouper at 463,000 pounds, and deepwater is at 220,000 pounds. Shallow-water is at 360,000 pounds, and tilefish is at 233,000 pounds. You can see that, in comparison to the quota, some of these are a rather significant amount of remaining allocation, if we were to carry over the entire amount.

We also did a little bit of investigation into how many of the accounts that held allocation throughout the year were accounts that also had remaining allocation in it, and, by share category, it varied considerably. We had red snapper, where only about thirty accounts that had held red snapper throughout the year still had remaining allocation, and remember they did land 99 percent of their quota, and the bulk of these accounts held somewhere between 101 to 1,000 pounds.

Looking at red grouper, we did split it out between red grouper and red grouper multiuse, as shown here, and it's around 63 percent of the accounts holding that, and, again, primarily, we're looking at accounts that are anywhere between one to 1,000 pounds being held within those.

The same thing with gag grouper, and we broke it up between the gag and the gag multiuse categories, and around 69 percent of the accounts had some form of allocation remaining in them, and the bulk of them was a little bit closer to that 100 to 1,000 pounds per account category.

Then deepwater grouper was 60 percent of the accounts had remaining allocation. Here, they were primarily in the eleven to 100-pound category range, and shallow-water grouper was 74 percent of all accounts, and it's primarily dominating in the eleven to 1,000-pound range. Finally, tilefish, which was 58 percent of the accounts, and, here, you can see that those accounts were primarily anywhere from one pound up to 1,000 pounds per category.

Here, what I wanted to show you is we went and we looked at the OFL, the ABC, what the buffer is between the two of those, and I compared the overage, and I have to apologize. The shallow-water grouper, the line is incorrect in this graph, and I don't believe we have an OFL for shallow-water grouper, due to issues

we had with black grouper, which is one of the species in that category.

The columns that are highlighted in red is where the overage, or what we have remaining within the IFQ system, if we were to carry it over, is actually exceeding what that buffer is, and so, realistically, we could probably carry over the red snapper and gag without much work, but, in looking at the other species, we would have to either raise an OFL or ABC to carry over the full amount or consider how to proportion out what to carry over of those remaining accounts. Here, I would like to kind of open it up for any questions or if John and Ryan have anything more to add to it.

CHAIRMAN POWERS: Are there questions?

MR. RINDONE: Just to echo what Dr. Stephen said about the deepwater and shallow-water grouper complexes and how the catch limits for those are just a little bit different, because the recreational landings for those tend to be lower by species, and so we have poundages listed for the quotas that are used in the IFQ programs, but all of the landings -- Just to clarify that all of the landings commercially and recreationally are still counted.

DR. ANDERSON: Could I ask that we put the last slide up again?

MR. RINDONE: We're working on it. The computer is having its own mind today sometimes.

CHAIRMAN POWERS: Lee, did you have a specific question about it, or did you just want to peruse it?

DR. ANDERSON: I just wanted to peruse it.

CHAIRMAN POWERS: Okay. We will probably want to refer back to this as we go on to discussion. At this stage, Andrew, did you have another question?

DR. ROPICKI: I realize it's probably not fair to ask this, but do we have any dockside price data, like how it changed throughout the year and what they were getting for the different species groups in 2020?

DR. STEPHEN: Give me a second, and I probably have something for the council for that, and I can look up and see if I have something for you.

MR. RINDONE: Dr. Stephen has been presenting the impacts of the pandemic on share prices, dockside prices, et cetera, to the council now for the past several meetings, and that's been very informative, and you can see the progression of those presentations and those data in the archived council briefing materials for I think just about every meeting since July, or June, rather.

DR. STEPHEN: I think I did add it as supplemental slides in this, and so if you can go to Slide 17. It's in graphical format, and so this is -- I have one for each share category, and what you see here is red snapper, with the bottom graph showing the ex-vessel price.

To orient you a little bit to the graph, the gray line is the average of 2017 to 2019, and the black-dotted line was 2019, and that blue-dashed line is representing 2020, and so here, in red snapper, you can see the dip down when the pandemic was really affecting things, but, as different states opened up, or different businesses figured out how to open restaurants or sell fish in fish markets, we see kind of that increase in the ex-vessel price in 2020 and the later weeks, and so we could page through each of these, if there's any particular species that anyone had interest in. For the deepwater, shallow-water, and tilefish, we picked one species to represent each one of those categories.

CHAIRMAN POWERS: Okay. You had asked for questions at that stage, and did you want to continue on with the presentation?

DR. STEPHEN: The rest of the slides that I have are really just supplemental, if you were going to ask questions, and we might want to go back to kind of the beginning slides and think about some of the questions of which categories would be worthwhile to consider or give advice towards the council about, as well as, if we do consider doing anything with the categories that have flexibility measures or multiuse, some decisions or thoughts about how to best accomplish that.

CHAIRMAN POWERS: Thank you. I think it was the previous slide that you had there, and can you go back to that? One had sort of the questions to be asked. Essentially, that category is what we're trying to address. Let me open the floor.

I think we're being asked to provide some guidance, and let's take the first step, on whether carryover affects the SSB levels to any large extent or rebuilding times, and those are species-by-species kinds of decisions, and so I think -- Well, Lee will

get us started. Thank you. Lee.

DR. ANDERSON: I hope so. Can you tell us what has been done in the past with respect to carryover, what percentage, because some of those ones in red on that last page, that's going to be a big carryover relative to the buffer, but what have they been in the past, please?

DR. STEPHEN: I can answer, or Ryan can, but we have not done carryover in the IFQ, and it is currently not an action that we take year-to-year, and Ryan probably can speak more to, when we were considering carryover provisions for stocks within the Gulf, we actually decided not to include the IFQ, due to a variety of different issues that may come up from having the IFQ kind of in effect and carrying over. Ryan, do you want to add to that?

MR. RINDONE: I was just going to say none, and so we have not done carryover in the Gulf ever. We had presented a document to the council that they ultimately tabled, and the presentation for which is actually one of the next items under this agenda item that I was going to go through, so you guys can see what the council's train of thinking was as they were going through this. That's really your pleasure about where you want to advance for this agenda item at this point, Mr. Chair.

CHAIRMAN POWERS: I think we're kind of struggling about how to go ahead, and so, at this point, I think the presentation, the other presentation, go ahead and do that, and we'll kind of formulate our thinking in the process.

MR. RINDONE: Okay. I will go through it briefly. Just to kind of recap what the council is asking of you guys for this particular agenda item, if we go back to the scope of work and head down towards the bottom of that, the council is asking you to review and discuss all of this information and make recommendations to them relative to the relevance and feasibility of carryover of unharvested quota within the IFQ programs.

The committee should also consider whether it's appropriate to modify the ABCs for certain species to accommodate carryover from 2020 to 2021, if I appropriate, and, of course, there are multiple things to consider here, and not just the biology, but also social and economic considerations.

If we bounce back over to the carryover presentation, if we look right here, and this is based on 2017, when we got this document

off the ground, and you can see that there were varying amounts of overages and underages for the different components of -- Or the different fleets for each species.

One of the things that we tried to focus on with respect to carryover was to ensure that any carryover was applied to the smallest divisible component of each sector, or in each fleet, and so, for example, greater amberjack would just be the commercial and recreational sectors, but, for kingfish, you have the recreational sector, and then you have the different zones and gears for the commercial sector, and so carryover for kingfish shouldn't be applied just to the commercial sector, but down to the smallest degree possible, and so, as an example, say the Western Zone handline component of the commercial sector.

That's to ensure that assumptions that are made in the stock assessment about things, like gear selectivity and catchability, et cetera, that those are not violated by carryover fish, and one component of a sector, or one fleet, may select for a different size and/or age than another one, for a variety of reasons.

These are some of the rules that we have put in place, the first one being the smallest managed portion that I just talked about. That if the combined sector landings exceeded the sector or the stock ACL, that no carryover should occur. That the amount to be carried over, when added to the ABC, cannot result in an ABC greater than the OFL. Then the carryover would only be an underage of the original ACL and not the adjusted one, and so, if in Year X, you didn't land your ACL, and so, in Year X-plus-one, there was a carryover, and you didn't land your ACL again in Year X-plus-one, then there would not be a subsequent carryover to Year X-plus-two.

These are just some of the options that were considered by the council prior to pulling the plug on this particular document, and the council preferred saying that carryover would not apply to species that were currently overfished or that did not have their fishing year close as a result of the ACL or quota being met or projected to be met.

This table here just shows, based on that decision at the time, which species would be eligible, and the species eligible is in green, and the species not eligible are in red.

Then we talked about how to adjust for management uncertainty. For some species, in some fleets, NMFS does a pretty good job with being able to manage those to their ACTs or ACLs, and an

example is the for-hire component for red snapper has been able to be maintained at or under its ACL for the last couple of years, but one that we struggle a little bit with is amberjack, and also sometimes triggerfish, and so consideration of something to help account for some of that management uncertainty, when we're fiddling with the ABC and the ACL like that, was considered.

The council said that -- They had preferred adjusting the amount of the ACL to be carried over by limiting how much the difference between the ABC and the OFL can be reduced, and so they said that they didn't want to reduce it by more than 50 percent, and so just kind of as a little bit of added insurance, especially since, for some species like red snapper, the stock ABC is only 2.5 percent and change underneath the OFL, and so, depending on species, it can be a razor-thin margin, kind of like you guys talked about yesterday with reservations about the way the P* process works with our current control rule.

Then we talked about modifying the framework procedures to automate pieces of this process, and the idea was just to make it as automatic as possible, so that we didn't have long, lengthy bureaucratic-management-related delays, wherever we could avoid them.

Ultimately, this was tabled, because, if you're going to carry over quota, like we've talked about in the past, then you should also be willing to pay back any overages that occur, and so, for some species, our current accountability measures don't exactly cater to that, and the payback side of things is a little bit more difficult of a pill to swallow than being able to gain something through a carryover, but, for every yin, there's a yang, and the Science Center has done extensive simulations on this, to show that, pound-for-pound, you can carry over what was foregone in Year X to Year X-plus-one, but, if you're going to do that, in keeping with balance, you need to be willing to pay back, whenever there is an overage, pound-for-pound, as well, and so that balancing act is what keeps us in check with our rebuilding timelines and making sure that we don't eat up too much of our principal by allowing carryover, but not doing any paybacks. That is a gross simplification of the simulations, but are there any questions?

CHAIRMAN POWERS: Okay. Andrew, did you have a question or a comment?

DR. ROPICKI: Just so I'm clear, what we're considering right now would be a one-time thing, right, just for the pandemic

year?

MR. RINDONE: That is correct.

CHAIRMAN POWERS: Sean and then Lee Anderson.

DR. POWERS: Ryan, can you go back to I think it's Slide 7 that showed the eligible species? I have big reservations on doing any carryover, especially with what we heard about gag and what we know about red grouper, and probably less over tilefish, but the management -- I will agree that the overages need to be paid back, but it's a target, and sometimes we go -- Hopefully sometimes we go low, and rarely do we go above, but, for some of these species that we have talked about, we have significant concern.

While they're not technically classified as overfished or overfishing, we have been talking that the assessments may not be accurately reflecting those stocks, and I definitely have that opinion for all the groupers involved, and, like I said, less so, probably, for tilefish, but it's been a while since we've had a new tilefish assessment, I believe. Anyway, that's my thoughts, and I just mainly wanted to see this slide.

CHAIRMAN POWERS: Thank you. Lee.

MR. RINDONE: Mr. Chair, just to Sean's point?

CHAIRMAN POWERS: Go ahead, Ryan. Sorry, Lee.

MR. RINDONE: For what you guys have before you for what the council is requesting right now, it's just for the IFQ species, and it's important to remember that, as far as overages are concerned for the IFQs, for the IFQ programs, it's not something that those programs deal with, because of the way that they're structured and the way the whole program works. Overages just aren't a thing for that. When you guys are thinking about it, that's just something to remember for those species, for this instance, that you're being asked for consider for this. Thank you.

DR. ANDERSON: Should I jump in here?

CHAIRMAN POWERS: Yes, please.

DR. ANDERSON: I am just interested in what is the --

MR. RINDONE: Lee, we lost you there. I think you were asking

what the motivation was, and something that -- I'm going to take a guess, since we lost your audio, that that's what your question was, but the motivation behind this, at least from what we've heard at the council meetings, is that there are fishermen that have invested in this fishery, or these fisheries, under the presumption that 2020 would be just like any other year, and clearly it was anything but.

There are fishermen that are carrying around, or at least were carrying around, pounds of fish that they weren't able to go and catch, and those pounds represented a financial commitment, and those fishermen are now in the hole on those pounds, and this was primarily something that applies to fishermen, commercial fishermen, that lease quota from other people.

If they don't use that in a particular year, then it doesn't carry over for them to the next year, and they're just out that money that they paid to lease those pounds of fish, and so what the council is trying to consider is a way to help make those fishermen whole, given that what happened in 2020 was not something that was able to be predicted, and the ability to carry over from one year to the next, as long as other conditions are met, is not expected to result in any long-term negative effects to the species that are being considered.

DR. ANDERSON: Thank you.

CHAIRMAN POWERS: Thank you. Let's go to the slide from Dr. Stephen's original presentation that actually had that table in it, and I have forgotten which one, but what the buffer was. I think this is kind of the decision table that we have to deal with, I think, in answering those particular questions. Walter.

DR. KEITHLY: Thank you. Jessica, you showed it on red snapper, I believe, just now, but could you refresh my memory -- I believe, at the previous SSC meeting, you had a graph, or graphs, of all the different IFQ species, in terms of their prices during the pandemic versus pre-pandemic, and could you at least refresh my memory as to whether prices for those species were significantly below the pre-pandemic prices?

DR. STEPHEN: I think I included most of the slides here as supplemental, starting -- I showed you Slide 17, but, if we move to Slide 18, it would be gag, and then looking at the bottom graph is where you would be looking for the ex-vessel prices, and you can see a little bit different story going on with gag, with how the fluctuations were occurring there, where we were definitely under during when the pandemic first hit, and then

moving up with the other ones.

If we move to the next slide, this would be red grouper, and what you're seeing in most of these slides is that, by the end of the year, we're seeing the ex-vessel price come up with those, and that's somewhat indicative that the market is beginning to recover, although I will leave that to the economists to determine.

This is yellowedge grouper, which is our representative species for deepwater grouper, and keep in mind this was one of the categories where the landings weren't as high as they had been in previous years, which you can see in the upper-right-hand corner. You also can notice here that the ex-vessel price never quite came up to where we had seen it in previous years.

Then one more slide here should be scamp is the species we picked for shallow-water grouper, and, within shallow-water grouper, and this is a somewhat different fishery, as it isn't one that is always targeted within our fisheries and IFQ, but you do see that the ex-vessel price here is approaching the 2019 values, but it's a little bit under what we've seen in the average of 2017 to 2019, and I believe we have one more with tilefish, with golden tilefish representing it. Here, you see similar to what you saw with deepwater grouper, and the landings, overall, didn't match up to what we had seen in previous years, and the ex-vessel price was lower.

DR. KEITHLY: Okay. Thank you.

DR. STEPHEN: Yes.

CHAIRMAN POWERS: Jason and then Andrew Ropicki.

MR. ADRIANCE: Thank you, Mr. Chair. I was looking at the table in Slide 5 and looking at how these landings had compared over recent years, and, really -- Obviously, accounting for red grouper having a quota change, proportionally, it still looks roughly the same, and the only one, to me, that looks like it really is off a good bit would be tilefish. I'm not sure if that's something to think about in a decision, and it's kind of going to Ryan's point as to making me wonder how far off is it for some of those folks that are stuck with some leasing issues.

DR. STEPHEN: If you do want to see more detailed years, starting at Slide 11, I have some further back in time, throughout the entire IFQ program, and I think Slide 11 has deepwater and tilefish in there, and that just gives you an idea

of how those landings have fluctuated over time in comparison to the quota. Keep in mind the quotas have changed over time for various species.

CHAIRMAN POWERS: Thank you. Andrew.

DR. ROPICKI: Just the slides, and I think it's 17, and down at the bottom, are helpful, but it's kind of hard to tease out, when you're looking at total ex-vessel value, what's happening to prices dockside, in terms of average ex-vessel, and is there any chance we've got that somewhere, where we could see what they were getting per pound through time?

DR. STEPHEN: I know we have the weekly ex-vessel price slides that we did for the last council meeting, and I won't be all the way through to the end of the year. Ryan, do you have those handy to show?

MR. RINDONE: Do I have what?

DR. STEPHEN: Do you have the last presentation that we did for the last council meeting? We had a weekly ex-vessel slide in the groups of slides like this. Is that something we can quickly grab and display?

MR. RINDONE: Quickly might be relative, but we can find it.

DR. STEPHEN: Let me also see if I have someone here who can grab it too, and I can email it real quickly and see what we can do.

MR. RINDONE: We're digging for it right now.

CHAIRMAN POWERS: In the meantime, let me recognize Tom Frazer.

DR. FRAZER: Thanks, Joe. My question for Jessica really is, again, to Ryan's point, and so a lot of the discussion was about people that held leased shares, and so is there a way to identify, for each of these particular fisheries, how many outstanding leased shares there are?

DR. STEPHEN: We're in the middle of still going through that analysis, and keep in mind that we only started trying to do this on January 4, because of waiting for the end of the year, and we also have gone over a complete system overhaul, and so we had to rewrite all of our code to generate it. We will have that by the council meeting though.

DR. FRAZER: Okay. Thank you.

CHAIRMAN POWERS: All right. I want to go back to the original table. Well, Lee, let me go ahead with you. Lee.

DR. ANDERSON: I am having some heartburn about the people that rent and how they should be treated. I can see both points, but I am not sure that the council needs to step into the market and say, well, if you bought it and then something happens, we're going to protect the sale or something, and I'm not sure that I agree with what I just said, but it's kind of a funny way to look at it, to separate it and say the guys who rented have to be treated separately, and I would like to hear what other people say on that.

CHAIRMAN POWERS: Jim Tolan.

DR. TOLAN: Thank you, Mr. Chairman. I tend to agree with Lee, being that this is just geared towards the IFQ program, but couldn't the same financial case be made by recreational fishermen who bought a boat at the very beginning of the year and, because of COVID, he wasn't allowed to go out fishing? It seems like an odd place for the council itself to step into the market, because the reason behind it wasn't specifically just the IFQ. Thank you.

CHAIRMAN POWERS: Thank you. We need to focus on what our decisions are in this and then some basic economic advice that we might give them. In terms of the decisions, I mean, on the basic decisions, my feeling is if you -- If whatever carryover it is is less than the buffer, and it remains within the ABC, then that's fine, in terms of the conservation objectives. If it doesn't, then that's not fine, in terms of the conservation objectives.

Then the other question that was being asked is do we want to modify the ABC, and certainly not at this point, and there's no reason for us to suggest modifying the ABC.

Now, I think, in general, that's at least my opinion, in terms of advice about the conservation sorts of issues, and I would like to get some sort of agreement about that, and then we can go on then as well about the economic implications of this and whatever advice we might give the council in terms of how they proceed relative to this, but I would like to kind of focus on that original table that had the overages for the seven or eight species that we're talking about.

DR. STEPHEN: I think was Slide 7.

CHAIRMAN POWERS: Okay.

DR. STEPHEN: My bad. It's Slide 8.

CHAIRMAN POWERS: Okay, and so, again, what I would like to do is kind of deal with those sorts of issues first, and Bob Gill and Will Patterson and Andrew, if you will keep the comments to these sorts of issues that I just mentioned, about the conservation objectives. Bob.

MR. GILL: Thank you, Mr. Chairman. I agree with your comments, and I will pass.

CHAIRMAN POWERS: Will Patterson.

DR. PATTERSON: You've addressed this, with respect to the earlier conversation, and I just didn't see anything in what's been presented that would allow us -- You know, there's no analysis to say what the economic impact of this could be, or the biological impact of this could be, and so, on the one hand, I don't see how the SSC has anything to comment on here, except to say the math is right in this table.

I mean, there's no real science being discussed here, and these are policy issues and management issues that the council can choose or choose not to affect the market in this way, but, really, there's not -- I don't see any science here for us to comment on.

CHAIRMAN POWERS: All right. If that is a tacit agreement, I don't feel the need for a particular motion associated with this, but the general opinion of the SSC, and we can move on then to the economic issues, and I would open again for the discussion about what information we might provide the council in terms of interpreting what they might do, and perhaps what information they might look at, as they proceed into that sort of decision-making. Andrew.

DR. ROPICKI: I had put my hand down, and it was kind of off-topic.

CHAIRMAN POWERS: Lee.

DR. ANDERSON: I agree with your point exactly, Joe. In fact, that's what I was trying to get at, and I couldn't say it as clearly as you did, but, in this case, you change this only if

it does not affect the biological health of the fishery, and so the red herring would have been in that to treat lessees different than owners, but, even in that case, I would not go for it.

Looking at these numbers here, and that other thing that we had, it looks like red snapper, the overage -- Even if it was all going to people who rented, you could give that back, and you would still be within -- You would not cut the buffer by more than 50 percent, which was something that was the preferred option, and so that's as far as I think we can go. Economics is important in certain ways, but I do not think that economics and people's pocketbooks should overrule the safe biological catches.

CHAIRMAN POWERS: Thank you. Mandy.

DR. KARNAUSKAS: In terms of what sort of information the council might want to look at, in terms of an economic analysis, I thought that Andrew made a good point earlier about the share prices, and, for example, the share price of gag grouper he mentioned is possibly bottoming out.

That could potentially be an indication that the quota is too optimistic and the reason they can't make the quota is because they can't find the fish, and so I think one piece of advice that the SSC might offer is to look at those share prices and try and differentiate where the fish aren't being caught because there is no market demand and where the fish aren't being caught because they can't be found.

CHAIRMAN POWERS: Thank you. Andrew Ropicki.

DR. ROPICKI: I just wanted to kind of touch on what Lee said, because it is very difficult, with how much bouncing around there is, in terms of percentage of the quota that gets harvested every year, to tell much about red and gag and deepwater and shallow-water grouper and tilefish as to how much of this is problems related to the pandemic versus just a normal year.

I mean, the one that I actually think would make the most sense to allow an overage, looking at the data you have going backwards, is red snapper, even though it's small. I mean, if you look at landings as a percentage of quota, going back to 2014, and, now, 99 percent doesn't sound like we're way down, but it's usually 99.4 or 99.6, and they harvest pretty much all of it, and, I mean, the one year where they were below 99 was

2015, and there was a big mid-year increase, and so that was kind of a different animal.

I mean, given the difference, the OFL and ABC buffer, and the overage being so small in our fairly common trend of 99.5 percent of it being harvested every year, I think there's definitely an argument to be made for a carryover there, whereas the other ones -- I think a lot more data would be needed to make a really informed decision on whether what we're seeing is pandemic-related or just normal kind of bouncing around that we have through time.

CHAIRMAN POWERS: Okay. Thank you. Ken Roberts.

DR. ROBERTS: My comments relate to red snapper and being in agreement with Lee. The only thing I want to add is that there's no need to correct a potential unanticipated impact on a group of people that are suffering some cost that hasn't been anticipated in their actions very quickly.

I think the gist of the discussion has been, well, we have an impact, and let's see how we can deal with it without affecting the buffer too much, but why not have the council give some thought to a two or three-year recovery period, instead of trying to have these people be corrected, so to speak, or have their problem corrected, within one calendar year?

I think it would be useful, if they're going to have a compensation program, and not direct payment, but a compensation in terms of giving them a chance to recover some of their business decisions, that it be done over a two or three-year period, and so I guess my comment is just to make sure that you don't try to correct a one-year event with a one-year reaction. Thank you, Mr. Chairman.

CHAIRMAN POWERS: Thank you. What we're doing here is providing some background information to our advice to the council about how they might approach this issue, given that they were to do it, and this is sort of separate from the sustainability issues that we've come to agreement with. Jessica, you had a comment?

DR. STEPHEN: I just wanted to add that, when we're looking at this data, some of the differences may not be all due to the pandemic, and we had several severe major hurricanes that shut down the fisheries, particularly in the Louisiana area, and that also would have an effect throughout for all the landings per year.

CHAIRMAN POWERS: Okay. Thank you. Ryan.

MR. RINDONE: I was going to mention that as well, that it seemed to be, in 2020, that, if we were going to hold a council meeting, it was going to get interrupted by a hurricane, and I know that correlation seemed to almost turn into causation, or at least that was the joke amongst staff.

Beyond that, when you guys are considering all of this, what's being requested of you is to consider whether it's appropriate to do this carryover from 2020 to 2021, but something that NMFS has provided guidance on for integration into the council's control rules is the application of carryover and phase-in approaches to changes in catch limits.

Phase-in can be to address positive or negative changes in catch limits, whereby that change is phased in, as it were, over a period not to exceed three years, but neither one of those is something that we functionally have in our current ABC control rule, and so that would be a point adjustment, if you will. Mr. Chair.

CHAIRMAN POWERS: Thank you, I think. At this point, Ryan, you don't really -- We have said all we have to say about this, correct?

MR. RINDONE: I mean, I am writing this up, and I feel like I've captured what you guys' discussions have been, and you guys will see that when you see the draft of the summary for your approval, and we've got a couple of council members that are listening in as well, and so they've heard those discussions.

I know that they asked you for a recommendation on what to do, and it's up to you guys whether you want to actually provide a recommendation in the form of a motion or if you just want them to try to grab it from what we've put in the summary.

CHAIRMAN POWERS: I would prefer to do it via the summary, because, basically, it's live with the ABC/OFL sort of arrangement we have now, and, if a carryover doesn't go over, fine. If it does, don't do it. Doug Gregory.

MR. GREGORY: I agree with that. There's no biological problem here, and, free market capitalism aside, it certainly wouldn't look good for the SSC to recommend to the council not to do this, when Congress has done this twice, for many, many businesses, many of whom didn't need it as much as the fishermen probably need it. Thank you.

CHAIRMAN POWERS: Thank you. All right. We're going to move on then, because we're hopefully getting towards the end of this meeting, but a big item remains, and that is the OFL and ABC for greater amberjack.

MR. RINDONE: Katie and Nancie, are you guys ready?

MS. CUMMINGS: Yes, I'm ready. Thanks.

CONTINUED DISCUSSION OF SEDAR 70

CHAIRMAN POWERS: Just a second. Before we actually get to the presentation, where we were before was we had made a motion, which carried, for the -- Basically, it said that the assessment was the best available information, and that, based on that assessment, we were determining that the stock is overfished and undergoing overfishing.

The vote, about a third of the people voted no on that, and largely because of the -- Well, some difficulties in terms of the understanding about what the assessment -- It's not so much the assessment itself, but the data and lack of understanding about some of the basic biology and information about amberjack and how that relates to what has happened over the last thirty years.

I sort of interpreted the vote that we had there as essentially agreeing that the assessment provided us information that didn't indicate that we should change our minds about whether it was overfished or overfishing, and now we kind of move to the next step, which is determining the overfishing limit and the ABC, and we had asked for another set of projections which modified the gap years related to this, and this is what the projections are that are being presented here, and so let me open the floor then for Nancie to present the new information that was passed out this morning.

MS. CUMMINGS: Thank you, Chair. Before I begin, I just want to make one small administrative edit from my acknowledgements on I think it was Tuesday, and I just want to make sure that I acknowledge all those external data providers and the reviewers from the panel that were not SAFMC reviewers, and I don't think I did that in my slide, and there were just a number of staff and individuals on the panel from outside of Southeast Fisheries that provided input, and they were really good input, and so I'm very grateful for that, and also for the folks from the SSC that have contacted me one-on-one about the presentation, and I

really appreciate your thoughts, and those were really good questions and points.

Thank you, Joe, for giving us a snapshot of the reason for this addendum, set of projections, and then, as we were -- Basically, I have here the -- I have repeated the assumptions and then the goal then of the updated projections was to change some of the inputs, in terms of how the 2019 data were used, and they were before used as an average, and now they're being used as 2019, and they're still preliminary, but it's my understanding that they're fairly close to being final.

Then 2020 and 2021 were informed by the 2016 to 2018 average, and no other changes were made to the rest of the projection assumptions, and, again, we're using the SS 3.30 Stock Synthesis model software, and that was the same, and so these are the only differences that were made.

Again, this is the same Magnuson-Stevens reference points table that you saw earlier, and there were no changes in any of this, and so this is a repeat, but it's presented here for completeness sake. I have two slides, and one figure, of the updated OFL and updated F rebuild calculations.

The way this is set up is similar to before, and I have several columns of the key metrics that are were in the projection. We have year, recruits, fishing mortality instantaneous, the F to F SPR 30 ratio, the spawning stock biomass, the spawning stock biomass to the spawning stock biomass at F at SPR 30 ratio, SSB to MSST and MSST being defined as 0.5 times SSB at SPR 30. We have also SSB per year, divided by the ratio of unfished biomass, and, finally, the calculated OFL.

Then we're characterizing the entire projection series of when does the stock spawning biomass attain MSST and greater, and/or greater, and when does the stock, spawning stock biomass, reach, attain, the SSB SPR 30. Then, for comparison, I have given you the OFL calculations from the -- I call them the pre-SSC, and they were presented at the SSC, but they were not these updated landings, and they were from Monday afternoon.

Then, as sort of a cheat sheet here for you, I have given you what the MSST is, again, defined as 0.5 times SSB at SPR 30, and I've given you the F SPR 30 value, and then I've given you the SSB at SPR 30.

The upshot of this, with the OFL series, is that we -- The stock reaches recovery, again to MSST, the overfishing definition, in

2023, and there is no change, and it attains SSB at SPR 30 in 2036. The difference, the take-home, is that there is a slightly lower OFL from this projection, and we can talk about any details in a moment, if you would like.

Moving on to the F rebuild projection, the F rebuild on the table that you see before you is similar to same layout as before and the key metrics from the projection. When the stock reaches the -- When it passes the SPR 30 50 percent value is 2023, and when the stock is rebuilt to SPR 30, within the rebuilding period, and the rebuilding period being before or equal to 2027, and the stock does attain that value in 2027. The previous scenario was the stock -- I think it was one year earlier, 2026.

I have highlighted, in both of these projections, the OFL and the F rebuild projection, I have highlighted those years when it reaches those two levels. The upshot of this, or the take-home, again, is that you -- In the initial years, you have a slightly lower OFL, and then here is a composite, sort of similar to some of our previous tables that we used to present, with the OFL -- Excuse me. The criteria, meaning at SPR 30 and/or at the F rebuild scenario, the retained catches by year, and we have presented five years here, and, again, the year the stock reaches, attains, MSST and attains or is greater than SSB at SPR 30.

Then a plot of the retained yield, and retained yield in whole weight, millions of pounds, by year, these being the historical years and these being the projection years, and, again, the projections have begun in 2022, but these 2019, 2020, and 2021 years, the historic yield being specified by your definitions of 2019, and 2019 was used as 2019, and 2020 to 2021 is used as 2016, 2017, and 2018, and the projection period going from 2022 forward.

I am just reminding the group that the other assumptions regarding the projections, regarding the relative F by year, selectivity, and retention then, for these years, would follow those definitions of being the 2016 to 2018 average. Thank you, and I will take any questions or comments.

CHAIRMAN POWERS: Thank you. Can you refer back to the table, the summary table, that was the five years?

MS. CUMMINGS: Okay. Thank you.

CHAIRMAN POWERS: All right. The reason I focused on the five

is that, traditionally, we haven't wanted to make recommendations many years out into the future, for obvious reasons.

I would remind people that we really didn't get a consensus when we voted on the original motion about the overfished and overfishing, and, again, I sort of interpreted that as not necessarily that they disagreed with it being overfished and overfishing, but rather the uncertainties in the data model mismatches that seem to be bothering us for a long, long time.

As we go through this, I fully expect those same issues to come up, in terms of people's comments about how we approach OFL and ABC, and so I am very much cognizant of that, and so let me begin by opening the floor to Bob Gill.

MR. GILL: Thank you, Mr. Chairman. Thank you, Nancie, for the work in producing this, and I have a couple of questions. The first one is on the detail slides, and you indicated, in the right-hand columns, the 2017 average yield, and did you mean 2019? Could you clarify for me which presentation you were referring back to with those columns? I think you meant the 2019.

MS. CUMMINGS: Yes, and I apologize. This is cut, and this should say -- I apologize. This was 2017 to 2019. I apologize.

MR. GILL: Thank you.

MS. CUMMINGS: But I need to also clarify that the updated projections, for both the OFL and the F rebuild, 2019 landings were used for 2019, but, for the average, for 2020 and 2021, it was the average of 2016 to 2018, and those were the definitions that were given to me by the group and also emailed to me by Ryan, and so this should say 2017 to 2019 average landings for all gap years, and this is the pre-SSC, the one you saw on Monday. My apologies. Thank you.

MR. GILL: Thank you for that clarification, and so I tried to compare the three projections that we've seen, from the report to the supplemental to the version you see in front of you, and, dealing with the one we have currently, what is striking is that this yield stream follows the supplemental ABC yield stream more closely, but, on the other hand, the OFL yield stream follows the original yield stream in the SAR, and that seems a little confusing. I was wondering if you would compare these and consider what the differences were and what generated them.

MS. CUMMINGS: Yes, I can, and thank you. The SAR -- At the time of the SAR, I just want to point out that we were not using the average recruitment from the last ten years, and we were still using -- I believe we were still using off the stock-recruitment curve, but, since the time of the delivery to the council for the SAR report, there were several changes made to the assumptions, and that was --

Basically, that's the reason that you're probably seeing the difference between the OFL, but I will point out that the final that we delivered on Monday afternoon -- Those were the final before this decision was made, or this request was made, to consider the different gap years information, informing the gap years, and so I would say that the projections presented in the SAR were very preliminary at that point, because there was changes made to the instructions for projections before that, and the main reason was the -- The main decision was, I believe, the stock-recruitment from the last ten years was not being used at that point.

MR. GILL: Thank you.

MS. CUMMINGS: Then I will point out that we have the one -- I think you recall the spike in the F rebuild error, the band here, that we had a little problem with the 2021, the first year, and that was due to the thing that Katie talked about yesterday with the little -- There's a little issue with SS, as to how it's calculating the error.

After the presentation, after the delivery of the SAR report, we worked with Rick Methot and one of the other developers as a work-around for that problem that was showing a large uncertainty, a spike in the uncertainty. Thank you.

CHAIRMAN POWERS: Thank you. Ryan.

MR. RINDONE: Thank you. Could we go to the next slide, please? We had fixed the information for 2020 and 2021 at the average of 2016 to 2018, and so I have two questions, as it relates to those two data points.

The first is they don't look to be the same, and if you could elaborate as to why, and the second is about the uncertainty around those two fixed point estimates and where that estimate of uncertainty is coming from. Then I have another question after that.

MS. CUMMINGS: Thank you, Ryan. I'll address the first one.

The landings information that went in for 2019 is 2019, and that is true. 2020 and 2021 was the average of the 2016 to 2018, and that's what is going into the landings. What you're seeing here is the SS estimated retained yield, and so what is going on -- Because, in the F rebuild projection, what is happening is that that F is being moved around to achieve the expected landings, and those expected landings are being calculated based on those assumptions regarding the 2016, 2017, and 2018 relative F selectivity and retention patterns, and those are going forward from 2021 on, because what we assume for the rule regarding setting of caps and allocations, as to when that could start, was 2021 forward. In both sets of projections that has been the rule. That's why you're seeing the retained yield for 2021 looking a little different, and your second question was regarding uncertainty?

MR. RINDONE: Yes, the uncertainty about those 2020 and 2021 fixed values.

MS. CUMMINGS: The uncertainty is coming from within SS, as I mentioned, but the input values are the 2016, 2017, and 2018 for 2020 and 2021.

DR. SIEGFRIED: Nancie, if I may help you.

MS. CUMMINGS: Yes.

DR. SIEGFRIED: One of the additional comments that I would like to make about this is that this is in yield, in millions of pounds whole weight. However, the recreational landings are entered in numbers, and so, even though we have a fixed value that went in in both 2020 and 2021, the model calculates the weight of those, which changes a bit, because F has changed a little bit in each of those years, and so it's a slight difference. We have had this occur in the past, when we've had fixed landings for an interim time period, and that's why it looks just a little bit different there, Ryan.

MS. CUMMINGS: Thank you very much, Katie. I forgot about the weight.

MR. RINDONE: Okay. I'm onboard.

MS. CUMMINGS: Thank you very much. That's an excellent question, Ryan.

MR. RINDONE: So then the other question that I had was as it relates to looking at the uncertainty as it balloons there in

2022, and then it kind of narrows out. Usually we tend to see the opposite of that, as we get further into the projections, which is one of the reasons why we have a little bit of a reticence to use projections further out than say three, or, at the most, five years, because circumstances can change, and I realize that we're already kind of stretching that here, because the terminal year in the model is 2018, and we're starting our projections in 2022, considerate of everything that we talked about on Tuesday. Maybe it's not really a question, but it's just something that I noticed that looked different.

MS. CUMMINGS: I think that's a valid, very valid, observation, and I think that's one concern I have regarding using 2022 forward for your projection years, as opposed to 2017 through 2019 average for those three years, but it's the purview of the SSC, as to your desire.

MR. RINDONE: I think the problem though with starting the projections earlier is we know for a fact that -- Well, I mean, just about the fact that whatever it is that comes out of this meeting is not going to be something that's implemented in time to affect the 2021 fishing season, given the pace at which amendments are developed and rules are implemented by NMFS, and there's just things that are typically in the way.

In the interim, there is a May season that may open up, and we have no idea what actually happened in 2020, and so we could start the projections in 2020, knowing that whatever it is that's been put in there is likely not what was landed, and that whatever we're saying is going to happen in 2021 is likely not what is going to be landed, and with no way of knowing the degree to which that recommended catch limit will be exceeded or not.

While there is a cost associated with that, in terms of the uncertainty about the recommended catch limits, I would encourage folks to think about that with respect to when we've requested these projections to actually begin and when we can actually affect catches in some measurable way.

CHAIRMAN POWERS: That with the tacit agreement we had on Tuesday is that we didn't want to adjust for the existing -- I wouldn't say known catch, the actual data that we had for catches for 2019, and then whatever averaging we needed to do for the gap years, 2020 and 2021. Katie.

DR. SIEGFRIED: Thank you. I just wanted to follow up on what Ryan was saying, and the Science Center doesn't actually

recommend using projections past three to five years for the state of management, and I know, Ryan, it's difficult, with the timing, to have that first year be the year you're getting the information, because of the lag of management, and I just wanted to also comment that we are working on a forecasting -- We have a forecasting working group starting in the Center to get at this uncertainty better in our projections, because it should get much larger. As we move forward in time, the uncertainty should get larger, we agree.

CHAIRMAN POWERS: Well, that's largely because it's all -- Once you get out a little bit into the future, it's all driven by the recruitment, and that's driven by the sigma-R, which is constant, and so that's why that band stays pretty much constant as you go forward.

DR. SIEGFRIED: Right.

CHAIRMAN POWERS: OFL and ABC, the previous slide, if we can go back to that, and I think that's kind of where we stand.

MS. CUMMINGS: I am sorry, Joe, and I apologize. I was listening, but I didn't hear. This slide here?

CHAIRMAN POWERS: Yes.

MS. CUMMINGS: Okay. Thank you.

CHAIRMAN POWERS: So how do we want to proceed with OFL and ABC? Ryan.

MR. RINDONE: Just a reminder to the SSC that these values are in the MRIP-FES data currency, and so, when you're looking at these and thinking about what we have now, what we have now is in CHTS.

CHAIRMAN POWERS: When you say what we have now, are you meaning the current ABC?

MR. RINDONE: Yes, sir. The current OFL and ABC were established using the MRIP Coastal Household Telephone Survey data currency, and these data that are presented now are using the Fishing Effort Survey calibrated data, and so it's not apples-to-apples.

If you guys recall, the table that Nancie had shown as part of her presentation that showed the differences in the equilibrium yields when the different data were applied to the same model,

you can glean what that difference in equilibrium yield actually ism as it's attributable to the change only in data currency without any consideration of changing the biological condition of the stock.

CHAIRMAN POWERS: Okay. Thank you. One other last question, as we get into thinking about the future, and there is -- Is there a date for a specified next time that the amberjack assessment is supposed to happen?

DR. SIEGFRIED: I can take a look at the master calendar, but there's also the -- There's been an interim request that we saw yesterday, and then there's also the greater amberjack count, and so there's a couple of pieces that will probably come before the next assessment.

MR. RINDONE: We have a memo out to Katie to request monthly interim analyses, and she's very excited. Just looking at our Gulf assessment schedule that we put together for the council members, to help them keep a bead on what's coming up when, we have an awful lot of activity for other species, but greater amberjack is not on the schedule between now and 2024.

For the interim analyses, the interim analysis schedule that you guys saw the other day, in 2022, we're requesting an interim analysis for greater amberjack, and then we're requesting the same again in 2024, and that would be using the combined video index as the representative index of abundance.

CHAIRMAN POWERS: Okay. Thank you. I am just thinking ahead and how long we should -- If we make recommendations for OFL and ABC, how long they should last before they get revisited, and, essentially, in terms of an index of abundance that will be relooked at in this context, you would look at 2024 and see whether something has changed, relative to these original recommendations. Paul Sammarco and then Jason Adriance.

DR. SAMMARCO: Thank you, Mr. Chairman. Actually, just a quick question for Ryan. The graph that we were looking at before, if Nancie could take us there, although we probably know it pretty well by know, for overfishing versus rebuilding, and, if there is that level of uncertainty, as you were mentioning, Ryan, with respect to the 2020 data and projected 2021 data, how would you recommend we proceed? How does one rebuild this graph? Would you use an average of the previous two or three years, or where would you -- How would you recommend filling in those dots, if you feel those dots are unreliable?

MR. RINDONE: Well, after hearing the explanation for it, it makes a little bit more sense. We input -- We started with the catches from 2016 to 2018, which, as Dr. Siegfried said, those are input as numbers, and then the model has to convert those numbers to pounds.

Then you also have the added requirement of adjusting the fishing mortality rate, in order to meet the rebuilding timeline, and so those points that you see there for 2020 and 2021 are in fact yield, and they're not fixed values of the pounds that would represent the average that we say was caught between 2016 and 2018. They are projected yields that the model predicts will have been caught in 2020 and 2021, and, as we know, as you go from one point to the next, what we say can be caught in 2021 relies on what is listed as having been harvested in 2020 actually being harvested to the pound, and that's true of every subsequent year, as it relates to its previous year.

I am comfortable with all of that, personally, and knowing that there's going to be some estimation error associated with how to adjust F on an annual basis, to try to meet the end goal of being able to rebuild the stock by a fixed point in time, and so I think the things that Dr. Siegfried was touching on about what the Science Center is working on to better describe uncertainty, being that the uncertainty at the tail-end of this visualized projection period is more narrow than we would think it would be, given how wide it is for 2022, and that's probably a separate task for another time, but I don't know that it limits you guys making a decision here.

DR. SAMMARCO: Thank you. Thanks very much.

CHAIRMAN POWERS: Jason, do you have a proposal?

MR. ADRIANCE: No, I do not. I have a clarification question on the previous slide, Slide 8. On the left-hand side there, those should both read "OFL", correct?

MS. CUMMINGS: This should read OFL, and this is ABC. This is annual yield, retained yield, at rebuild, which is the defined ABC for the stock, unless I am misinterpreting this, and our OFL definition is for the projection for retained yield at F SPR 30, the proxy for FMSY.

MR. RINDONE: The OFL is set at the annual yield at the maximum fishing mortality threshold, or the MSY proxy, and then an annual yield for F rebuild, like Nancie said, is 75 percent of F at MSY, or 75 percent of F at 30 percent SPR.

CHAIRMAN POWERS: No.

MS. CUMMINGS: No, Ryan.

CHAIRMAN POWERS: No, it's the F that gets it to --

MR. RINDONE: Sorry. You're right. The F that gets you to rebuild at 2027.

MS. CUMMINGS: Thank you, Chair.

MR. RINDONE: I'm sorry. You're right. The OFL are the values on the top, and the ABC is on the bottom.

MR. ADRIANCE: Sorry that. I was flipping through multiple tables, and I confused myself. Thanks.

MS. CUMMINGS: It's okay. Thank you for the question.

CHAIRMAN POWERS: So, basically, the supposition here is we're not going to go through this defining what ABC is based on some sort of buffer, that that's essentially been defined for us by the objective of rebuilding by 2027, and that default will become the ABC.

MR. RINDONE: Right, and that output is something that's prescribed in the terms of reference for the assessment, and so this is what you guys are supposed to see, is F at rebuild.

CHAIRMAN POWERS: So a proposal? Nobody is excited about this, not even to get to lunch? Doug Gregory.

MR. GREGORY: Thank you, Chair. I don't see us going forward with any sort of average, even if you take an average of the ABCs of the first three years, and it's higher than the first year OFL, and so we're stuck with annual OFLs and ABCs, and I think the question is do we just go for three years or go for five years, but I have no such motion.

CHAIRMAN POWERS: Ryan.

MR. RINDONE: Thank you, Mr. Chair. I think, with some fiddling of the interim analysis schedule to be expected, by 2024, we should have been able to get another interim analysis in front of you guys for this species, for you to, at a minimum, heat check the progress of rebuilding for the stock, and so, as long as you go out to at least 2024, I think you should be covered,

and I'm happy to hear some information from Dr. Siegfried on that, but I would expect us and them to be able to put one together for you guys by that point.

CHAIRMAN POWERS: Thank you. All right. If we do not make a recommendation, presumably the ABC and OFL will remain what it is, but have to be converted into the FES metric, and is that correct?

MR. RINDONE: Sorry. We were conversing here. Can you repeat that?

CHAIRMAN POWERS: The question I have is we're not getting much response, in terms of moving forward, and so, if we do not recommend an OFL or an ABC, then presumably the existing ones remain in place, but those would have to be corrected to the FES metric, and is that correct?

MR. RINDONE: Well, they are currently collected in FES, and then they're back-calibrated to the Coastal Household Telephone Survey data currency. If you guys don't do anything here, as far as recommending a change in the catch limit, the catch limits that we have on the books, by their equivalent, if converted to FES units, would be considerably higher than what's being recommended here, just to put that simple calibration math there in front of you. John, did you want to say something?

DR. FROESCHKE: Just as a follow-up, in the recent past, with all the stocks that we've done assessments and switched from CHTS to FES, they have come with changes in allocation between the sectors as part of the amendment process that we're working on, and we haven't completed any of those.

Since amberjack has a sector allocation, it's likely that that could be a component of the amendment, in which case we would have to come back to the SSC to ask for a review of projections at different allocations as part of the alternative, and so this would be the Alternative 1 in an allocation scenario. If they chose to go with other things, we would still be required to come back. I don't know if that figures into your calculus, but it's likely to require some additional work at any rate.

CHAIRMAN POWERS: Well, my calculus is I'm not hearing much enthusiasm for providing advice. If we do not provide advice, what Ryan said is the existing ABCs and OFLs will be considerably higher. Is that correct?

DR. FROESCHKE: I guess my concern is that the stock, based on

the assessment, is overfished and overfishing, and the current catch levels are too high to end overfishing, and so a recommendation -- Something has to be done, in order to lower the catch levels sufficient to end overfishing and rebuild the stock.

CHAIRMAN POWERS: All right. I guess that's my point.

DR. SIEGFRIED: Mr. Chair, if I can just make a clarification to something, and I think it was Doug that brought up earlier about the fact that we can't really take an average of the ABCs, because it will be larger than the OFLs in any one year, and we can also average the OFLs, and so then I don't think we would have the same issue that he was -- Not we, but you all can average the OFLs and the ABCs, to get a constant catch allowance before the next interim is done, and that has been done with the OFLs in the past.

CHAIRMAN POWERS: Yes, and we know that. Doug Gregory.

MR. GREGORY: I was wrong earlier about that. That was just my way of looking at things to see if taking -- Much like I did with king mackerel and looking at the equilibrium OY, and is that an extreme position, or is it in line, and, of course, an average of the ABCs would be less than the average of the OFLs, and so that would be acceptable, but we do need to make a recommendation.

This body clearly accepted the assessment and claimed that the fishery was overfished and overfishing, and, like John said, we can't go forward saying nothing about OFL and ABC. That would be highly irregular and negligent for a fishery that's been overfished for twenty or thirty years.

CHAIRMAN POWERS: So I will not recognize anybody that doesn't have a motion to recommend an ABC and OFL. Paul Sammarco.

DR. SAMMARCO: Mr. Chairman, in order to get this ball rolling, I would recommend that we accept the recommendations as-is, period, and that will open up the discussion to tweaking these recommendations, as has been discussed over the past half-hour or so.

CHAIRMAN POWERS: You have to be more specific about recommendations for what years, et cetera.

DR. SAMMARCO: Well, there's been a lot of discussion about 2014 and -- I'm sorry. 2024 and 2026, one being an interim year and

the other being another final year review, and those could be used.

CHAIRMAN POWERS: I need something specific to begin this process.

MR. RINDONE: Dr. Sammarco, do you want to recommend catch limits for 2022 to 2024 or from 2022 to 2026?

DR. SAMMARCO: I believe 2022 to 2024 is more realistic.

CHAIRMAN POWERS: All right. Thank you.

DR. SAMMARCO: Then a review again after that period.

CHAIRMAN POWERS: When you accept the recommendations, and we'll probably have to reword this, it's basically -- I mean, typically, when we make these motions, and particularly if there's only three numbers, we list what those numbers are, and I think that's essentially what you're asking for. Is there a second to this?

DR. NANCE: I will second this.

CHAIRMAN POWERS: Okay. Thank you. Let's go ahead and enter in what those numbers are, and these are in millions pounds whole weight. Okay. Thank you. All right. Go ahead, Will.

DR. PATTERSON: The table that Nancie put together, these aren't recommendations. These are just projections based on the parameters that we asked to be projected, and so we need to remove any statement here about recommendations.

CHAIRMAN POWERS: Yes, and it was basically -- It's not accepting it, but it's basically we recommend the amberjack OFL and ABC for 2022 to 2024. Is that our motion that Paul put forward and Jim Nance seconded? Is there other discussion, or is there discussion? Bob Gill.

MR. GILL: Thank you, Mr. Chairman. I am one of those that likes motions that are self-standing, so that anybody that looks at them later understands what goes into them, and, with that in mind, I would suggest that we define what the OFL and ABC are, the yields and the F rebuild yields, et cetera, as part of the motion, and I also suggest that we tie this back to SEDAR 70.

CHAIRMAN POWERS: I am not sure that I understand the first part of that. The OFL and the ABC are as we've defined. Is that not

the case? I am not sure. Can you repeat the --

MR. GILL: I am suggesting that the OFL is the yield at F SPR 30 percent and ABC is the yield at F rebuild, based on rebuilding by 2027.

CHAIRMAN POWERS: Okay. As you wish. If Paul or Jim are amenable to that, can you suggest some exact wording there that we can put in there?

MR. GILL: I can if they are amenable.

DR. NANCE: I am, Bob.

CHAIRMAN POWERS: Okay. Go ahead.

MR. GILL: After "OFL", "is based on the yield at F SPR 30 percent. After "ABC", based on the yield at F rebuild by 2027.

CHAIRMAN POWERS: Okay. Thank you. All right.

DR. NANCE: I'm not sure you can see my hand, Joe.

CHAIRMAN POWERS: I can't see. Go ahead, Jim.

DR. NANCE: I was just going to say that we asked for these projections, and Nancie did a great job in running those, and I don't see any issues with this motion, and so I think it's acceptable to me.

CHAIRMAN POWERS: Thank you. Paul.

DR. SAMMARCO: After the "SSC", would it be appropriate to put in "the SSC accepts and recommends the greater amberjack OFL as based on the yield of F SPR 30 percent and ABC as based on the yield at F rebuild by 2027 as presented by the report for 2022 to 2024", and so it would be the SSC accepts and recommends the greater amberjack OFL as based on the yield at F SPR, blah, blah, blah, ABC as based on the yield at F rebuild by 2027", and would you like to put in something right there that says as reported in such and so, or is that implied?

CHAIRMAN POWERS: That is implied.

DR. SAMMARCO: Okay.

CHAIRMAN POWERS: All right. I think we've reached the end of our rope here, or at least I have.

DR. PATTERSON: Bob Gill recommended that we put the "SEDAR 70" in here, and I think that still needs to be done.

DR. SAMMARCO: Right after "accepts".

CHAIRMAN POWERS: SEDAR 70 didn't provide these projections.

MR. RINDONE: Mr. Chair, the projections aren't directly from the stock assessment, but they do rely on a lot of assumptions that were made based on data that was generated by the model, for what that's worth.

CHAIRMAN POWERS: Well, ultimately, it's the SSC that is making these decisions. Anyway, I can go along with it, I guess. Harry.

MR. BLANCHET: I'm sorry, and I was trying to take my hand back down. If we wanted to add something at the end about those yield streams coming out of the projections provided today, and that is -- I get where you're coming from, that it's not coming from 70, and it's coming from the yield streams that we were given today, but -- Because that was predicated on how we use those historic and interim years to get to where what the status would be when we start implementing those regulations, but I don't know how to frame it more clearly than that.

CHAIRMAN POWERS: I think we're trying to dance on the head of a pin here. We've built a record of what we're doing, what we have done, and our basis for doing that, and I think the motion is pretty self-explanatory. Katie.

DR. SIEGFRIED: Thank you, Chair. Just very briefly, we'll update the Executive Summary for SEDAR 70, and it will include the most recent projections, and so that's where your documentation will occur.

CHAIRMAN POWERS: Is there any other discussion about this motion? If not, then we will vote on the motion. Let me first ask if there are any objections, and I expect that there might be. **Are there any objections to this motion? If there are not, then the motion carries.**

All right. We have almost reached the end of our agenda, and we also have now an opportunity for public comment. Ryan, if we would open the floor for that.

MR. RINDONE: Sure.

CHAIRMAN POWERS: We will give ourselves a little bit of time here, and, in the meantime, we will -- I do want to thank all of the presenters here, and we've had a good mix of topics, both purely scientific and purely mundane management sorts of issues, and I appreciate people's contributions to both of those, and I will try to faithfully present this information to the council at the next meeting.

DR. ANDERSON: Good job.

CHAIRMAN POWERS: Thank you. Public comment, we have Bob Zales. It's nice to hear from you, Bob.

PUBLIC COMMENT

MR. BOB ZALES, III: This is Bob Zales, and I'm down here in Doug Gregory's country, and so I've got problems with logging in and doing everything else technology-wise, but a couple of things.

Number one, on amberjack, clearly this whole amberjack thing has been a cluster since 1990 with the Amendment 1, and I sent an email earlier in the week, and I don't know if you all got it or not, but, in the 1990s, I tagged a lot of amberjack. Two fish that are the most memorable to me that we tagged in Panama City Pass, one was twelve inches, and one was fourteen inches. Three years later, both of those fish were recovered by a boat off of Destin, and fishing the same area that we fished, and they were thirty-two and thirty-four inches.

Now, that told me, back then, that if you've got a fish that will grow up from twelve to thirty-two or thirty-four inches within three years, that, if you're got proper management, you can effectively farm that fish. Well, apparently, all the management that we've tried since that period of time hasn't worked, because we're not able to farm those fish, and we still have an overfished fish, and we've got a fishery that is undergoing overfishing.

We've got our second, at least second, or maybe the third, ten-year rebuilding plan for this fish, and we still are no closer to getting it fixed than we have been in the past, and this is what I kind of relate to as National Marine Fisheries Service cafeteria-style management, where they pick and choose what they want to do and how they want to manage different species.

When you go back to 2007, red snapper was declared as undergoing

overfishing, and the Fisheries Service essentially shut down the quota, and they cut it back so far that private rec people got one or two days of fishing that year, and the charter guys got about six days, and the commercial guys lost a lot of quota. Well, after that year, that fishery started rebounding, and so they stopped overfishing.

Now, with amberjack, we have never done that, and so apparently amberjack is not important enough to the government to do that, but we've got a serious problem, and I blame myself and some other fishermen, because we pushed the council, during these years, to allow us to continue to catch amberjack, but, unknown to us until this recent stock assessment, we never knew that this fishery had been overfished since like the 1950s, from what you were saying, and so this fishery clearly has a problem.

It should be able to be properly managed, to where you can continually harvest some rate of these fish, but we haven't gotten to that point yet, and how we do it I don't know, but the overfishing has got to be addressed, because, with the limited knowledge I've got about fishery management, if you're overfishing a stock, you will never rebuild it, and we have continued to overfish that stock of fish.

When it comes to the issue of carryover, to be sure you all understand where this is, these guys that lease quota, because they can't buy quota, and there is no quota for them to buy, and they have to lease it, year after year, because of their history of fishing, they lease certain amounts that they expect to fish, regardless of what the weather or markets may be.

That's in normal times, but, this past year, with COVID, it killed a lot of our friends, and it killed a lot of our family, and it almost completely destroyed all the markets in this country, and these people leased fish, expecting, prior to COVID, to be able to do what they normally do, and they got caught here, and so they're sitting on quota that they've paid money for that they can't fish.

Now, that quota, what they have leased, their shares, that's within the overall quota, and so, if you let them fish what their shares are that they haven't been able to capture in 2020 and 2021, you're not overfishing the quota, because it's within there, and so I hope all that makes sense, and I appreciate all the work that you all do, and I'm glad that all of you all are healthy.

CHAIRMAN POWERS: Thank you. In terms of the latter aspect,

that's essentially what the SSC is suggesting there, from a conservation standpoint. If you can live within the ABC by carrying it over, fine. Are there any other public comments? If not, then I believe -- This isn't a public comment, but, Paul Sammarco, did you want to make a comment?

DR. SAMMARCO: No, and I was just going to respond to a point that the gentleman made. If I remember correctly, there has been interest by the federal government in mariculture, particularly recently, fish mariculture, and particularly offshore, which is, of course, a challenging area, and I'm not entirely certain whether amberjack is an eligible candidate for that, but I do know that there is interest, and I do know that there was legislation passed within the past five years or so to make it possible to do offshore pelagic mariculture, and so the gentleman might want to chase this down, and this is funding for offshore mariculture. Thank you.

CHAIRMAN POWERS: Thank you. A subject for another time. All right. If there is no other public comment, then, again, I appreciate all the input from both the SSC and the participants, and I am going to move to adjourn, and I'm going to second it, and we will adjourn, and thank you very much.

(Whereupon, the meeting adjourned on January 7, 2021.)

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